NBTP NATIONAL REPORT: 2016 INTAKE CYCLE

Centre for Educational Testing for Access and Placement (CETAP):
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This report is the combined effort of the National Benchmark Tests Project (NBTP) team at UCT.

Mr Emlyn Balarin	Operations Manager
Dr Carol Bohlmann	NBTP Mathematics Research Lead
Mr Peter Chifamba	Data Manager
Ms Janine Dunlop	New Media, Communications and IT Manager
Ms Natalie Le Roux	NBTP Quantitative Literacy Research Lead
Mr Darlington Mutakwa	Statistician
Mr Robert Prince	Test Development Coordinator
Mr Kabelo Sebolai	NBTP Academic Literacy Research Lead

Contents

List of Figures 6
List of Tables 8
Executive Summary 9
1. Introduction 10
2. Purpose of the report 10
Objective 10
Description of the sample 10
Limitations 11
Planned Research 11
3. Description of the tests 12
Purposes of the tests 12
Aims of the tests 12
Test domains 12
Academic Literacy (AL) 12
Quantitative Literacy (QL) 13
Mathematics (MAT) 13
Recommended uses of the tests 14
Inferences to be made from test scores 14
Duration of the tests 15
Language of the tests 15
Test item-types 15
Test scoring 15
Test reporting 15
Test administration 15
Item and test development 16
NBTP annual cycle 16
The NBT benchmarks 16
Institutions and Organizations using the NBT 19
Accessibility of the NBT project 21
4. Demographic characteristics of the 2015 NBTP candidates 23
5. Test performance of the 2016 intake NBTP Candidates 24

Descriptive Statistics 24
2015 NBT Cohort by Performance Levels 26
Performance on NBT by intended faculty 27
AL Performance by intended faculty 28
QL Performance by intended faculty 29
MAT Performance by intended faculty 30
Performance on the NBT by test language 31
AL performance on tests written in Afrikaans and English 32
QL performance on test written in Afrikaans and English 33
MAT performance on test written in Afrikaans and English 34
Comparison: NBT performance levels by intended faculties of study, tests written in English and Afrikaans 35
AL performance by intended faculty of study, tests written in English and Afrikaans 35
QL performance by intended faculty of study, tests written in English and Afrikaans 37
MAT performance by intended faculty of study, tests written in English and Afrikaans 39
Performance profile of South African and non-South African candidates 41
AL Performance by citizenship 42
QL Performance by citizenship 43
MAT Performance by citizenship 44
6. Comparison of the 2016 intake results to the 2015 intake results 45
National Cohort 45
Test Language 47
Citizenship 51
7. Performance on NBT at Subdomain level 54
The construct of the AL test 54
The construct of the QL test 67
The construct of the MAT test 80
8. Performance on the 2016 NBTP HE intake cycle testing and performance in cognate NSC subjects in 2015 93
Minimum Requirements for Admission to the Higher Certificate, Diploma and Bachelor's Degree 94
Notes on the sample used for the analysis in this section 94
Self-reported demographics 96

Descriptive Statistics 97
NBT Benchmarks 99
Associations between scores on the National Benchmark Test in Academic Literacy and the National Senior Certificate Examination for English 100
Associations between scores on the National Benchmark Test in Quantitative Literacy and the National Senior Certificate Examination for Mathematics and Mathematical Literacy 104
Associations between scores on the National Benchmark Test in Mathematics and the National Senior Certificate Examination for Mathematics and Physical Science 107
9. Conclusion 109
10. References 110
Appendix A: BENCHMARK REPORT 2015 112
Appendix B: 10 facts about the accessibility of the NBT 3

LIST OF FIGURES

Figure 1 NBT test centres for the 2016 intake cycle 22
Figure 2 NBT test scores 25
Figure 3 NBT test scores 25
Figure 4 2015 NBT performance levels for AL, QL and MAT 27
Figure 5 2016 NBT Academic Literacy performance levels by intended faculty of study 29
Figure 6 2016 NBT Quantitative Literacy performance levels by intended faculty of study 29
Figure 7 MAT performance levels by intended programme of study, NBT 2016 intake cycle 30
Figure 8 2016 NBT AL Performance Levels by test language 32
Figure 9 2016 NBT QL Performance Levels by test language 33
Figure 10 2016 NBT MAT Performance Levels by test language 34
Figure 11 2016 NBT AL Performance Levels by intended programme of study for Afrikaans writers 35
Figure 12 2016 NBT AL Performance Levels by intended programme of study for English writers .. 36
Figure 13 2106 NBT QL performance Levels by intended faculty of study for Afrikaans writers 37
Figure 14 2016 NBT QL performance Levels by intended faculty of study for English writers 38
Figure 15 2016 NBT MAT performance levels by intended programme of study 39
Figure 16 2016 NBT MAT performance levels by intended programme of study for English writers 40
Figure 17 2015 NBT AL performance levels by citizenship 42
Figure 18 2016 NBT QL performance levels by citizenship 43
Figure 19 2016 NBT MAT performance levels by citizenship 44
Figure 20 Performance in AL, 2015 and 2016 intake cycles 45
Figure 21 Performance in QL, 2015 and 2016 intake cycles 46
Figure 22 Performance in MAT, 2015 and 2016 intake cycles 47
Figure 23 AL performance of Afrikaans candidates 2015 and 2016 intake cycles 48
Figure 24 QL performance of Afrikaans candidates NBT 2015 and 2016 intake cycles 49
Figure 25 MAT performance of Afrikaans candidates NBT 2015 and 2016 intake cycles 50
Figure 26 NBT Academic Literacy performance levels by citizenship 51
Figure 27 NBT Quantitative Literacy performance levels by citizenship 52
Figure 28 NBT Mathematics performance levels by citizenship 53
Figure 29 Allied Healthcare and Nursing sub-domain AL performance, NBT 2016 56
Figure 30 Art and Design sub-domain AL performance, NBT 2016 57
Figure 31 Business/Commerce and Management, AL performance NBT 2016 58
Figure 32 Education, AL performance NBT 2016 59
Figure 33 Engineering and Built Environment, AL performance, NBT 2016 60
Figure 34 AL sub-domain scores for Health Science 61
Figure 35 AL sub-domain scores for Hospitality/Tourism 62
Figure 36 AL sub-domain scores for Humanities 63
Figure 37 AL sub-domain scores for Information and Communication Technology 64
Figure 38 AL sub-domain scores for Law 65

Figure 39 AL sub-domain scores for Science/Mathematics 66
Figure 40 Allied Healthcare and Nursing subdomain QL performance, NBT 2016 69
Figure 41 Art and Design subdomain QL performance, NBT 2016 70
Figure 42 Business/Commerce and Management, QL performance NBT 2016 71
Figure 43 Education subdomain QL performance, NBT 2016 72
Figure 44 Engineering and Built Environment QL subdomain performance, NBT 2016 73
Figure 45 Health Sciences QL subdomain performance, NBT 2016 74
Figure 46 Hospitality and Tourism QL subdomain performance, NBT 2016 75
Figure 47 Humanities QL subdomain performance, NBT 2016 76
Figure 48 Information and Communication Technology subdomain QL performance, NBT 2016 77
Figure 49 Law QL subdomain performance, NBT 2016 78
Figure 50 Science and Mathematics QL subdomain performance, NBT 2016 79
Figure 51 MAT subdomain scores for Allied Healthcare/Nursing 82
Figure 52 MAT subdomain scores for Art/Design 83
Figure 53 MAT subdomain scores for Business/Commerce/Management 84
Figure 54 MAT subdomain scores for Education 85
Figure 55 MAT subdomain scores for Engineering/Built Environment 86
Figure 56 MAT subdomain scores for Health Science 87
Figure 57 MAT subdomain scores for Hospitality/Tourism 88
Figure 58 MAT subdomain scores for Humanities 89
Figure 59 MAT subdomain scores for Information and Communication Technology 90
Figure 60 MAT subdomain scores for Law 91
Figure 61 MAT sub-domain scores for Science/Mathematics 92
Figure 62 2015 NSC/2016 NBT scores 98
Figure 63 2015 NSC/2016 NBT scores 98
Figure 64 NSC cohort performance levels on NBT 100
Figure 65 NSC ENHN against NBT AL 102
Figure 66 Scatterplot NBT AL vs NSC English First Additional Language 103
Figure 67 Scatterplot NBT QL vs NSC Mathematics 105
Figure 68 Scatterplot NBT QL vs NSC mathematical Literacy 106
Figure 69 NBT MAT vs NSC MTHN 107
Figure 70 NSC PSCN vs NBT MAT 108

LIST OF TABLES

Table 1 Description of NBT tests 14
Table 2 NBT overall benchmark descriptors 18
Table 3 NBT benchmarks set in 2012 for degree and diploma/certificate study 18
Table 4 NBT degree Intermediate benchmarks and how they should be interpreted 19
Table 5 Institutions receiving scores from the NBTP, NBT 2015 and 2016 intake cycles 19
Table 6 Number of national test centres and test sessions by province for NBT 2014 intake, NBT 2015 intake and NBT 2016 intake cycles 22
Table 7 Frequency tables for selected self-reported demographic characteristics for the 2016 NBT cohort 23
Table 8 Descriptive statistics for AL, QL and MAT of the 2016 NBT cohort 24
Table 9 Frequency tables for the degree benchmark levels of the 2016 NBT cohort 26
Table 10 Frequency tables of test language 31
Table 11 Descriptive statistics for AL, QL, and MAT of the 2015 NBT cohort by test language 31
Table 12 Number of test writers: SA citizens vs non-SA candidates 41
Table 13 Scores: SA citizens vs non-SA candidates 41
Table 14 Academic literacy skills assessed in the NBT AL 55
Table 15 Competency specification for the Quantitative Literacy test by Mathematical and Statistical Ideas 67
Table 16 Scale of achievement/level descriptors 93
Table 17 Self-reported demographics 96
Table 18 Correlation matrix for NSC 2015 and NBT 2016 results, Diploma/Higher Certificate. 101

EXECUTIVE SUMMARY

The objective of this report is to provide an initial analysis of the National Benchmark Tests written by candidates for entry into higher education institutions in the 2016 academic year. Candidates considered in this report will have written the NBT between 1 May 2015 and 29 February 2016.

In the 2016 National Benchmark Tests (NBT) intake cycle, 81,669 Academic Literacy (AL) test scores, 81,694 Quantitative Literacy (QL) test scores and 59,644 Mathematics (MAT) test scores were obtained. In 2015 these scores were, respectively, 77,108 (AL), 76,693 (QL) and 56,500 (MAT). This suggests that the NBT project is increasing its national footprint within South African high schools and higher education institutions. There were 104 national test sites and 929 test sessions in 2015.

The 2016 NBT cohort consisted of approximately 59% women; approximately 61% were black and 21% white; approximately 95% were South African citizens and approximately 31% reported English as their home language. This information is all based on self-classified data collected at the time the tests were written.

The mean and median scores for AL, QL and MAT are all in the Intermediate band. All scores are provided in the body of the report.

Slightly more than 10% of the national candidates wrote the Afrikaans AL, QL and MAT tests. Their mean and median performance was better than those of the English candidates in each domain.

Candidates intending to study Engineering and Science performed better than those intending to study Humanities and Law in all test domains. The performance of candidates intending to study Education was particularly low.

The 2015 and 2016 intake proficiency categories at national level are quite consistent. Although the 2016 intake results differ slightly from the 2015 intake results, the changes in all domain scores are consistent with the changes that would be expected within a one year period.

The second last section of the report uses national data to show the additional information for teaching and learning that can be obtained from the NBT. Sub-domain analyses in AL, QL and MAT of NBT results from the 2016 intake cohort identified areas of strengths and weaknesses.

The last section of the report investigates the relationships between the NBT domains AL, QL and MAT and cognate NSC subjects: Mathematics, Mathematical Literacy, Physical Science, English Home Language and English First Additional Language for those NBT candidates who also wrote the NSC examinations. This section clearly shows the complementarity of the information provided by the NBT to that provided by the NSC.

NATIONAL BENCHMARK TESTS - IMPROVING ACCESS AND SUCCESS IN HIGHER EDUCATION

1. INTRODUCTION

The National Benchmark Tests Project (NBTP) was commissioned in 2005 by Higher Education South Africa (HESA), now called Universities South Africa. The main objective of the project was to assess the entry level academic skills of students in Academic Literacy (AL), Quantitative Literacy (QL) and Mathematics (MAT). In addition, the project also provided a service to Higher Education Institutions requiring additional information to assist in selection and placement of students in appropriate curricular routes. The project has also assisted with curriculum development through first year teaching and learning forums and in relation to foundation, extended and augmented courses.

The National Benchmark Tests (NBT) are designed to provide complementary criterion-referenced information to supplement norm-referenced school-leaving results such as those provided by the National Senior Certificate (NSC). The NBT assess a candidate's competence in the three domains of AL, QL and MAT. The tests are described below.

2. PURPOSE OF THE REPORT

OBJECTIVE

The objective of this report is to provide an initial analysis of the National Benchmark Tests written by candidates for entry into higher education institutions in the 2016 academic year. Candidates considered in this report will have written the NBT between 1 May 2015 and 29 February 2016.

This report is intended for distribution to Universities South Africa, South African higher education institutions, institutions supporting or complementing higher education in South Africa e.g. Umalusi, government departments, institutions (other than higher education) which make use of the NBT - for example those offering bursaries - and schools.

DESCRIPTION OF THE SAMPLE

The sample considered for the 2016 report consists of all NBT candidates who wrote the tests by 29 February 2016, i.e., not the full 2016 cohort. Outstanding scores consisted of results from special sessions (sessions at the express request of particular institutions). The number of candidates in these sessions was small and should not impact substantially on the results reported below. However, the difference has not been evaluated statistically.

Section 7 considers a subsample of the 2016 NBT cohort relating specifically to candidates who have NSC results as well. More detailed notes on this sample are provided in that section.

LIMITATIONS

The results reported here are limited by the following factors:

- NBT candidates do not indicate whether they intend to study at degree or diploma level. Therefore, apart from Section 7 where NSC data is used, all results are benchmarked against degree level criteria.
- Candidates are asked to indicate their first, second and third choice of faculty to which they have applied or will apply. Only the first choice of intended faculty was used in this analysis. Data are not collected by the NBT Project on actual placement of all the candidates within faculties or institutions. Caution should therefore be used when drawing conclusions based on the results from intended faculty of study.

PLANNED RESEARCH

CETAP does research on the NBT and general preparedness of students beyond that presented in this report. This includes more detailed analysis of the data used in this report and can be requested from the Test Development Coordinator.

3. DESCRIPTION OF THE TESTS

PURPOSES OF THE TESTS

The National Benchmark Tests are designed specifically:

- To perform a function that is complementary to that of the National Senior Certificate. They act as a provider of augmented independent and objective information against which the performance of students on the National Senior Certificate can be compared and calibrated. They assess students' levels of academic readiness at a particular point in time, i.e. prior to possible entry to higher education.
- With the aim of providing information that makes it possible for students to be placed more accurately in programmes of higher education, based on their performance on the tests. The tests comprise constructs in three broad domains, which enable the assessment of students' readiness to cope with differing forms (e.g. mainstream, foundation) of curriculum. Minimum (benchmark) scores on the constructs of the test(s) represent levels at which a student would be expected to perform in order to be deemed "recommendable" for different forms of educational provision.
- The tests are designed to assess entry-level preparedness of students in terms of the key areas of academic literacy, quantitative literacy and mathematics. The domains represent core areas of competency in which students entering any form of higher education would be expected to display minimum levels of proficiency. The tests are criterion-referenced, i.e. they are aimed at assessing students' academic and quantitative literacy and mathematics performance against standard levels of performance regarded by experts in the fields as being acceptable for entry into higher education in the three fields.

AIMS OF THE TESTS

The NBT are aimed at assessing the school-leaving higher education applicant pool, i.e. the national cohort of school-leavers wishing to access higher education in any one year. The tests aim to address the following question:

What are the academic literacy, quantitative literacy and mathematics levels of proficiencies of the school-leaving population, who wish to continue with higher education, at the point prior to their entry into higher education at which they could realistically be expected to cope with the demands of higher education study?

The constructs and domains of the three tests are based on testing this question, and the levels of the tests have been set with the notion of levels of proficiency as focus.

TEST DOMAINS

ACADEMIC LITERACY (AL)

The National Benchmark Test in Academic Literacy aims to assess candidates' ability to:

- read carefully and make meaning from texts that are typical of the kinds that they will encounter in their studies;
- understand vocabulary, including vocabulary related to academic study, in their contexts; identify and track points and claims being made in texts.
- understand and evaluate the evidence that is used to support claims made by writers of texts; extrapolate and draw inferences and conclusions from what is stated or given in text;
- identify main from supporting ideas in the overall and specific organisation of a text;
- identify and understand the different types and purposes of communication in texts;
- be aware of and identify text differences that relate to writers' different purposes; audiences, and kinds of communication.

QUANTITATIVE LITERACY (QL)

The National Benchmark Test in Quantitative Literacy aims to assess candidates' ability to:

- select and use a range of quantitative terms and phrases;
- apply quantitative procedures in various situations;
- formulate and apply simple formulae;
- read and interpret tables, graphs, charts and text and integrate information from different sources; and
- accurately do simple calculations involving multiple steps;
- identify trends and patterns in various situations;
- reason logically;
- understand and interpret information that is presented visually (e.g., in graphs, tables, flow-charts);
- understand basic numerical concepts and information used in text, and do basic numerical manipulations;
- competently interpret quantitative information.

MATHEMATICS (MAT)

The National Benchmark Test in mathematics, referred to as the NBT MAT test, aims to assess candidates' ability with respect to a number of mathematical topics:

- Problem solving and modelling, requiring the use of algebraic processes, as well as understanding and using functions represented in different ways.
- Basic trigonometry, including graphs of trigonometric functions, problems requiring solution of trigonometric equations and application of trigonometric concepts.
- Spatial perception (angles, symmetries, measurements, etc.), including representation and interpretation of two and three dimensional objects; analytic geometry and circle geometry.
- Data handling and probability.
- Competent use of logical skills.

It is not the intention of the MAT tests to replicate either the NSC or the Mathematics Olympiad. The point of departure of the tests is the expectations of the Curriculum and Assessment Policy Statement (CAPS). The Department of Basic Education provides educators with a pace-setter document which guides the planning of lessons in order to assist them to complete the curriculum before the period of revision and final examinations. The NBT MAT tests are designed with the pace-setter document in mind. The assumption is made that if a student is to achieve a competent pass in the NSC, a certain level of content and procedural competence will have been reached by the time the first MAT tests are written. The MAT tests are explicitly designed to probe higher education competencies (i.e. depth of understanding and knowledge) within the context of the NSC curriculum.

RECOMMENDED USES OF THE TESTS

As stated above, the tests are recommended for use as an assessment of students' levels of readiness to cope with the typical demands of higher education in the three domains specified. Whereas the two literacy tests are recommended for use for all prospective higher education students, the mathematics test should typically be administered to students who wish to study courses with greater demand for mathematical competence.

Benchmark levels on the tests are intended for use in placing students in different forms of higher education curriculum provision, with different levels of possible support.

INFERENCES TO BE MADE FROM TEST SCORES

As the NBT are criterion-referenced tests, inferences about the results of writers of the tests should be focused on interpreting the extent to which students have met the expected standards set for each domain, and on the extent to which curriculum provision will be able to support students who are deemed not to be competent to cope with the demands of mainstream higher education provision without appropriate levels of support. It is appropriate to interpret certain (lower) levels of performance on the tests as meaning students will require extensive levels of academic support if they are going to cope with the demands of higher education.

Table 1 shows the interpretations of the benchmark levels of performance, aligned to the level of institutional response deemed appropriate to meet candidates' educational needs.

Table 1 Description of NBT tests

Academic and Quantitative Literacy test (3 hours) The results of the two sections of the AL and QL tests are reported separately as percentages and benchmark levels.	**The test targets students'** o Capacity to engage successfully with the reading and reasoning demands of academic study in the medium of instruction; and o ability to solve problems in a real context that is relevant to higher education study, using basic quantitative information that may be presented verbally, graphically, in tabular or symbolic form as related to both the NSC subjects of Mathematics and Mathematical Literacy.
The Mathematics test (3 hours) The results of the test are reported as a percentage and in terms of benchmark levels.	**The test targets candidates' ability** related to mathematical concepts formally regarded as part of the secondary school Mathematics curriculum.

DURATION OF THE TESTS

The two test domains, Academic Literacy (AL) and Quantitative Literacy (QL), have been compiled into one test, namely the Academic and Quantitative Literacy (AQL) test, and the Mathematics (MAT) domain is administered as a separate test. The two tests are administered separately and are three hours duration each, written on the same day. All applicants will write the Academic and Quantitative Literacy (AQL) Test. The proportions of items in each domain of this test are as follows: Academic Literacy 60 – 70%; Quantitative Literacy 30 – 40%. The AL component of the AQL test currently consists of 74 items and the QL component of the test currently consists of 50 items. Time allocation for the AL and QL sections of the test is two hours and one hour, respectively. The MAT test consists of 60 items. The results of each test domain are reported separately. At the request of certain organisations or departments some candidates will write only the AL or QL test. However, as stated above, the tests have been designed to be written as a set.

LANGUAGE OF THE TESTS

The tests are available in English and Afrikaans - the two languages of instruction in higher education in South Africa.

TEST ITEM-TYPES

Test questions are select response (multiple-choice) items, with four options for each item.

TEST SCORING

Writers' responses are recorded on mark-reading sheets that are scanned using Optical Scanner technology. Responses are scored using the uni-dimensional three parameter (a, b, c[1]) Item Response Theory (IRT) model for the AL, QL and MAT tests.

Items are scored dichotomously, i.e. either as right or wrong. Since all tests are power tests, missing responses are scored as wrong. This is valid, given that piloting and the experience of several years shows that sufficient time has been allocated to each of the domains.

TEST REPORTING

Test results are reported to institutions and candidates in two forms: as two (AL / QL) or three (AL / QL / MAT) scores as a percentage as well as by benchmark category. As Table 2 indicates, they are also informed about the level of institutional response deemed appropriate to meet educational needs.

TEST ADMINISTRATION

The tests are pencil-and-paper instruments and are administered under standardised conditions, as set out in a Test Administration Manual. These procedures are the same as those under which the pilot tests were administered, and which have remained unchanged since the tests first became operational

[1] Where a = discrimination, b = difficulty, and c = guessing/pseudo-chance.

in 2009. These procedures are available from the Centre for Educational Testing for Access and Placement (CETAP) at UCT.

ITEM AND TEST DEVELOPMENT

Item and test development teams are comprised of academics from all higher education institutions in South Africa as well as practising teachers. In addition to calls on academics to put themselves forward and participate in these teams, the NBTP regularly appeals to senior academic staff (relevant Deputy Vice Chancellors and Deans) to identify appropriate staff. Ongoing efforts are made to ensure the teams are representative of all higher education institution types and disciplinary areas. To date, around 400 academics have participated in one or more ways in the NBTP.

The teams are constructed on the basis of the expertise of the participants in what constitutes proficiency of test writers at the school-leaving stage wishing to enter higher education. Language and disciplinary experts drawn from outside the test development teams function as reviewers of the tests in terms of their language, content and format appropriateness, construct representation, and bias and fairness. Items are assessed by review panels constituted from academics and teachers for bias, fairness, content and construct representation, and statistical processes (Item Response and Classical Test Theory) are used to investigate any Differential Item Functioning.

The item and test development and review cycle relating to the tests featured in this report was carried out from November 2014 to February 2015. The NBTP organised and hosted item and test review workshops for AL, QL and MAT for the 2017 intake cycle tests. Item and test review reports are available on request from the CETAP Test development coordinator.

NBTP ANNUAL CYCLE

The NBTP follows an annual cycle of:

- Item development and item review workshops;
- Populating the Item Banks;
- Test assembly and preparation of tests in each domain for each testing session;
- Test administration, scoring, and score reporting to writers and institutions;
- Data analysis as part of continual item and test development and improvement;
- Contribution towards the NBT Stakeholders Consultative Forum;
- Annual reporting to Universities South Africa;
- Dissemination of information about the NBTP to the higher education sector, the Department of Higher Education and Training sector (DoHET) and the Department of Basic Education (DBE);
- Revision and resetting of benchmarks for Degree and Diploma study every three years.

THE NBT BENCHMARKS

The NBTP aims to deliver information against benchmarked categories of performance for formal study at institutions of higher learning. Table 2 provides a description of benchmark levels and what

institutional response to candidates performing at these levels should be. More detailed description of benchmark levels for each of the NBT domain tests is provided in Appendix A of this report.

Table 2 NBT overall benchmark descriptors

	100%	
Proficient		Performance in domain areas suggests that academic performance will not be adversely affected in cognate domains. If admitted, students should be placed on regular programmes of study.
Intermediate		Challenges in domain areas identified such that it is predicted that academic progress in cognate domains will be affected. If admitted, students' educational needs should be met in a way deemed appropriate by the institution (e.g. extended or augmented programmes, special skills provision).
Basic		Serious learning challenges identified. Students will not cope with university study.
	0%	

The score range at which the benchmarks are defined were first set in May 2009 by panels drawn from across the country, comprising academics who were at that stage engaged in mainstream teaching relevant to the domain and who had not previously been involved in any NBTP test development processes. Benchmarks are revised every three years, as part of good testing practice. Benchmarks were last set in 2012, and were set again in October 2015. More detailed description of benchmark levels for each of the NBT domain tests set in October 2015 is provided in Appendix A of this report. Table 3 shows the benchmarks for degree study as well as those for diploma/certificate study which was set in 2012 and used to determine the proficiency of the 2016 intake candidates.

Table 3 NBT benchmarks set in 2012 for degree and diploma/certificate study

Proficient	100	Test performance suggests that future academic performance will not be adversely affected (students may pass or fail at university, but this is highly unlikely to be attributable to strengths or weaknesses in the domains tested). If admitted, students may be placed into regular programmes of study. Degree: AL [64%]; QL [70%] MAT [68%] Diploma/Certificate: AL [64%]; QL [63%] MAT [65%]
Intermediate		The challenges identified are such that it is predicted that academic progress will be adversely affected. If admitted, students' educational needs should be met as deemed appropriate by the institution (e.g. extended or augmented programmes, special skills provision). Degree: AL [38%]; QL [38%]; MAT [35%] Diploma/Certificate: AL [31%]; QL [34%] MAT [35%]
Basic	0	Test performance reveals serious learning challenges: it is predicted that students will not cope with degree-level study without extensive and long-term support, perhaps best provided through bridging programmes (i.e. non-credit preparatory courses, special skills provision) or FET provision. Institutions admitting students performing at this level would need to provide such support themselves.

In addition, the Intermediate performance band is divided into Upper and Lower Intermediate as shown in Table 4. The Intermediate band represented the majority of the applicant pool, and this is the pool for which educational institutions should be prepared to address educational needs with extended or augmented support programmes to enable students to succeed in their degree studies.

Table 4 NBT degree Intermediate benchmarks and how they should be interpreted

	Upper intermediate	Assessment of need	Lower Intermediate	Assessment of need
AL	Degree: [51-63] Diploma/Certificate: [48-63]	Students are likely to need complementary support (additional tutorials, workshops, augmented courses, language intensive work)	Degree: [38-50] Diploma/Certificate: [31-47]	Students need to be placed in an extended programme
QL	Degree: [54-69] Diploma/Certificate: [49-62]		Degree: [38-53] Diploma/Certificate: [34-48]	
MAT	Degree: [52-67] Diploma/Certificate: [50-64]		Degree: [35-51] Diploma/Certificate: [35-49]	

INSTITUTIONS AND ORGANIZATIONS USING THE NBT

Twenty-nine institutions requested and received scores from the NBTP during the 2016 intake cycle. A short survey of institutions using the NBT was undertaken in 2013. The survey indicated that the NBT was used for a variety of reasons by institutions (and, in many cases, in different ways by individuals or faculties or departments within an institution). These reasons included admission, placement, research and bursary allocation.

The project undertook to update this survey during 2015 and will report on the results in October, 2016.

Table 5 Institutions receiving scores from the NBTP, NBT 2015 and 2016 intake cycles

Institution	NBT Candidates	AL Scores	QL Scores	MAT Scores
AllanGray	16	16	16	16
Anderson HS	30	30	30	14
Bishops	154	154	154	133
Chisipite HS	55	55	55	35
Christel House	27	27	27	11
CPUT	665	665	665	437
CUT	718	718	718	593
Deutsche	14	14	14	10
DUT	1,178	1,178	1,178	9
Exxaro	373	373	373	371
GillNet	106	106	106	106
Glencore	26	26	26	26
Helderberg	59	59	59	0
Investec	46	46	46	46
Kutlwanong	1796	1796	1796	1784

Monash	78	78	78	0
PeterHouse	78	78	78	52
Rhodes	2741	2741	2741	2078
Rosebank	55	55	55	0
Ropyal Bafokeng Mines	18	18	18	18
SAICA	469	469	469	469
Saldanha	73	73	73	15
Shawco	331	331	331	331
Sisekelo School	62	62	62	37
Stellenbosch	19699	19698	19698	16276
StudieTrust	28	28	28	28
Ubunye	41	41	41	11
UCT**	81745	81669	81694	59644
UFH	1872	1872	1871	1192
UFS	12554	12554	12551	9417
UJ	22208	22208	22207	17578
UP**	81745	81669	81694	59644
UP100	186	186	186	186
Upper Mupako High School	20	20	20	20
UWC	10,074	10,074	10,073	7,274
Varsity College	2765	2765	2765	714
Vega Bordeaux	188	188	188	4
Venda	100	100	100	0
VUT	405	405	405	254
WITS	29984	29984	29940	26028
ZimBCBC	33	33	33	26
Zim Midlands	19	19	19	18
Zim Arundel	80	80	80	60
Zim Chisipite	41	41	41	18
Zim SJC	192	192	192	157
Zim SGC	97	97	97	83
**** All scores provided through Peoplesoft System**				

ACCESSIBILITY OF THE NBT PROJECT

In the 2016 intake cycle testing 27 different AQL tests were written by 81,699[2] candidates and 26 different MAT tests were written by 59,644 candidates (different tests are written to maintain the security and integrity of the tests). This represents an almost 6% increase in the number of candidates from 2015.

The NBT places great importance on the accessibility of the tests, and, in particular searches for ways to expand the number of test centres, particularly in the rural areas. In the 2016 intake test cycle, the project increased the number of test centres and test sessions in the following regions:

The Eastern Cape centres by 14% and sessions by 44%

Free State centres by 50% and sessions by 76%

Gauteng centres by 10% and sessions by 16 %

Mpumalanga centres by 14% and sessions by 42%

Nationally the number of test centres has increased by 6% and the number of sessions by 9%

Plans are in place to expand our footprint in the coming year.

Table 6 below provides details of the number of national test sessions and test centres by provinces, and Figure 1 below illustrates this graphically.

Appendix B provides more information on the accessibility of the NBT.

[2] Although the AL and QL tests are designed to be written together, certain institutions, administering special sessions of the tests, instruct candidates to write only one. The total number of tests administered therefore differs from the total number of candidates in the sample.

Table 6 Number of national test centres and test sessions by province for NBT 2014 intake, NBT 2015 intake and NBT 2016 intake cycles

Province/ Region	Province	Number of NBT test centres in 2015	Number of NBT test sessions in 2015	Number of NBT test centres in 2016	Number of NBT test sessions in 2016	Percentage change Number of NBT test centres	Percentage change Number of NBT test sessions
EASTERN CAPE	EC	14	109	16	157	14%	44%
FREE STATE	FS	4	41	6	72	50%	76%
GAUTENG	GP	10	117	11	136	10%	16%
KWAZULU-NATAL	KZN	19	132	19	146	0%	11%
LIMPOPO	LP	4	54	4	61	0%	13%
MPUMALANGA	MP	7	48	8	68	14%	42%
NORTHERN CAPE	NC	6	38	6	46	0%	21%
NORTH-WEST	NW	3	27	3	35	0%	30%
WESTERN CAPE	WP	13	128	13	141	0%	10%
INTERNATIONAL	International	15	155	15	67	0%	-57%
Grand Total		95	849	101	929	6%	9%

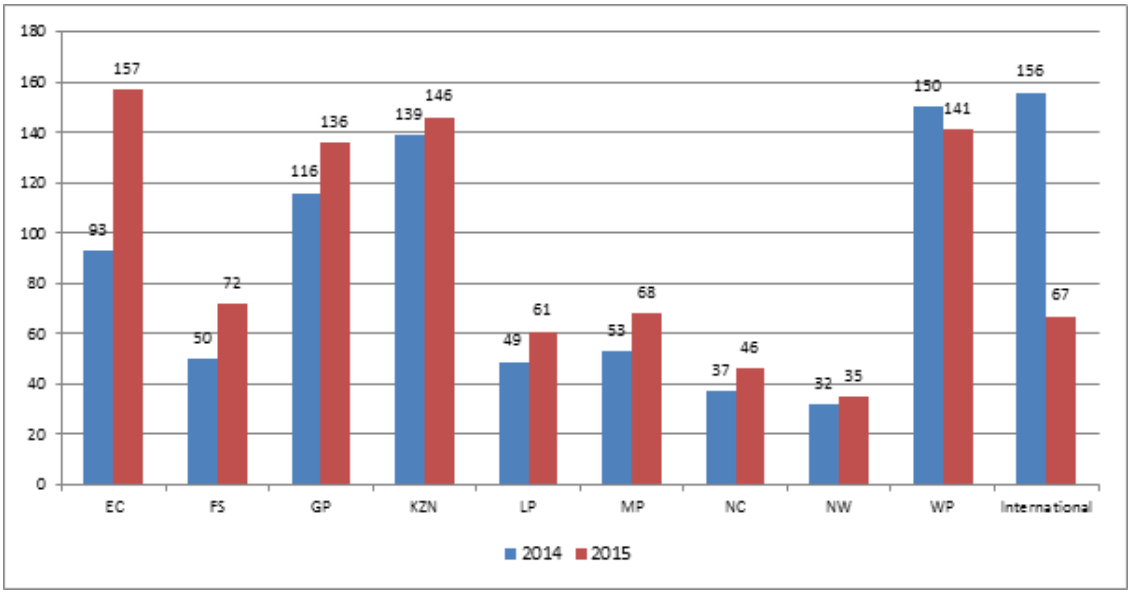

Figure 1 NBT test centres for the 2016 intake cycle

4. DEMOGRAPHIC CHARACTERISTICS OF THE 2015 NBTP CANDIDATES

Candidates writing the NBT in the 2015 intake cycle provided demographic information through self-reporting. The demographic information is provided when the candidates write the actual tests.

Selected self-reported demographic characteristics are reported in Table 7. The table reflects the frequencies based on writers of each test. For example, the subsample of AL writers consisted of 41% women, and 61% indicated their population group as black.

Table 7 Frequency tables for selected self-reported demographic characteristics for the 2016 NBT cohort

	Wrote AL		Wrote QL		Wrote Maths	
	Count	**%**	**Count**	**%**	**Count**	**%**
GENDER						
Male	33,511	41.03	33,527	41.04	26,136	43.82
Female	48,118	58.92	48,127	58.91	33,485	56.14
Missing	40	0.0500	40	0.0500	23	0.0400
Total	81,669	100	81,694	100	59,644	100
POPULATION GROUP						
Black	49,590	60.72	49,564	60.67	37,251	62.46
Coloured	9,670	11.84	9,673	11.84	5,739	9.620
Indian/Asian	5,315	6.510	5,317	6.510	4,281	7.180
White	16,741	20.50	16,785	20.55	12,127	20.33
Other	353	0.430	355	0.430	246	0.410
Missing						
Total	81,669	100	81,694	100	59,644	100
CITIZENSHIP						
South African	77,477	94.87	77,494	94.86	56,365	94.50
SADC county	2,776	3.400	2,780	3.400	2,205	3.700
Other African country	772	0.950	772	0.940	586	0.980
Other	644	0.790	648	0.790	488	0.820
Total	81,669	100	81,694	100	59,644	100
GR 12 LANGUAGE						
Afrikaans	9,162	11.22	9,163	11.22	6,135	10.29
English	70,737	86.61	70,759	86.61	52,174	87.48
Other	1,770	2.170	1,772	2.170	1,335	2.240
Total	81,669	100	81,694	100	59,644	100
HOME LANGUAGE						
Afrikaans	9,962	12.20	9,963	12.20	6,761	11.34
English	25,269	30.94	25,312	30.98	17,687	29.65
isiNdebele	757	0.930	761	0.930	608	1.020
isiXhosa	10,417	12.76	10,415	12.75	7,235	12.13
isiZulu	9,633	11.80	9,623	11.78	7,038	11.80
Sesotho	6,136	7.510	6,131	7.500	4,420	7.410
Sesotho sa Leboa	5,632	6.900	5,629	6.890	4,727	7.930
Setswana	4,371	5.350	4,365	5.340	3,256	5.460
siSwati	1,855	2.270	1,855	2.270	1,501	2.520
Tshivenda	2,745	3.360	2,747	3.360	2,466	4.130
Xitsonga	3,066	3.750	3,067	3.750	2,491	4.180
Other Language	1,826	2.240	2.240	100	1,454	2.440
Total	81,669	100	81,694	100	59,644	100

5. TEST PERFORMANCE OF THE 2016 INTAKE NBTP CANDIDATES

The tests were made available in both English and Afrikaans, the two official languages of instruction at South African Higher Education Institutions for the 2016 intake cycle. For the 2016 intake, registration opened on the 1st of April 2015.

Institutions and number of candidates writing different tests are shown in Table 5 above. The scores indicated below shows the scores of candidates that wrote the NBTs by 29 February 2016.

It is encouraging that the uptake of NBT is on the increase. The number of AL scores increased from 77,108 in 2015 to 81,669 in 2016, an increase of 4,561 (5.9%) in one year. The number of QL scores increased from 76,693 in 2015 to 81,694 in 2015, an increase of 5,001 (6.5%) in one year. The number of MAT writers increased from 56,500 in 2015 to 59,644 in 2016, an increase of 3,144 (5.6%) in one year. The NBT candidates represent the demographic characteristics of the national higher education applicant cohort.

The actual number of 2016 intake cycle test scores is slightly larger because the scores of the candidates who wrote the NBT after 29 February 2016 but before the 2016 intake cycle are not included in the 2016 intake cycle report.

The NBT candidates include both those who wrote as part of their application for tertiary study and those who wrote for placement purposes after admission. This section reports the descriptive statistics for the three NBT scores as well as the frequency tables for the benchmark bands. Table 8 shows the descriptive statistics for the cohort as a whole. Both the mean and median scores fall within the Intermediate benchmark categories for all three domains, as in 2015. The distributions on both the QL and MAT were positively skewed (see histograms).

DESCRIPTIVE STATISTICS

Table 8 Descriptive statistics for AL, QL and MAT of the 2016 NBT cohort

NBT Test	n	Mean	SD	Minimum	1st Quartile	Median	3rd Quartile	Maximum
AL	81669	54.75	14.39	14	43	54	66	95
QL	81694	46.29	15.60	5	34	42	56	98
MAT	59644	40.40	16.59	2	27	34	49	97

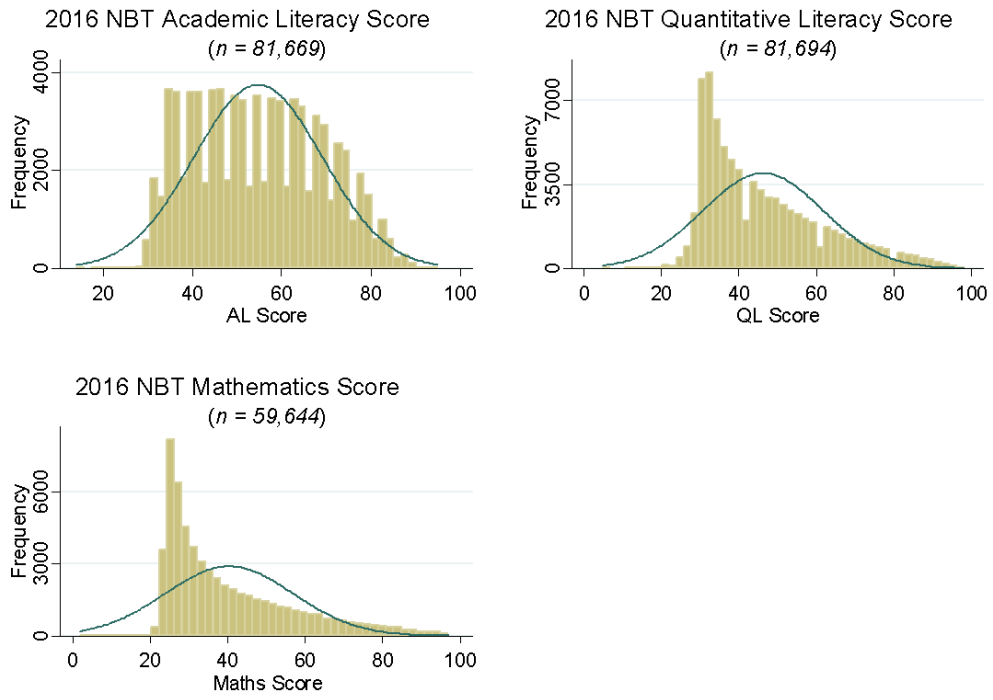

Figure 2 NBT test scores

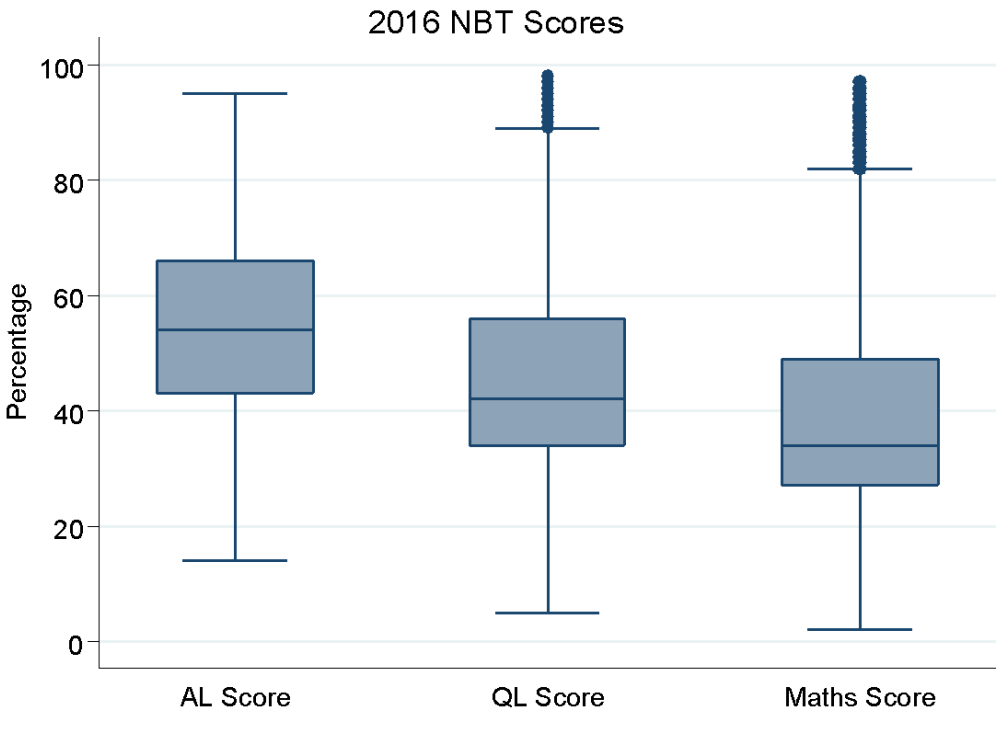

Figure 3 NBT test scores

2015 NBT COHORT BY PERFORMANCE LEVELS

Table 9 represents the performance within criterion-referenced degree benchmark levels for the 2016 NBT cohort as a whole. These candidates were placed into four degree benchmark levels: Basic, Intermediate Lower, Intermediate Upper and Proficient. The interpretation of benchmark levels was discussed in section 3.3.14 of this document.

Table 9 Frequency tables for the degree benchmark levels of the 2016 NBT cohort

NBT tests	Basic	Intermediate Lower	Intermediate Upper	Proficient	Total (N)
Academic Literacy	11,257 (13.78%)	23,437 (28.70%)	22,399 (27.43%)	24,576 (30.09%)	81,669
Quantitative Literacy	31,442 (38.49%)	27,402 (33.54%)	14,338 (17.55%)	8,512 (10.42%)	81,694
Mathematics	29,935 (50.19%)	15,611 (26.17%)	8,710 (14.60%)	5,388 (9.03%)	59,644

The performance of the 2016 cohort strongly suggests that higher education institutions need to be prepared to provide extensive support in QL and MAT, since as many as ninety percent (90%) of their prospective students are likely to fall within the Basic and Intermediate benchmark bands.

Intermediate band

Table 9 above shows that 56% of candidates had scores in the Intermediate benchmark level for AL and 50% of candidates had scores in the Intermediate benchmark level for QL, while 41% of the MAT candidates were in the Intermediate category.

Basic band

The number of candidates in the Basic band changed slightly from 2015. For AL, 14% of candidates were in the Basic category in 2016 compared to 15% in 2015; 38% of QL writers were in the Basic category compared to 40% in 2015; 50% of MAT writers were in the Basic category compared to 45% in 2015. The prediction is that these candidates will require extensive support if they are to have a chance of succeeding in higher education degree study.

Proficient band

The Proficient band can be interpreted to mean that academic progress in higher education ought not to be limited or negatively affected by ability in this domain. As can be seen from Table 9 above and Figure 4 below, the percentage of Proficient candidates in QL and MAT is quite low, being 10% for QL, and 9% for MAT. Although the percentage of Proficient candidates in AL is higher, at approximately 30%, it is also still not the majority.

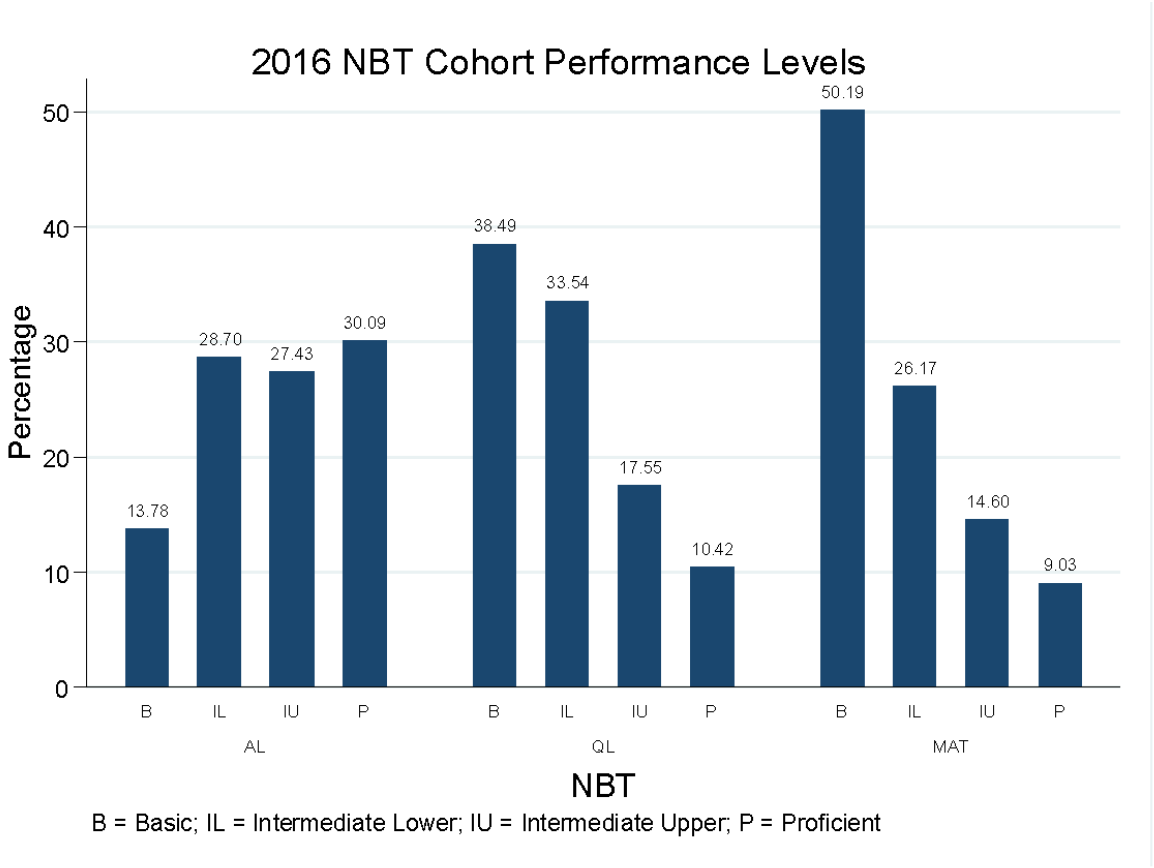

Figure 4 2015 NBT performance levels for AL, QL and MAT

PERFORMANCE ON NBT BY INTENDED FACULTY

Candidates are asked to indicate their first, second and third choice of faculty to which they have applied or will apply. Only the first choice of intended faculty was used in this analysis. All applicants to the majority of Health Science faculties are required to write the NBTs as part of the admission requirements. The use of NBT for admission, placement and teaching and learning in other programmes varies across institutions and faculties. Degree benchmarks are applied in this section as we do not know which programme of study candidates will embark upon. In section 8, Degree and Diploma/Higher certificate benchmarks will be reported separately when the NSC subsample is considered and reported depending on how the NSC was achieved.

AL PERFORMANCE BY INTENDED FACULTY

Figure 5 below reports the NBT AL performance levels by intended faculty. The general pattern was that the highest proportion of the scores in the Proficient band tended to be for candidates who intended to enrol in Art and Design (35%), Engineering/Built Environment (31%), Health Science (32%), Hospitality and Tourism (34%), and Law (41%). Furthermore, the highest proportion of the scores within the Intermediate Upper band were for candidates intending to enrol in Art and Design (30%), Business/Commerce/Management (31%) and ICT (31%). It is further evident from the graph that the largest proportion of the scores in the Intermediate Lower band were those for candidates intending to enrol in the faculties of Art and Design (38%), Education (37%), Humanities (31%), Science and Maths (31%) and Other (36%). Lastly, the largest proportion of the scores in the Basic band was those for candidates intending to study in the faculties of Allied Healthcare/Nursing (35%), Education (24%) and Other (23%).

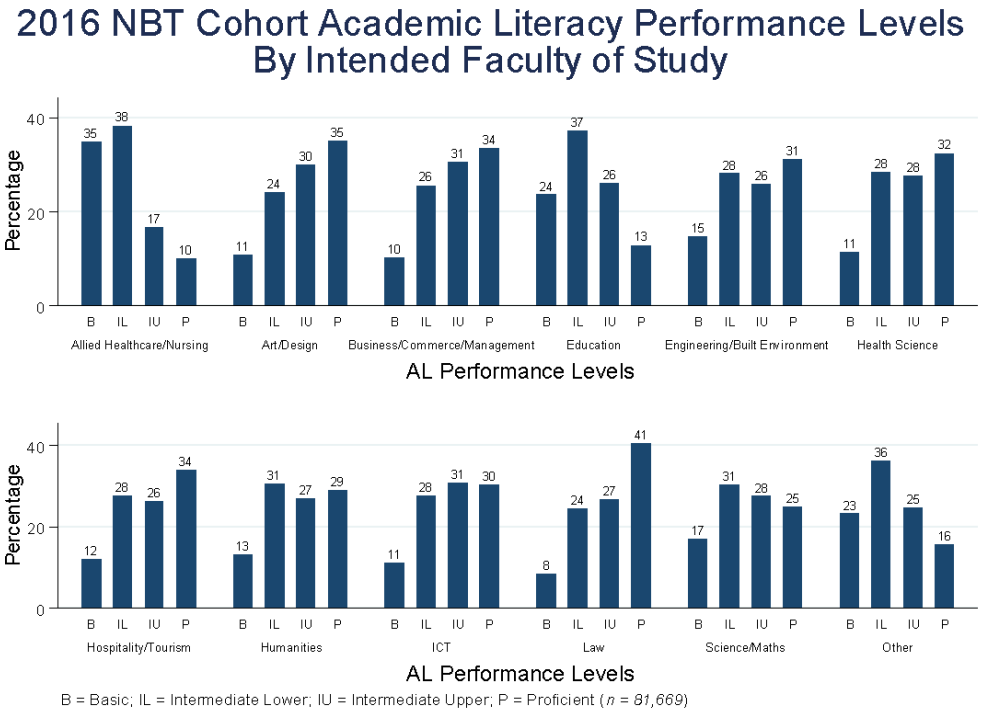

Figure 5 2016 NBT Academic Literacy performance levels by intended faculty of study

QL PERFORMANCE BY INTENDED FACULTY

Figure 6 shows the QL performance of candidates across all the faculties. The performance was considered low. For the faculties of Education and Allied Health/Nursing more than 60% of the candidates were within the Basic performance bands.

Proficient band

The proportion of candidates in the Proficient band for Law (20%) Health Sciences (10%), Humanities (14%) and Science-related subjects was below 20%. Of the proportion of candidates applying to the faculty of Engineering and Built Environment, only 17% were in the QL Proficient band. The small proportion of candidates who are Proficient in the various faculties is an indication of the proportion of candidates that would be able to cope with academic study at university and would not require QL support. The faculties of Engineering and Built Environment (29%), and Law (25%) had the smallest proportions of candidates in the Basic performance band.

Intermediate band

The candidates who were in the Lower Intermediate performance bands such as Health Sciences (37%), Engineering and Built Environment (33%), ICT (36%), and Science and Maths (32%) is an indication of the proportion of candidates that would require additional QL support whilst undertaking their academic studies at universities, since most of their courses are reliant on quantitative literacy.

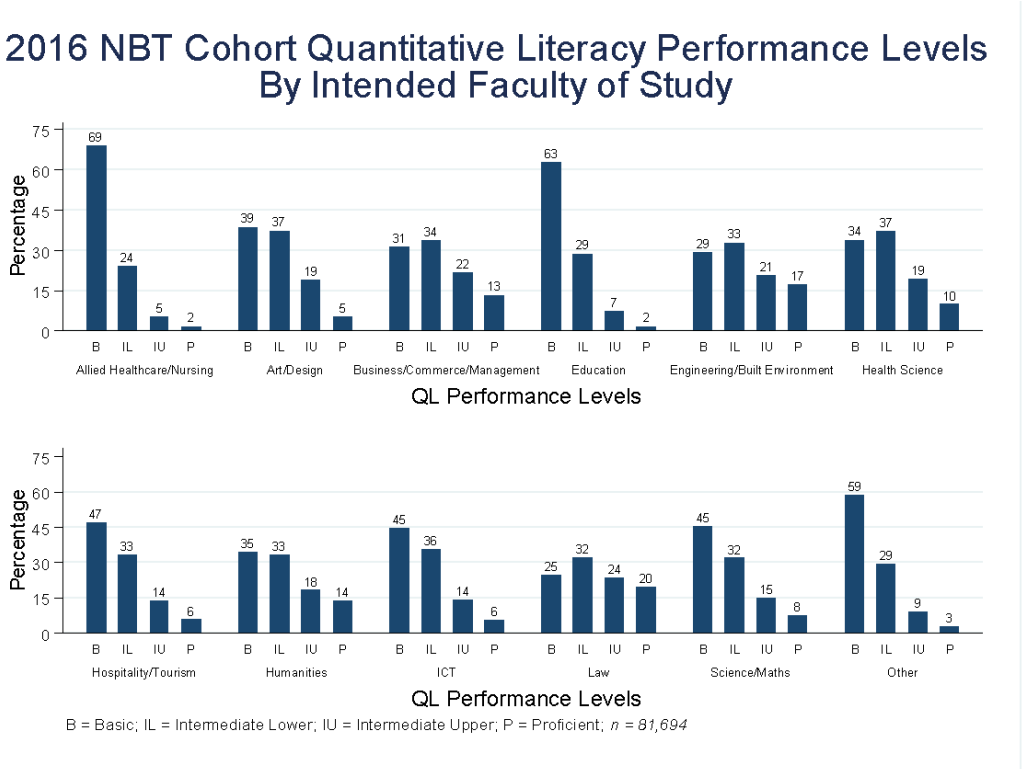

Figure 6 2016 NBT Quantitative Literacy performance levels by intended faculty of study

MAT PERFORMANCE BY INTENDED FACULTY

Figure 7 indicates that MAT proficiency is very low among all the candidates.

Proficient band

The highest numbers of Proficient scores in MAT are among those candidates intending to study Law (15%), and Engineering and Built Environment (13%). In Allied Healthcare and Nursing, the number of Proficient scores in MAT is close to 1%. This would be a matter of concern if any of these programmes include mathematics courses. The percentage is the same in Education, and this certainly presents a problem if a sizeable proportion of these candidates are intending to become mathematics teachers.

Basic band

The highest percentages of scores in the Basic group in MAT represent candidates intending to study Allied Healthcare and Nursing, and Education.

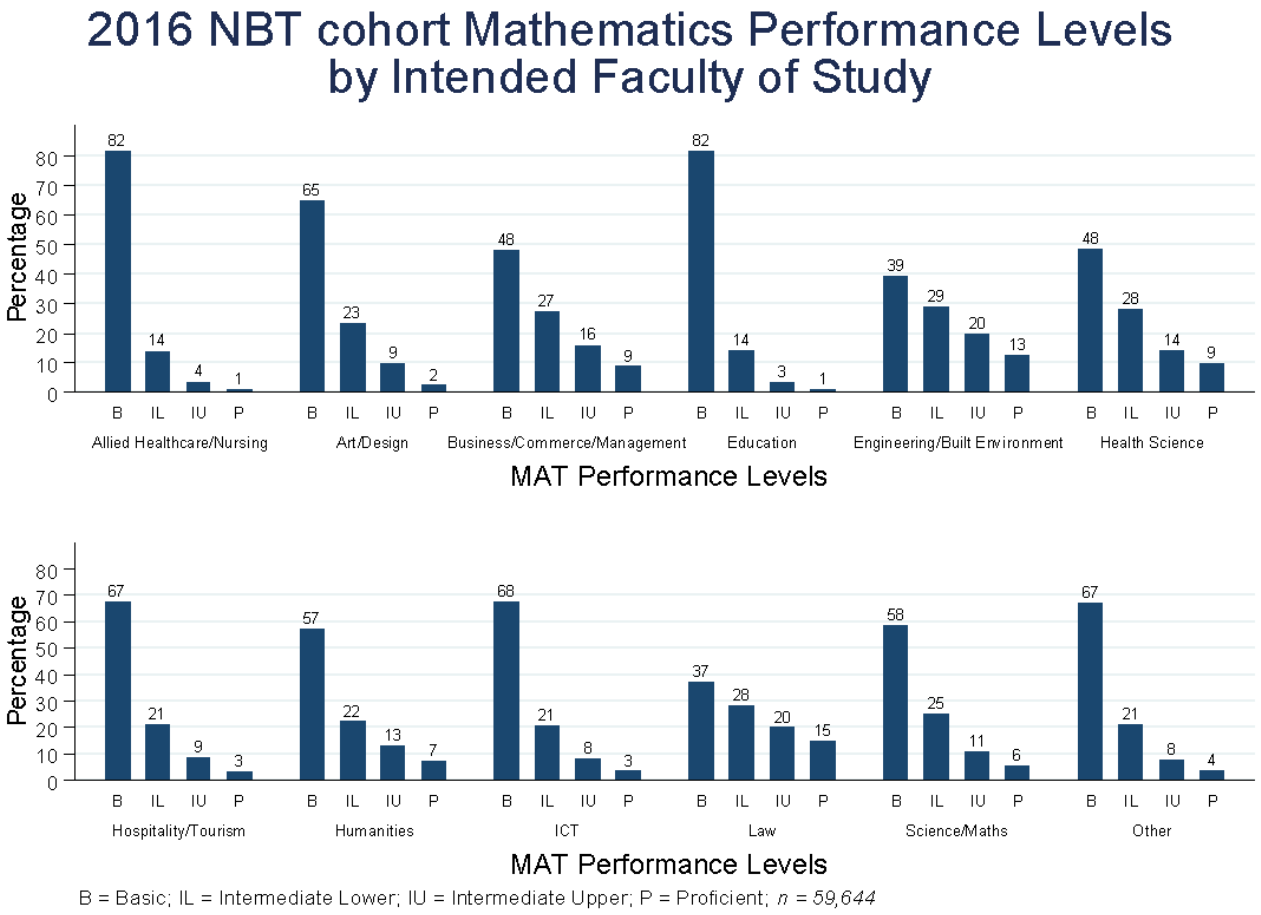

Figure 7 MAT performance levels by intended programme of study, NBT 2016 intake cycle

PERFORMANCE ON THE NBT BY TEST LANGUAGE

This section reports a comparison in performance by candidates who wrote the NBT in English and Afrikaans. A total of 7,707 and 7,706 (9.44% and 9.43%) candidates, respectively, wrote the NBT AL and NBT QL in Afrikaans while 5,482 (9.19%) candidates wrote the NBT MAT in Afrikaans. This information is summarised in Table 10 below.

Table 10 Frequency tables of test language

	Wrote AL		Wrote QL		Wrote MAT	
AQL/MAT test language	**Count**	**%**	**Count**	**%**	**Count**	**%**
Afrikaans	7707	9.44	7706	9.43	5482	9.19
English	73962	90.56	73988	90.57	54161	90.81
Total	81669	100.00	81694	100.00	59643	100.00

Table 11 reports the descriptive statistics for the 2016 Afrikaans and English NBT cohort. Inspection of the means suggests that the Afrikaans cohort obtained higher mean scores on all the tests compared to the English cohort. Analysis of the tests has shown that at item and test level, there is no language DIF (differential item functioning or commonly referred to as bias). Factors beyond the test may therefore explain any statistically significant performance differences between those who wrote the test in English and those who wrote it in Afrikaans, but further research and analysis is required (including testing the significance of the difference).

Table 11 Descriptive statistics for AL, QL, and MAT of the 2015 NBT cohort by test language

NBT Test	**Test language**	**n**	**Mean**	**SD**	**Min.**	**1st Quartile**	**Median**	**3rd Quartile**	**Max.**
AL	Afrikaans	7707	61.57	10.91	21	55	63	69	92
	English	73962	54.04	14.52	14	42	53	65	95
QL	Afrikaans	7706	54.20	16.61	15	39	53	67	97
	English	73988	45.46	15.26	5	33	41	54	98
MAT	Afrikaans	5503	48.74	17.94	10	33	47	61	97
	English	54141	39.55	16.20	2	27	34	48	97

AL PERFORMANCE ON TESTS WRITTEN IN AFRIKAANS AND ENGLISH

As shown in Figure 8 below, 2.56% of Afrikaans writers of NBT AL were in the Basic category as compared to 14.95% of the English writers. 13.86% of the former were in the Intermediate Lower band as compared to 30.24% of the latter group. 35.68% of the Afrikaans candidates were in the Intermediate Upper category when compared to 26.57% of the English writers. Lastly, 47.90% of the Afrikaans group were in the Proficient band as compared to 28.24% of the English group.

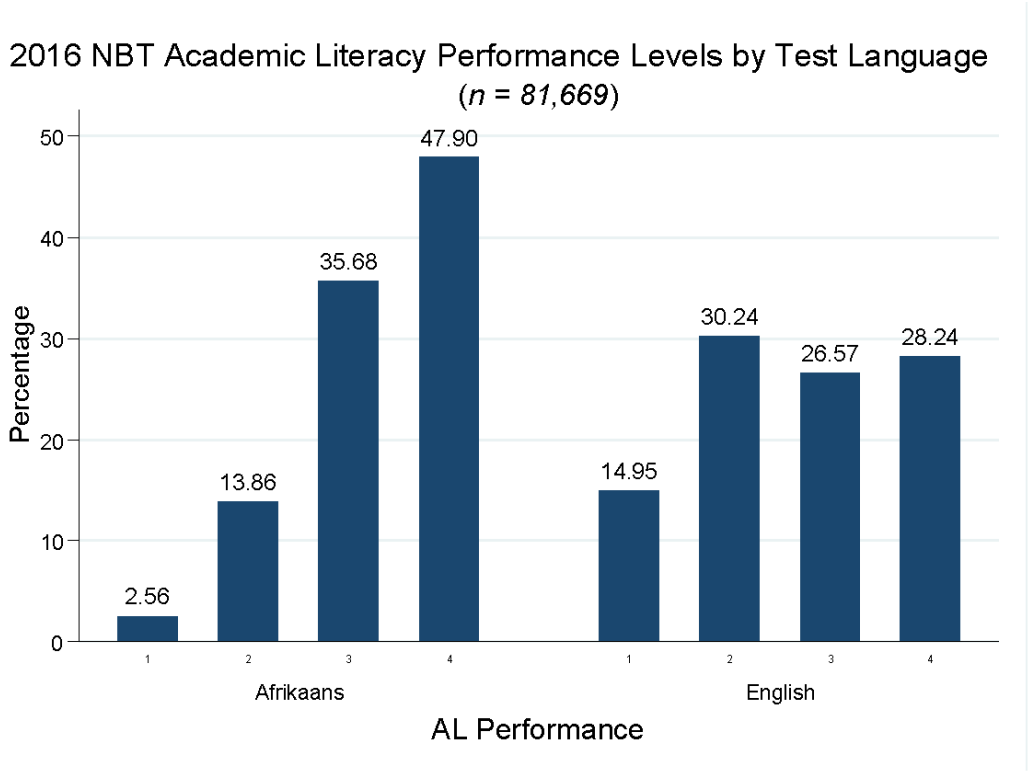

Figure 8 2016 NBT AL Performance Levels by test language

QL PERFORMANCE ON TEST WRITTEN IN AFRIKAANS AND ENGLISH

The Afrikaans writers represented 9.4% of the total candidates who wrote the QL tests in 2015. Of this, 20.70% were in the Proficient category compared to 9.35% of the English writers in the same category. Forty percent (40.31%) of the candidates who wrote QL tests in English were in the Basic category compared with twenty one percent (21.02%) of the candidates who wrote QL tests in Afrikaans. Figure 9 shows that Afrikaans writers' overall performance was better than that of English writers across the 4 performance categories.

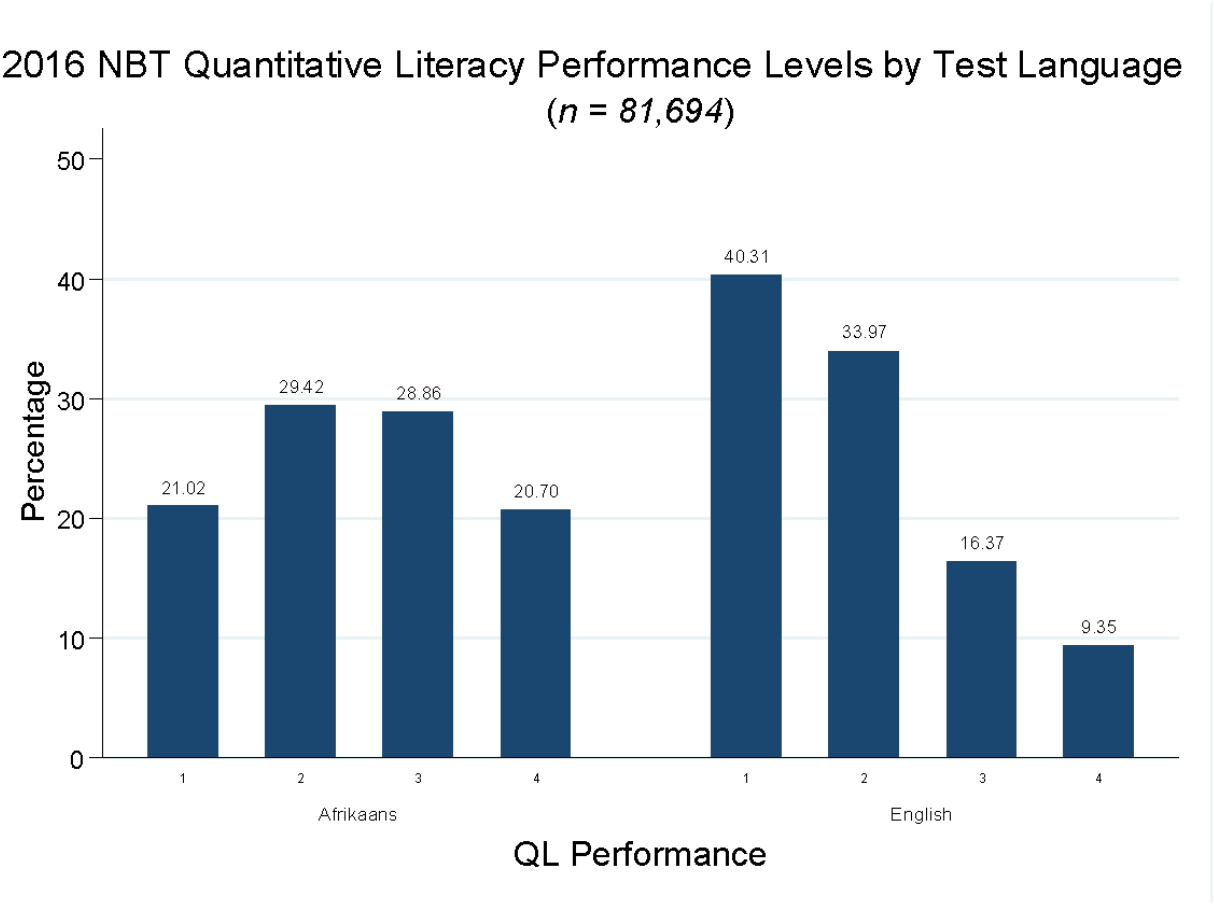

Figure 9 2016 NBT QL Performance Levels by test language

MAT PERFORMANCE ON TEST WRITTEN IN AFRIKAANS AND ENGLISH

Slightly more than 17% of those who wrote the Afrikaans MAT test had scores in the Proficient category compared to just over 8% of the English group. Twenty seven percent (27%) of those who wrote the Afrikaans MAT test had scores in the Basic category compared to 52.6% of the candidates in the English group.

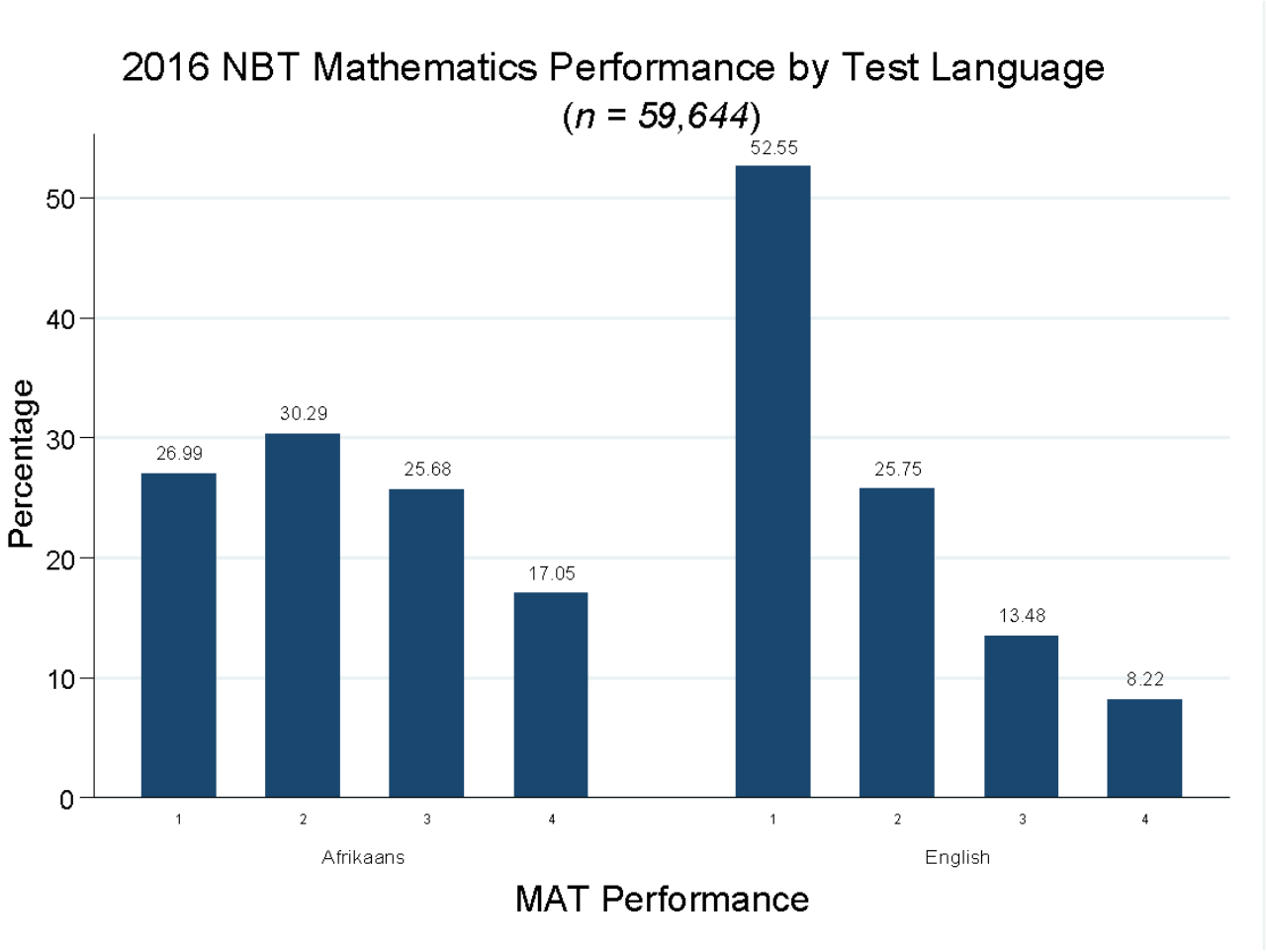

Figure 10 2016 NBT MAT Performance Levels by test language

COMPARISON: NBT PERFORMANCE LEVELS BY INTENDED FACULTIES OF STUDY, TESTS WRITTEN IN ENGLISH AND AFRIKAANS

This section reports the comparison between candidates by intended faculty of study separately for English and Afrikaans writers.

AL PERFORMANCE BY INTENDED FACULTY OF STUDY, TESTS WRITTEN IN ENGLISH AND AFRIKAANS

In general, performance by candidates who wrote the NBT AL in Afrikaans was better than that of those who wrote it in English. It can be seen from Figures 11 and 12 below that the scores for Afrikaans writers were higher in the Proficient band for the faculties of Business/Commerce/Management, Engineering/Built Environment, Health Sciences and Law, for example, when compared to those of the candidates who wrote the test in English. The proportions of the scores in the Proficient band for the former group in these faculties were 51%, 60%, 64% and 65% respectively, as opposed to 32%, 28%, 30% and 38% for the latter group. Similarly, the proportions of the scores in the Basic band for Afrikaans writers in these faculties tended to be smaller when compared to those for English writers. Such proportions equalled, 1% for the former former group in all faculties as opposed to 11%, 16%, 12% and 9% for English writers in the four faculties respectively.

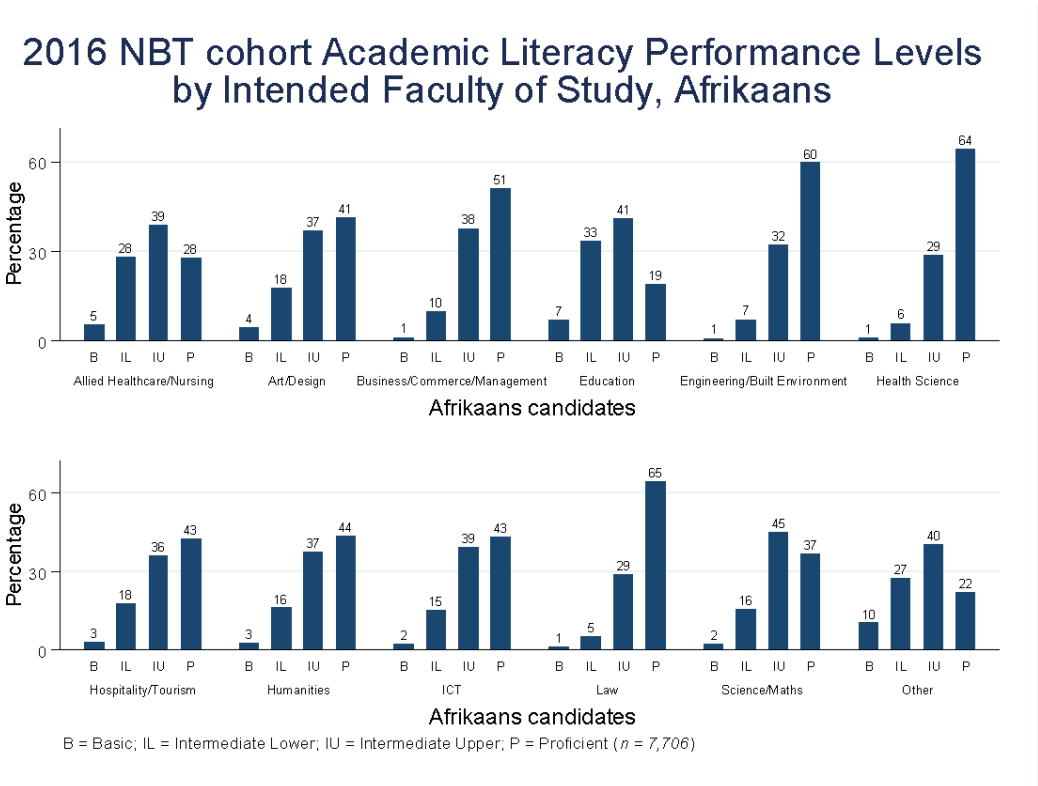

Figure 11 2016 NBT AL Performance Levels by intended programme of study for Afrikaans writers

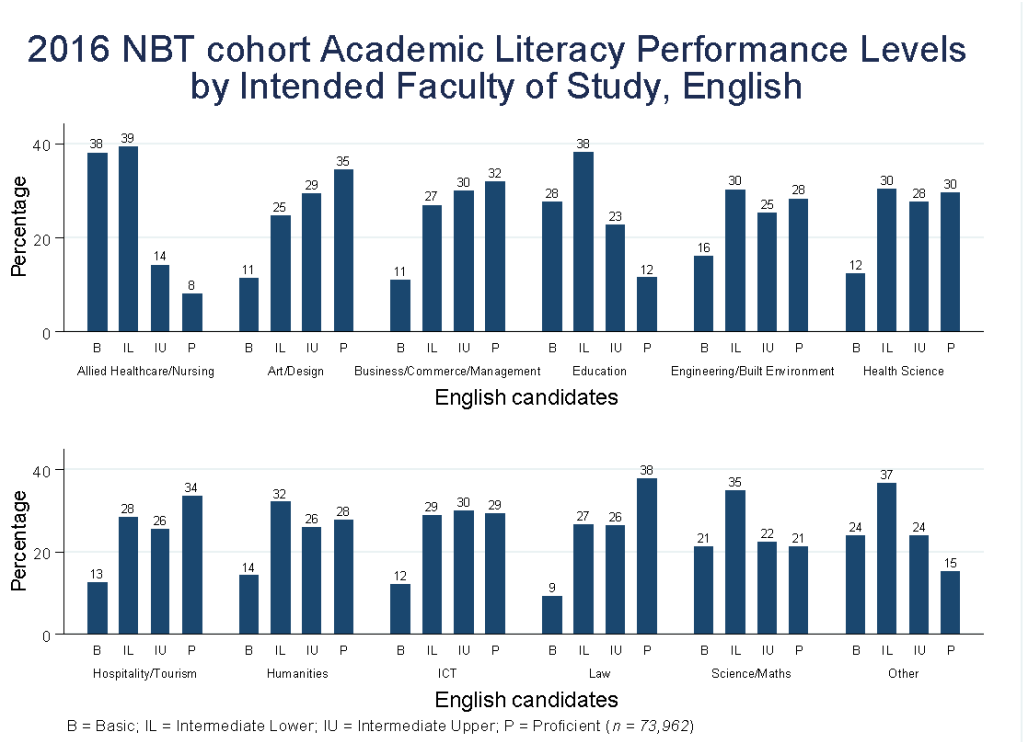

Figure 12 2016 NBT AL Performance Levels by intended programme of study for English writers

QL PERFORMANCE BY INTENDED FACULTY OF STUDY, TESTS WRITTEN IN ENGLISH AND AFRIKAANS

The QL performance of candidates who wrote in Afrikaans was generally higher than that of the candidates who wrote in English. The proportion of Afrikaans candidates classified as Proficient in Engineering and the Built Environment (43%), Health Sciences (23%), Humanities (28%) and Law (34%) was higher than their English counterparts which were respectively, 15%, 9%, 13% and 18%. A concern is the high proportion of candidates who wrote in English and are classified Basic. These candidates are applying to Allied Healthcare/Nursing (72%); Education (65%). These candidates may face severe challenges as the results indicate they might be unprepared for the demands of academic study, particularly in relation to quantitative literacy.

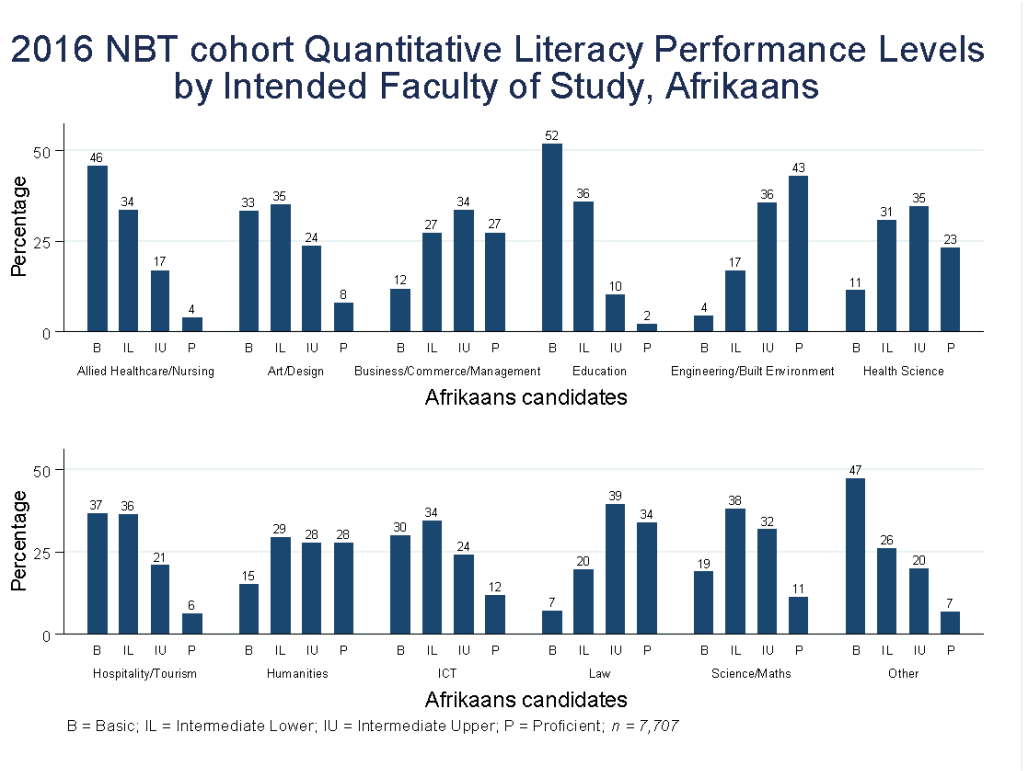

Figure 13 2106 NBT QL performance Levels by intended faculty of study for Afrikaans writers

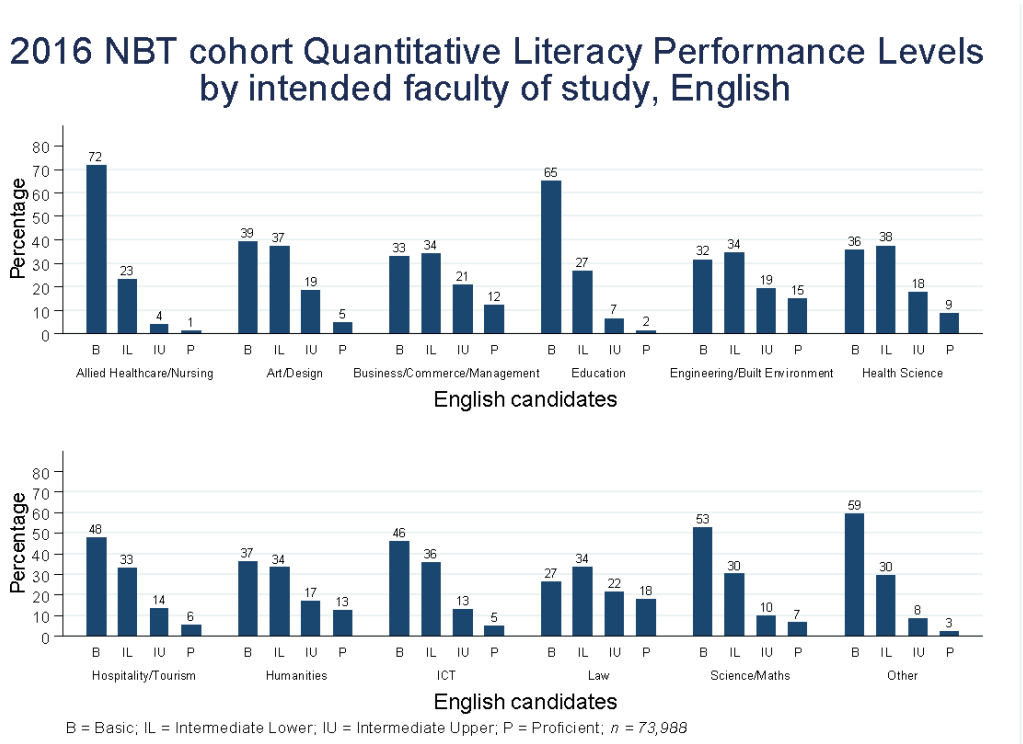

Figure 14 2016 NBT QL performance Levels by intended faculty of study for English writers

MAT PERFORMANCE BY INTENDED FACULTY OF STUDY, TESTS WRITTEN IN ENGLISH AND AFRIKAANS

MAT performance of candidates who wrote in Afrikaans was generally higher than that of candidates who wrote in English. This is noticeable in most cases. Specifically, if we consider Health Sciences, Engineering and the Built Environment, and Science/Mathematics, we see that the percentages of candidates who wrote in Afrikaans and fell in the Proficient band in these areas were respectively 20%, 29% and 8%, against the percentages of the candidates who wrote in English and fell in the Proficient band which were respectively 9%, 11% and 5%. Also noticeable are the differences in the Basic category. In the areas of Nursing and Education, for example, the percentages of the candidates who wrote in Afrikaans and whose scores were in the Basic category in these two areas were respectively 62% and 71%, against 83% in both these faculties for the candidates who wrote in English.

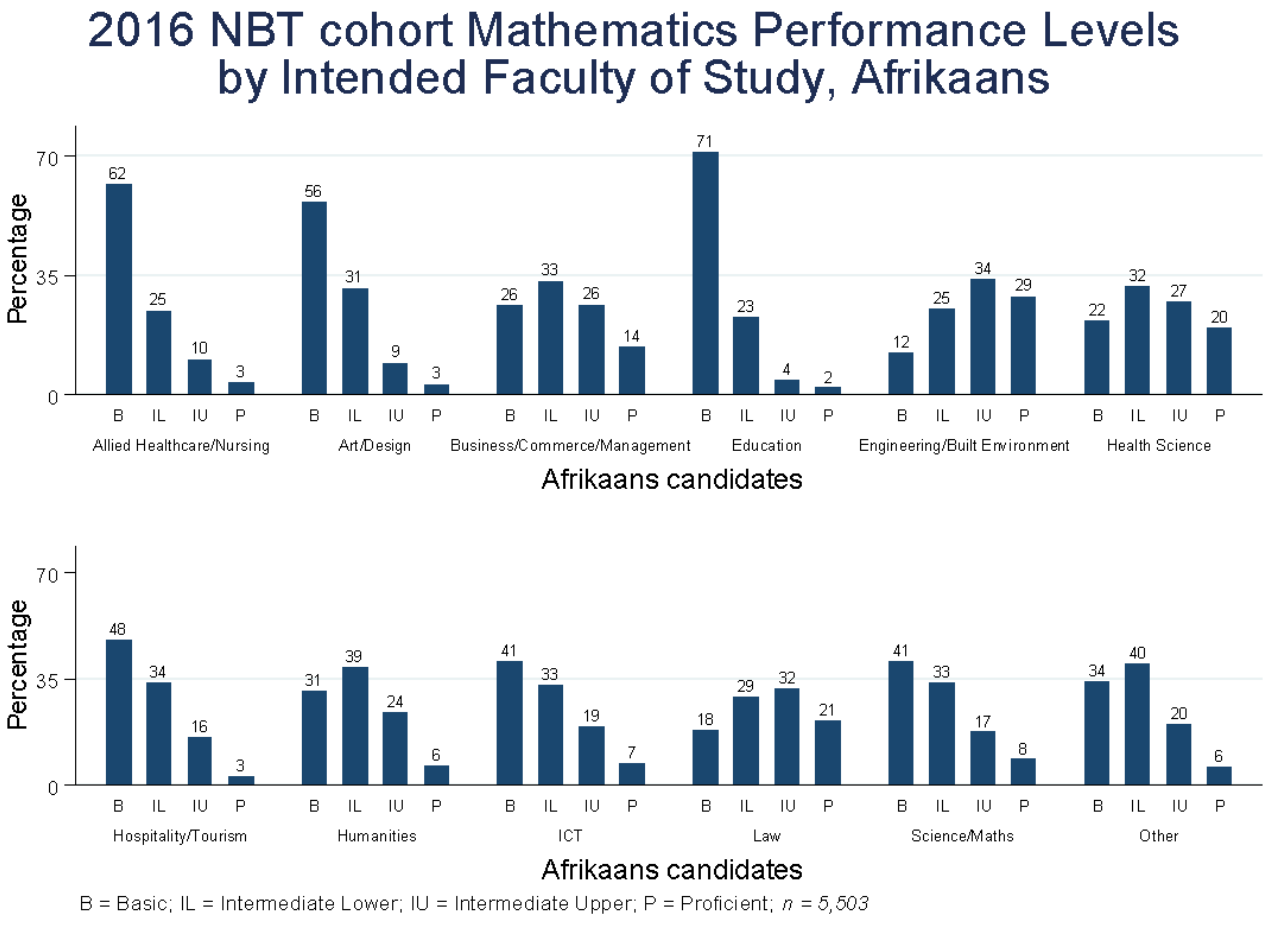

Figure 15 2016 NBT MAT performance levels by intended programme of study

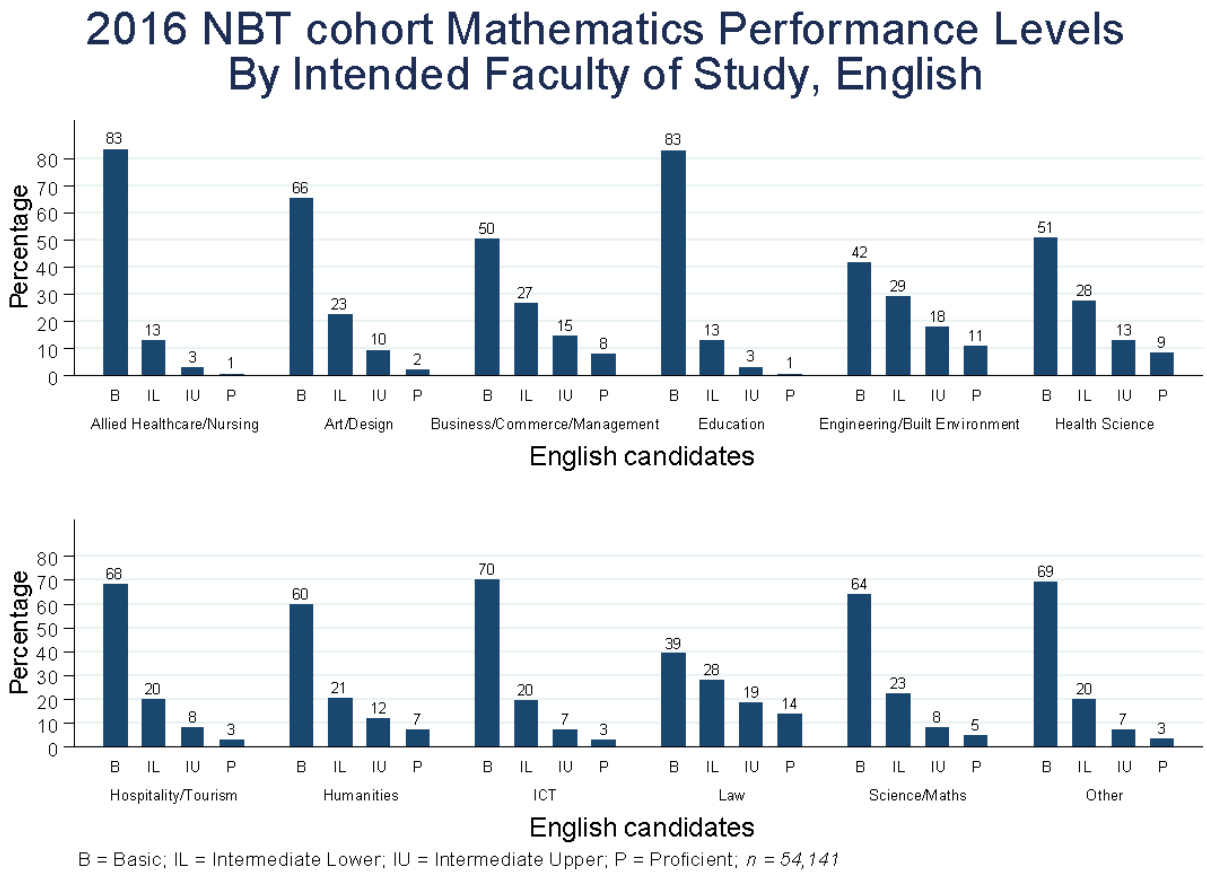

Figure 16 2016 NBT MAT performance levels by intended programme of study for English writers

PERFORMANCE PROFILE OF SOUTH AFRICAN AND NON-SOUTH AFRICAN CANDIDATES

This section reports the comparisons between South African citizens and non-South African candidates. The 2016 NBT cohort consisted of 3,279 (5.5%) candidates who reported themselves as non-South African citizens. This included candidates who reported themselves as having SADC citizenship, citizenship from other African countries, and elsewhere.

Table 12 Number of test writers: SA citizens vs non-SA candidates

	Wrote AL		Wrote QL		Wrote MAT	
	n	%	n	%	n	%
South African	77,477	94.87	77,494	94.86	56,365	94.50
non-South African	4,192	5.130	4,200	5.140	3,279	5.500
Total	81,669	100	81,694	100	59,644	100

Table 13 Scores: SA citizens vs non-SA candidates

AL Score	n	Mean	sd	min	p25	p50	p75	max
AL SCORE								
South African	77477	54.49	14.43	14	42	54	66	95
non-South African	4192	59.49	12.71	21	50	60	69	90
Total	54.75	14.39	14	43	54	66	95	
QL SCORE								
South African	77494	45.94	15.49	5	33	41	55	98
non-South African	4200	52.77	16.21	13	39	51	64	98
Total	46.29	15.60	5	34	42	56	98	
MAT SCORE								
South African	56365	40.26	16.56	2	27	34	49	97
non-South African	3279	42.79	16.93	17	29	38	53	97
Total	40.40	16.59	2	27	34	49	97	

AL PERFORMANCE BY CITIZENSHIP

The non-South African candidates performed slightly better than the South African candidates. Of the non-South African candidates, 39.48% were Proficient in AL compared to 29.58% of the South African candidates, while 5.30% of the non-South African candidates were in the Basic category compared to 14.24% of the South African candidates. Finally, slightly more South African candidates (56.17%) scored in the Intermediate bands when compared to their non-South African counterparts (55.23%).

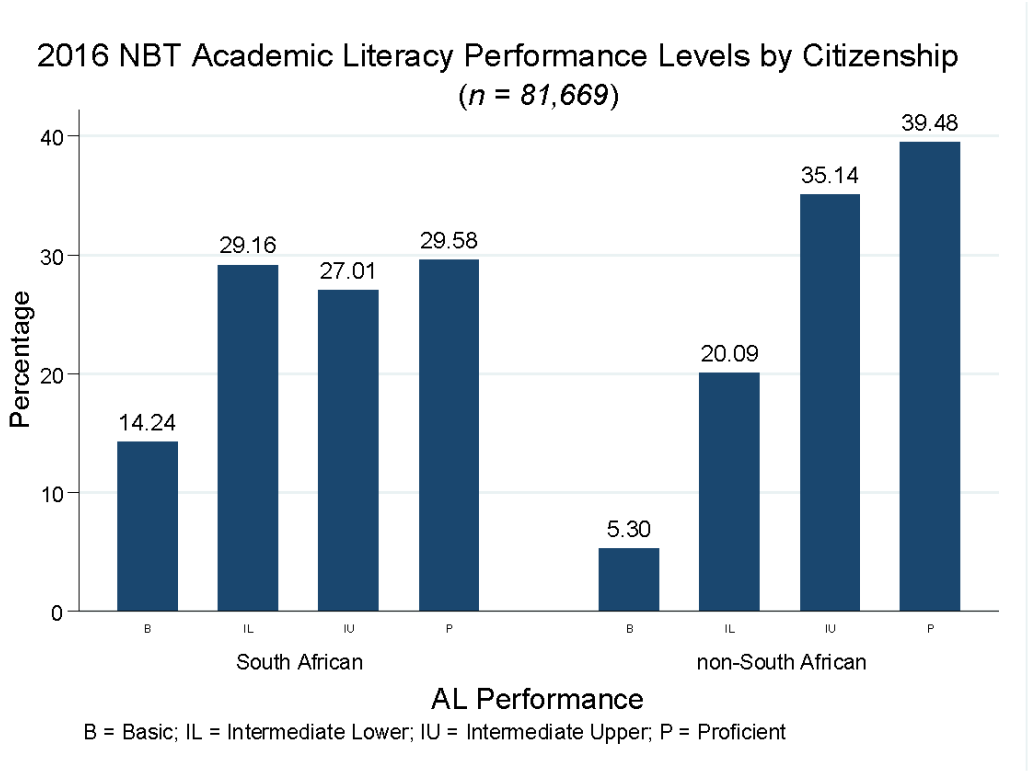

Figure 17 2015 NBT AL performance levels by citizenship

QL PERFORMANCE BY CITIZENSHIP

The Non-South African candidates represented 5.1% of the total number of candidates who wrote the QL tests. This small proportion of candidates performed better than their South African counterparts. The results show that 17.38% of non-South Africans were Proficient in QL compared to approximately 10.04% in the South African group of candidates. The proportion of candidates in the Basic category for the South African group was 39.45% compared to the non-South African group which was 20.76%. In the Intermediate category, the non-South African candidates fared better than their South African counterparts. The non-South African candidates in the Intermediate Upper represented 27.50% versus 17.01% for the South African candidates.

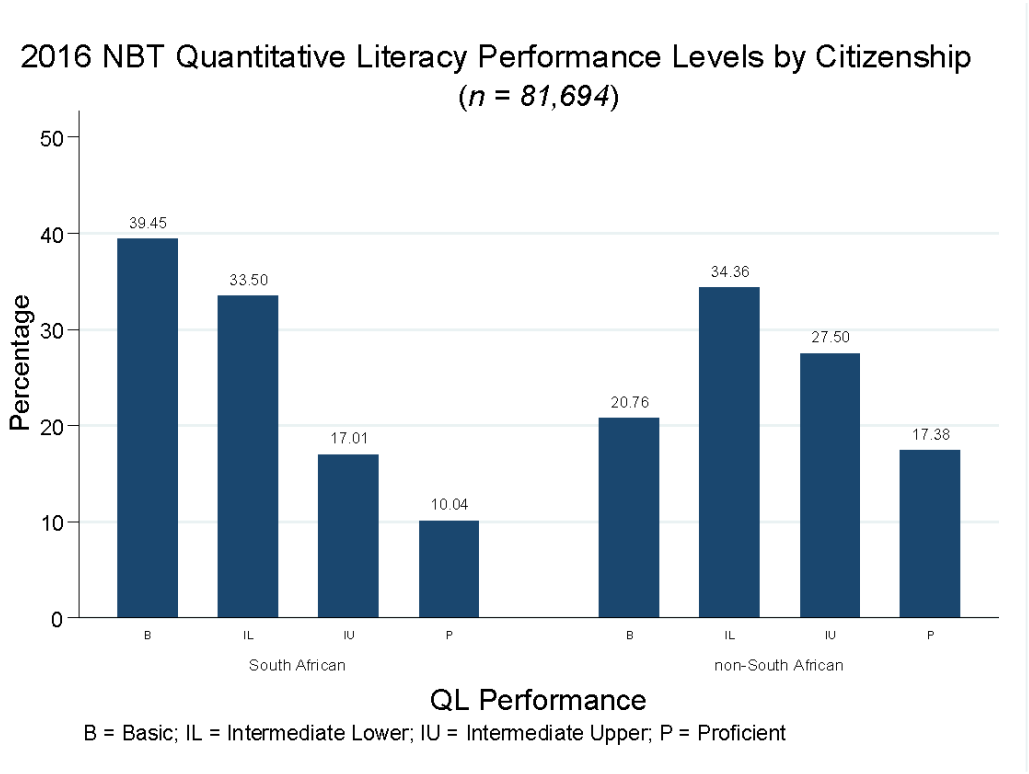

Figure 18 2016 NBT QL performance levels by citizenship

MAT PERFORMANCE BY CITIZENSHIP

MAT performance among the non-South African candidates was a little better than that of the South African candidates. Of the non-South African candidates, 10.49% had scores in the Proficient band in MAT compared to 8.95% of the South African candidates; 42.60% of the non-South African candidates had scores in the Basic category for MAT compared to 50.63% of the South African candidates whose scores were in the Basic category in MAT. The difference in the Basic category (8.03% more in the South African group) is somewhat offset by the difference in the Intermediate Lower category (2.64% more in the non-South African group).

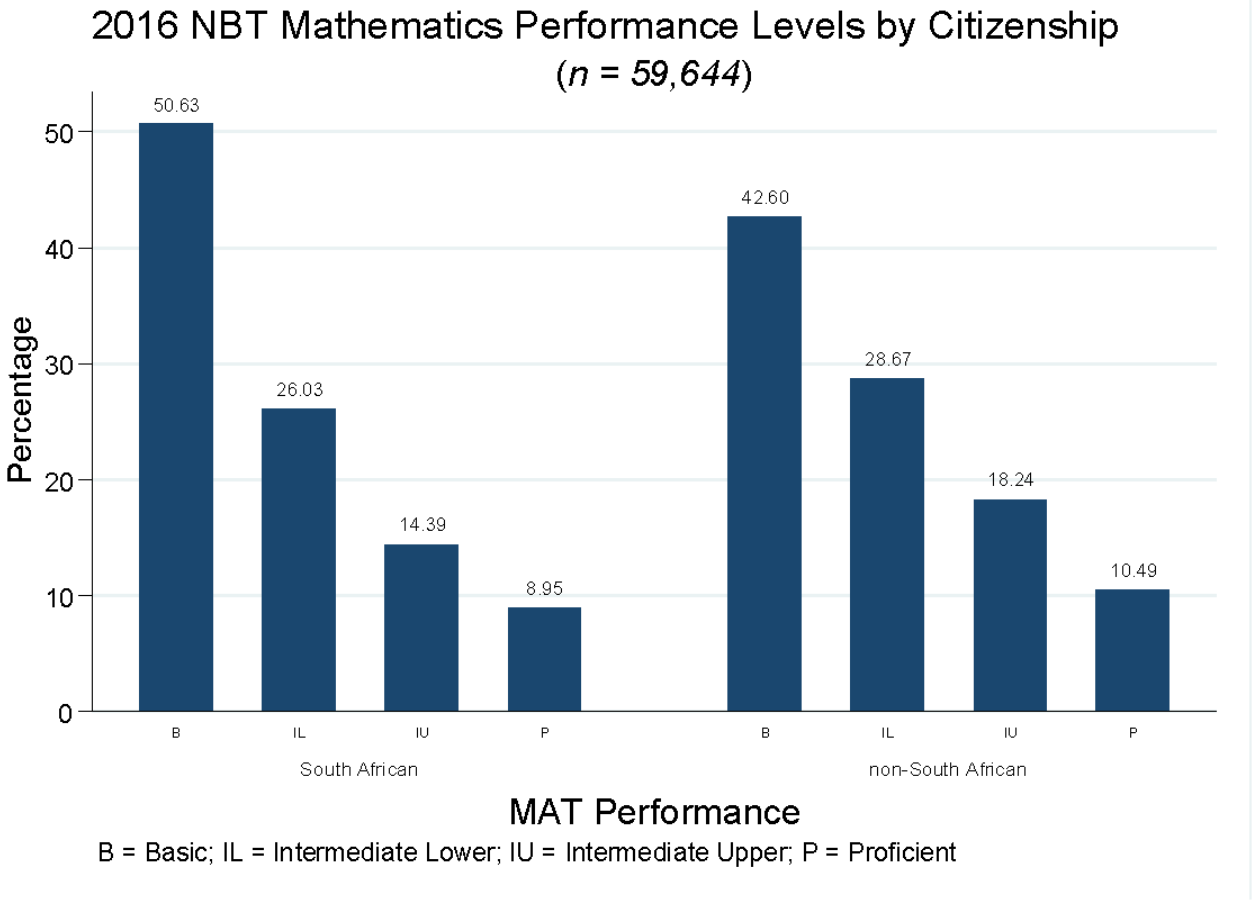

Figure 19 2016 NBT MAT performance levels by citizenship

The non-South African candidates appeared to have performed slightly better in AL, QL and MAT than the South African candidates.

6. COMPARISON OF THE 2016 INTAKE RESULTS TO THE 2015 INTAKE RESULTS

In this section we examine the performance in AL, QL and MAT of the candidates in the 2015 and 2016 intake cycles to investigate broad trends of the NBT over time. In broad terms, the 2016 intake cohort performed fairly similarly to the 2015 intake cohort in terms of NBT proficiency categories.

NATIONAL COHORT

Figure 20 below shows that there was a slight improvement in performance on **AL** from 2015 to 2016. The proportion of scores in the Proficient category for this domain increased slightly from 28.87% in 2015 to 30.09% in 2016, while the proportion of the scores in the Basic category decreased slightly from 15.26% in 2015 to 13.78% in 2016. Also, the proportion of the scores in the Intermediate bands has negligibly increased from 55.87% in 2015 to 56.13 in 2016.

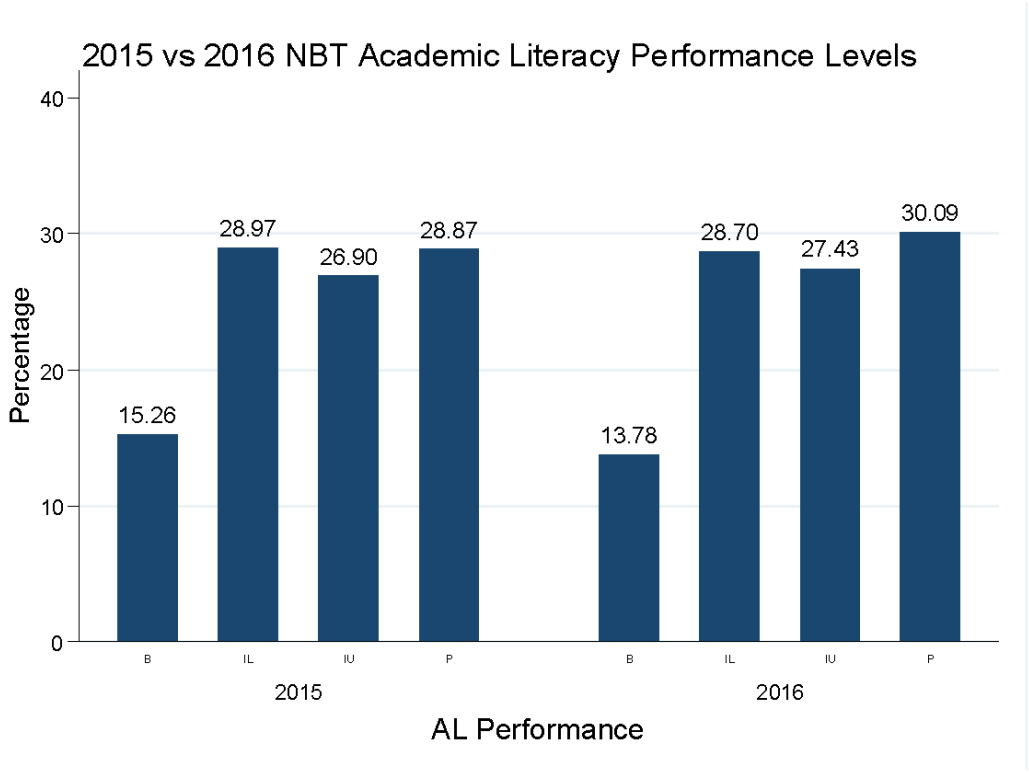

Figure 20 Performance in AL, 2015 and 2016 intake cycles

Overall, the **QL performance** has stayed the same over the last two years with only marginal shifts in the 4 performance categories. The proportions of candidates who were deemed Basic in QL decreased from 40.38% in 2015 to 38.49% in 2016. There have also been slight increases in the proportions in the Intermediate performance bands between 2015 and 2016, such as 17.24% to 17.55% for the Upper Intermediate band and 31.44% to 33.54% for the Lower Intermediate band. Over the last three years, there has been a consistent decline in the proportions of candidates deemed Proficient in QL, namely, 12.94% in 2014 and 10.94% in 2015 and 10.42% in 2016. This is a worrying trend as it may indicate that candidates wishing to enter higher education will be increasingly less prepared for the demands of academic study.

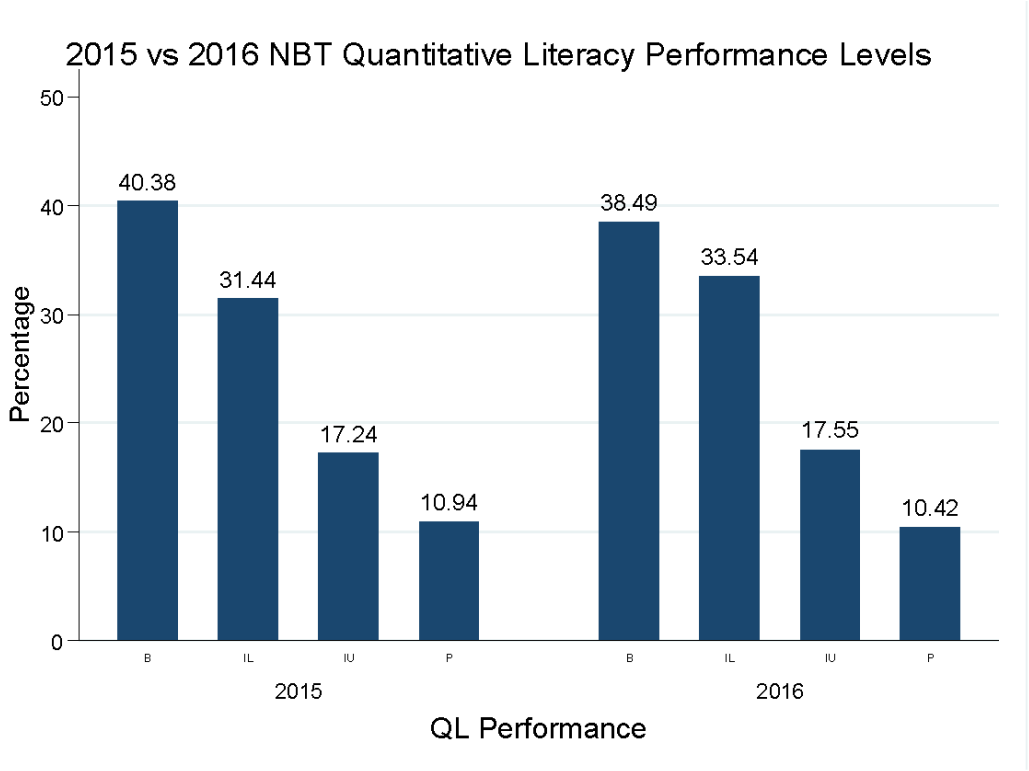

Figure 21 Performance in QL, 2015 and 2016 intake cycles

Performance in **MAT** has declined somewhat. The proportions of scores in the Basic category have increased from 45.01% in 2015 to 50.19% in 2016. In the Proficient category the scores moved down slightly from 10.90% in 2015 to 9.03% in 2016. The proportions in the two Intermediate categories (Lower and Upper considered together) also decreased slightly, from 44.09% in 2015 to 40.77% in 2016.

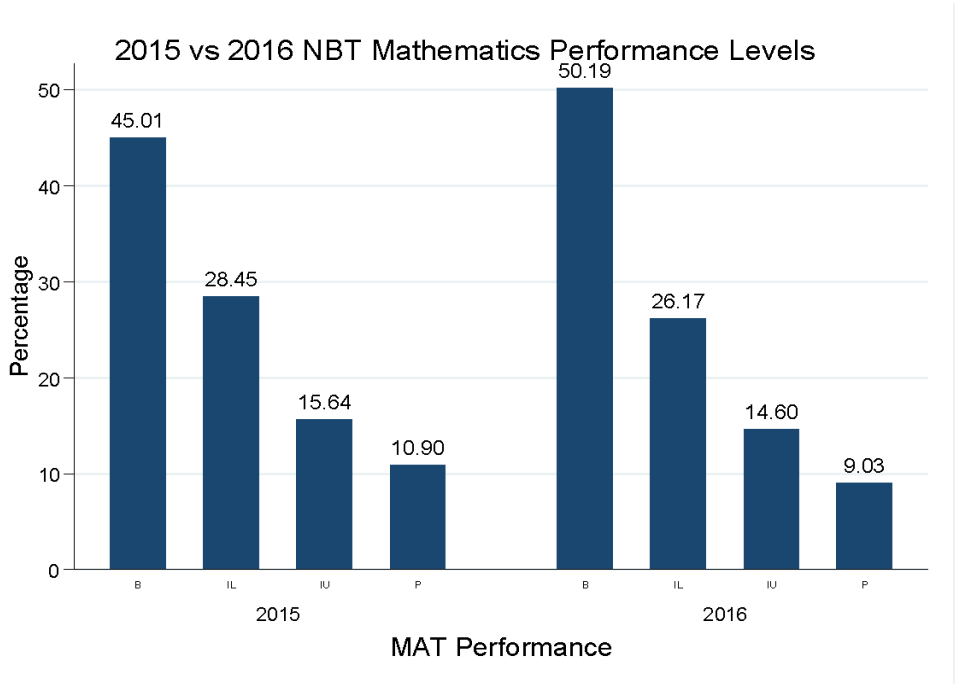

Figure 22 Performance in MAT, 2015 and 2016 intake cycles

TEST LANGUAGE

Figure 23 below contains statistical data comparing the performance of candidates who wrote the AL test in Afrikaans and candidates who wrote the AL test in English respectively.

It is clear from this graph that for the 2015 cohort, there were more English candidates in the Basic category (16.7%) than their Afrikaans counterpart (1.5%); the Afrikaans group constituted a lower proportion in the Intermediate Lower category (13.2%) than their English counterparts (30.6%); the Afrikaans candidates constituted a higher proportion of those in the Intermediate Upper (37.6%) than their English counterparts (25.8%) and that the English candidates constituted a lower percentage in the Proficient band (26.9%) than the Afrikaans group (47.9%).

For the 2016 intake, a greater proportion of the English AL candidates were in the Basic category (15.0%) than the Afrikaans candidates (2.6%), fewer Afrikaans candidates were in the Intermediate Lower band (13.9%) than their English counterparts (30.2%), more Afrikaans candidates were in the Intermediate Upper band (35.7%) than the English group (26.6%), and the Afrikaans group comprised a higher proportion of those in the Proficient category (47.9%) than the English group (28.2%).

What is evident from these comparisons is that Afrikaans NBT AL candidates tended to perform better than their English counterparts in both 2015 and 2016. The possible explanation for this is that the majority of candidates who tend to choose to take the test in English are speakers of English as an additional language (rather than as a home language) and regard themselves as more proficient in that language than in Afrikaans. Another possible reason is that the majority of those who write the test in Afrikaans were home language speakers of this language and that this was an added advantage to them.

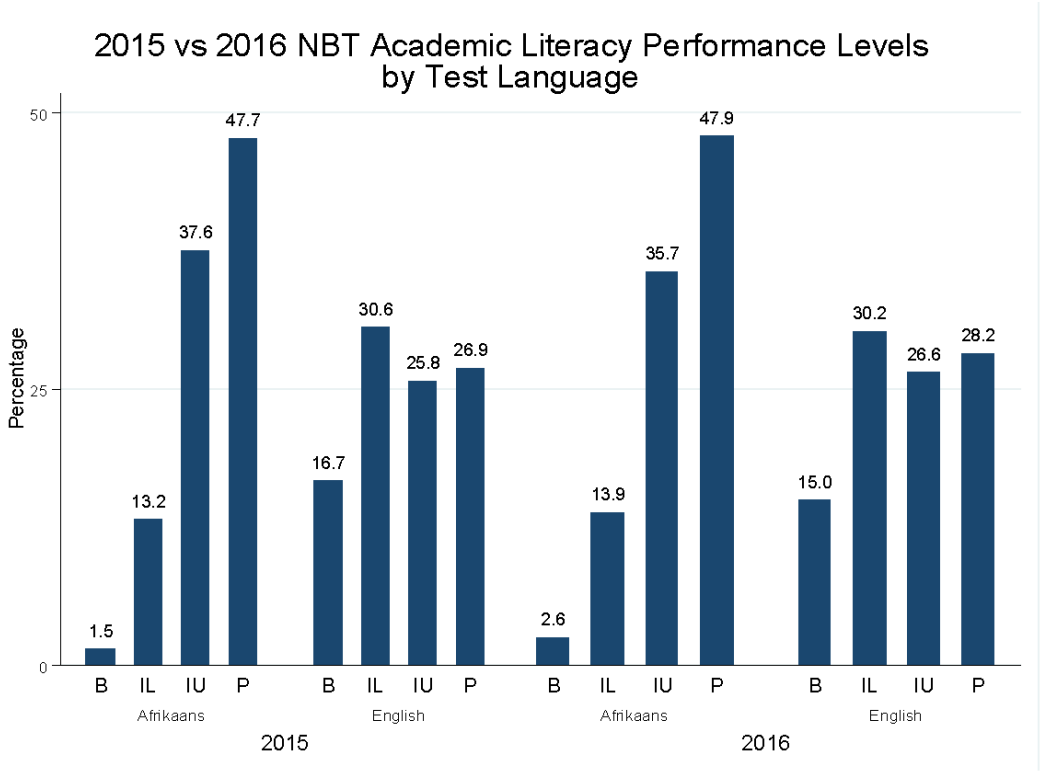

Figure 23 AL performance of Afrikaans candidates 2015 and 2016 intake cycles

The proportion of candidates who wrote the QL test in Afrikaans is small. These candidates are most likely first language speakers of Afrikaans. The candidates who wrote the QL tests in English comprised a larger proportion of all writers. These included English first language speakers as well as second and third language speakers of English.

The performance of the Afrikaans candidates on the QL tests declined between 2015 and 2016. This is evident from the slight increase in the proportion of candidates deemed Basic, from 1.5% in 2015 to 2.6% in 2016, and the slight decrease in the proportion of candidates deemed Proficient, from 21.2% in 2015 to 20.7% in 2016.

Generally the performance for the English candidates stayed relatively the same. There was a slight decrease in the proportion of English candidates deemed Basic, from 43.0% in 2015 to 40.3% in 2016. The proportions of candidates who were in the four performance bands for the English candidates were very similar for 2015 and 2016. Overall, the performance of the candidates who wrote the QL test in Afrikaans performed better than those who wrote the QL tests in English.

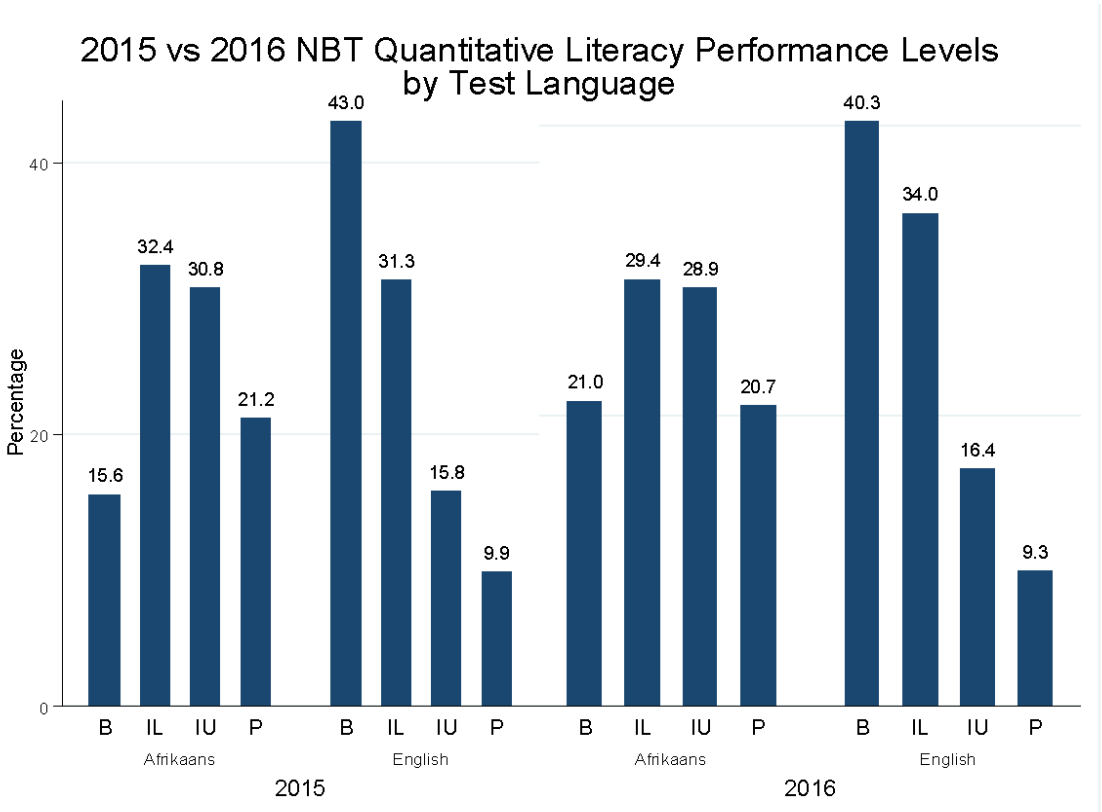

Figure 24 QL performance of Afrikaans candidates NBT 2015 and 2016 intake cycles

Between 2015 and 2016 the performance of the Afrikaans candidates on the MAT test declined, while the performance of the English candidates remained much the same. In both 2015 and 2016, the candidates who wrote the MAT test in Afrikaans outperformed the candidates who wrote the MAT test in English. The differences remained large: in 2015, 19.5% of the Afrikaans candidates had scores in the Basic band, compared to 47.8% of the English cohort; 22.5% of the Afrikaans candidates' scores were in the Proficient band compared to 9.7% in the case of the English candidates. In 2016 the pattern is similar: 27% of the Afrikaans candidates and 52.5% of the English candidates had scores in the Basic band; 17.0% of the Afrikaans cohort and 8.2% of the English cohort had scores in the Proficient band. Note however that the proportions of candidates in the two language groups differ considerably. The Afrikaans group comprised 9.19% of the cohort, while the English group comprised 90.81% of the cohort. The Afrikaans group most likely represents a more homogeneous population, in that their first language is probably Afrikaans. Those who wrote the test in English are representative of all the other language groups. These results are illustrated in Figure 25 below.

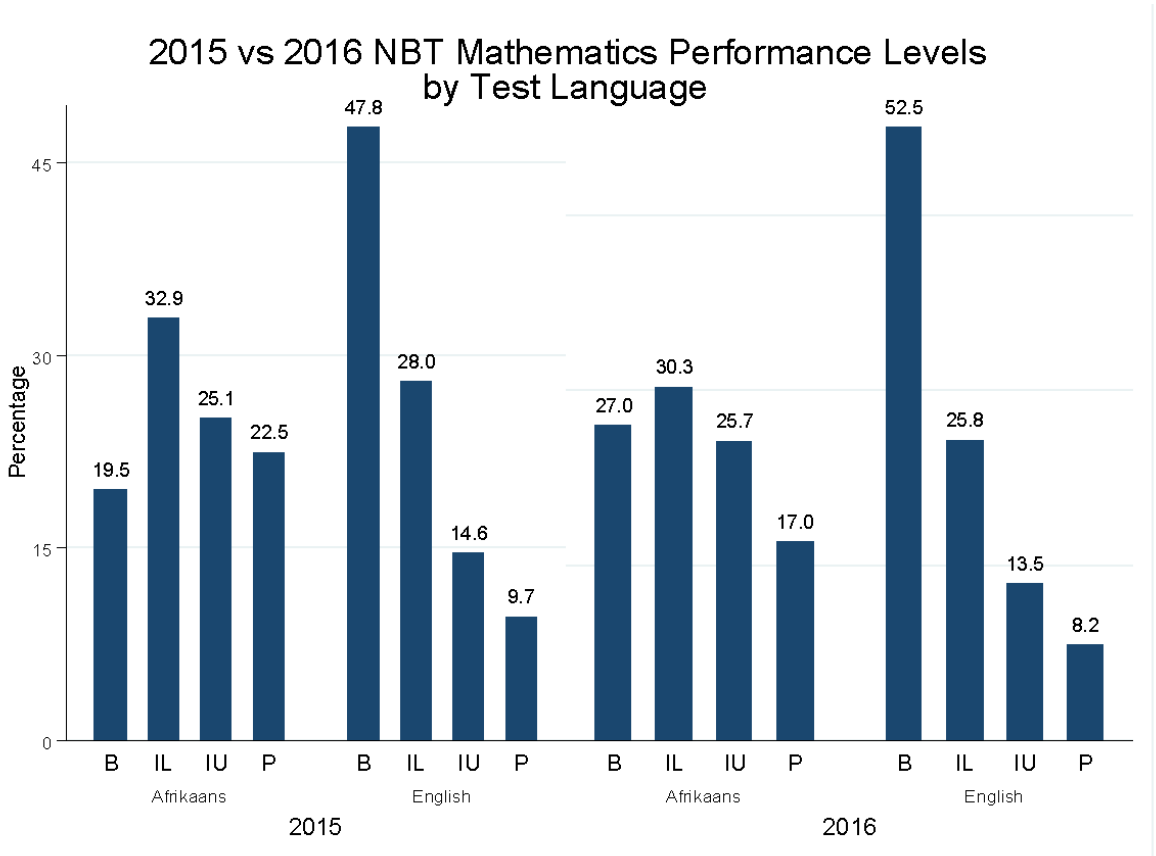

Figure 25 MAT performance of Afrikaans candidates NBT 2015 and 2016 intake cycles

CITIZENSHIP

Figure 26 below depicts a comparison of performance on the NBT AL by South African citizens and non-South African citizens in 2015 and 2016. As can be seen from the graph, for the 2015 intake, more South African candidates were in the Basic category (15.7%) than their non-South African counterparts (6.8%), more South African candidates were in the Intermediate Lower (29.4%) than the non-South African candidates (20.8%), fewer non-South Africans were in the Upper Intermediate band (26.4%) than their South African counterparts (35.1%) and more non-South African writers were in the Proficient band (37.4%) than South African candidates (28.4%).

For the 2016 intake, more South Africans were in the Basic category (14.2%) than non-South Africans (5.3%), more South Africans were in the Intermediate Lower category (29.2%) than the non-South African writers (20.1%), more non-South Africans were in the Intermediate Upper band (35.1%) than their South African counterparts (27.0%) and more non-South Africans were in the Proficient band (39.5%) than South Africans (29.6%).

It is clear from this graph that in general, non-South African candidates performed better on the NBT AL than South African candidates both in 2015 and 2016. The possible explanation for this is that non-South African candidates are exposed to a wider range of AL related tasks earlier in their schooling than the South African candidates.

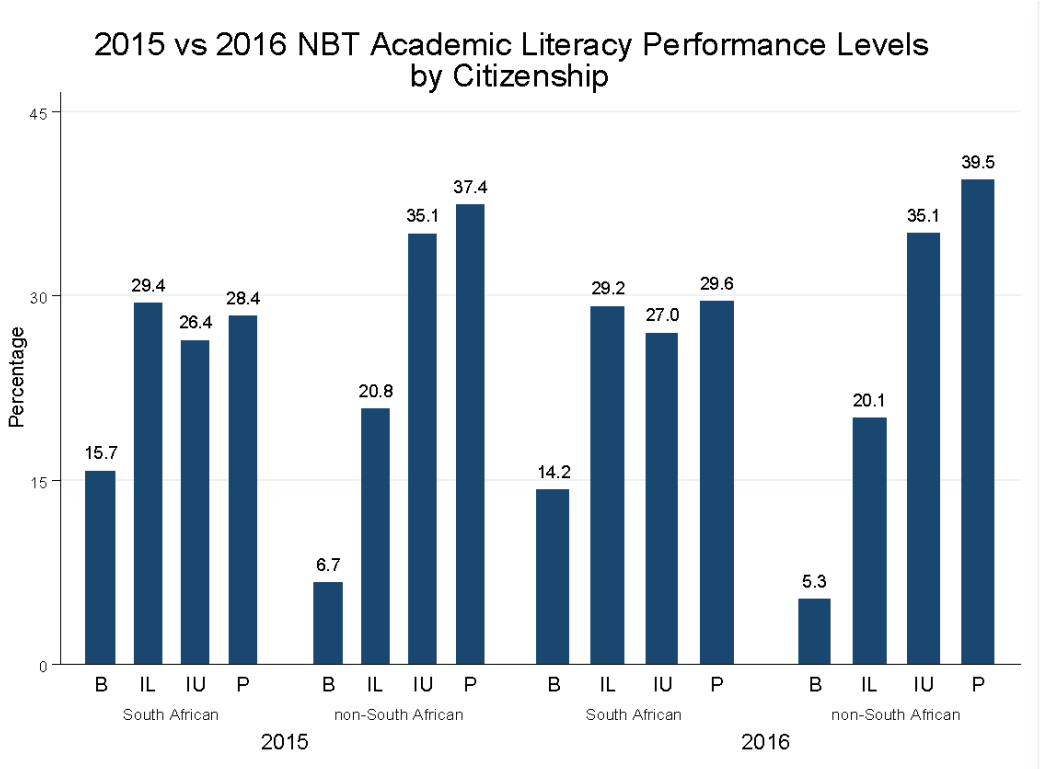

Figure 26 NBT Academic Literacy performance levels by citizenship

The non-South African candidates outperformed the South African candidates in 2015 and 2016 in the QL tests. In both years, the proportion of non-South African candidates (16.0% and 17.4%) who were in the Proficient performance band was higher than that for the South African candidates (10.6% and 10.0%). There has been a slight decline in the proportions of candidates who were in the Basic performance category for both the South African and non-South African candidates over the two years. In 2016, 39.4% (down from 41.5%) of South African candidates were in the Basic band, compared to only 20.8% (down from 21.6%) in the non-South African group. The fact that the non-South Africans are performing better in QL than the South African candidates could be ascribed to their schooling system.

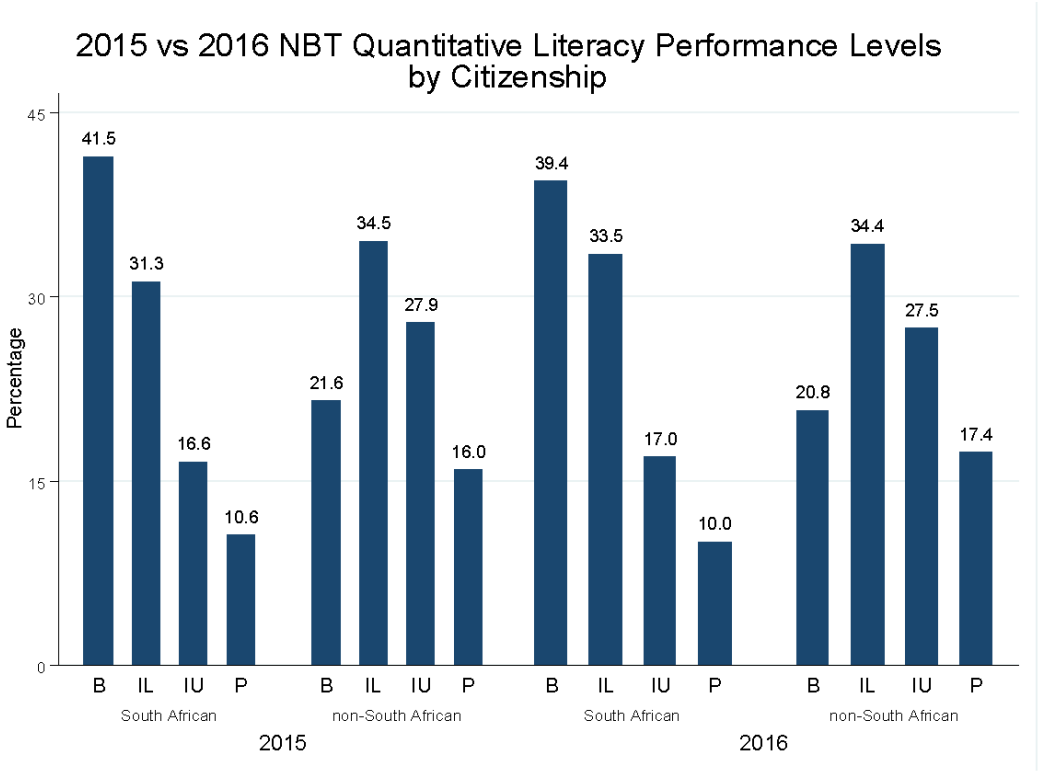

Figure 27 NBT Quantitative Literacy performance levels by citizenship

In both 2015 and 2016, non-South African candidates performed better in the MAT tests than the South African candidates. The difference in performance between the two years, for the two groups, is more noticeable for scores in the Basic and Intermediate bands than it is for the Proficient band. In 2016, in the Basic category, there was a difference of 8% in the number of non-African candidates (42.6%) compared to the South African candidates (50.6%). This difference in 2015 was 6.3%, with 45.4% and 39.1% of South African and non-South African candidates, respectively, having scores in the Basic band. In the Intermediate category (considering both Lower and Upper Intermediate together) there is also some difference between the two groups: 5.0% in 2015, and 6.5% in 2016. In the Proficient category the difference in performance between the two groups is less: in 2015 there was a 1.2% difference in performance (10.8% of the South African candidates and 12% of the non-South African candidates had MAT test scores in this band). In 2016 the corresponding figures are 12.0% (non-South African) and 10.5% (South African), i.e. a difference of 1.6%.

The larger differences at the Basic and Intermediate levels may indicate differences in schooling.

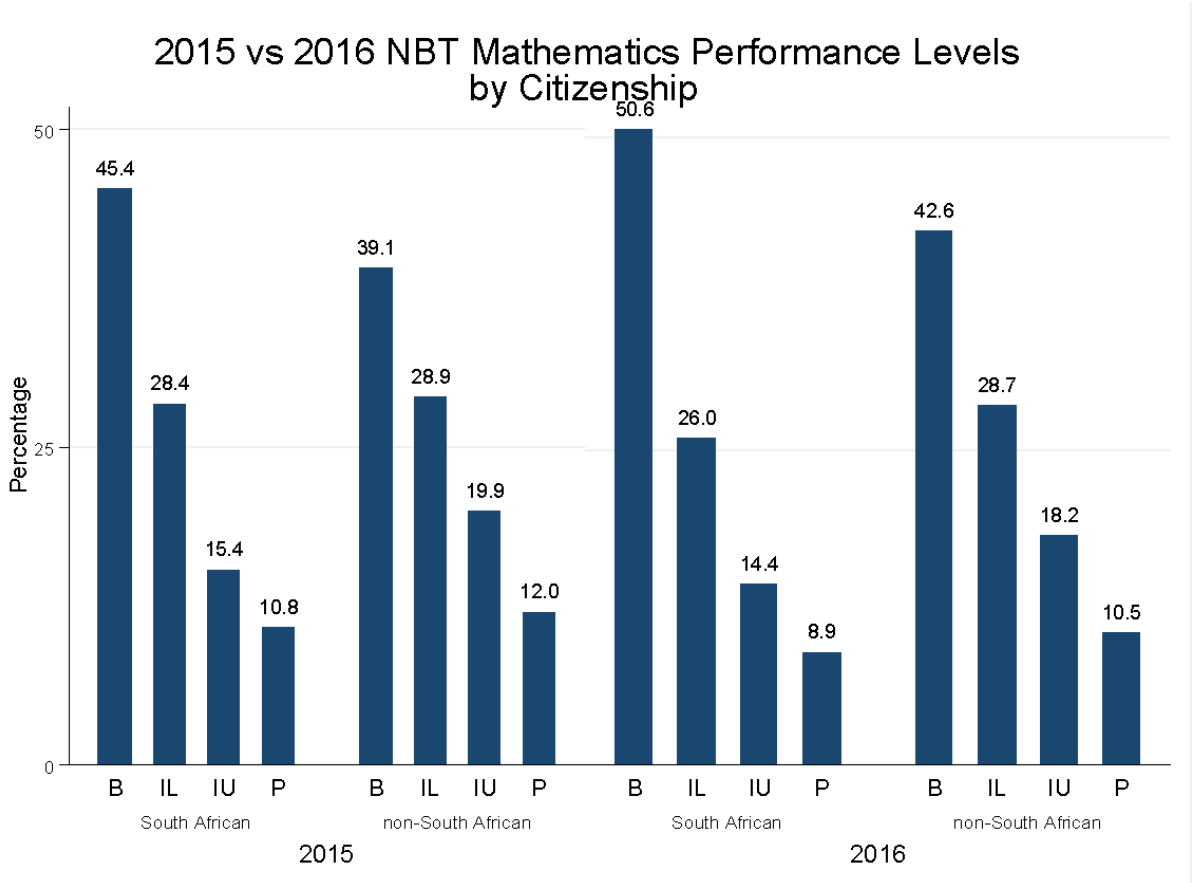

Figure 28 NBT Mathematics performance levels by citizenship

7. PERFORMANCE ON NBT AT SUBDOMAIN LEVEL

The main uses of NBT data by institutions are for the selection and placement of students. Once these students are accepted at institutions, NBT can be used for providing information about the academic needs of accepted students. In order to use NBT diagnostic information for this purpose, institutions need to provide the NBTP with the actual list of their registered students.

This analysis can also be done for a particular course or programme, giving lecturers a useful tool for aligning their teaching with the students they actually have. The sub-domain analysis for the various faculties gives an indication of the competence areas in which NBT candidates have particular strengths and in which they will experience difficulties. The subdomain analyses also highlight the competence areas where prospective students may experience challenges when faced with higher education curricular expectations aligned with the NBT domains.

An understanding of the difficulties that students/learners experience is useful for teaching and learning as it can aid educators at schools as well as lecturers at university in changing, adapting or improving their teaching strategies.

This section presents the results on the various subdomains of AL, QL and MAT for the 2015 NBT cohort. This analysis has great potential to contribute to making institutional teaching and learning initiatives more responsive to the actual needs of students.

The analysis by sub-domain is based on the intended faculty of study indicated by the candidates when they write the NBT. Candidates are asked to indicate their first, second and third choice of faculty to which they have applied or will apply. Only the first choice of intended faculty was used in this analysis. Data is not collected by the NBT project on actual placement of all the candidates within faculties or institutions. Caution should therefore be used when decisions are made based on the results from intended faculty of study.

THE CONSTRUCT OF THE AL TEST

The NBT AL test is an assessment of the generic academic reading ability of applicants entering courses of higher education study. The construct of academic literacy on which the test is based has a well-theorised history (see, for example, Bachman and Palmer, 1996; Cummins, 2000; Yeld, 2001; Cliff, Yeld and Hanslo, 2003; Cliff and Yeld, 2006) and empirical studies have been reported exploring associations between performance on this construct and academic performance in a wide range of South African higher education contexts (cf. Cliff, Ramaboa and Pearce, 2007; Cliff and Hanslo, 2009). The construct of the test is summarised in the table below:

Table 14 Academic literacy skills assessed in the NBT AL

Skill Assessed	Explanation of Skill Area
Perceiving and understanding cohesion in text	Readers' abilities to be able to 'see' anaphoric and cataphoric links in text, as well as other mechanisms that connect parts of text to their antecedents or to what follows
Understanding the communicative function of sentences	Readers' abilities to 'see' how parts of sentences / discourse define other parts; or are examples of ideas; or are supports for arguments; or attempts to persuade
Understanding discourse relations between parts of text	Readers' capacities to 'see' the structure and organisation of discourse and argument, by paying attention – within and between paragraphs in text – to transitions in argument; superordinate and subordinate ideas; introductions and conclusions; logical development
Separating the essential from the non-essential	Readers' capacities to 'see' main ideas and supporting detail; statements and examples; facts and opinions; propositions and their arguments; being able to classify, categorise and 'label'
Grammar / syntax as these affect academic meaning and interpretation	Readers' abilities to understand and analyse the extent to which grammatical and sentence structures are organised in academic language, and the extent to which these structures affect and can change meaning
Extrapolation, application and inferencing	Readers' capacities to draw conclusions and apply insights, either on the basis of what is stated in texts or is implied by these texts.
Metaphorical expression	Readers' abilities to understand and work with metaphor in language. This includes their capacity to perceive language connotation, word play, ambiguity, idiomatic expressions, and so on
Understanding text *genre*	Readers' abilities to perceive 'audience' in text and purpose in writing, including an ability to understand text register (formality / informality) and tone (didactic / informative / persuasive / etc.)
Vocabulary	Readers' abilities to derive/work out word meanings from their context

The boxplots that follow provide performance information for the NBT AL candidates in the 2016 intake year. The candidates were asked to indicate their first choice field of study and the associated faculty at the institution they wish to study. The boxplots are for the eleven faculties and show the distributions of student scores on different subdomains of the NBT AL.

For the purpose of this report, performance on the NBT AL subdomains by candidates who had indicated their intention to enrol for courses in various faculties was examined. These faculties included the following: Allied Health Care/Nursing, Art/Design, Business/Commerce/Management, Education, Engineering/Built Environment, Health Science, Hospitality/Tourism, Humanities, Information and Communication Technology, Law, and Science/Mathematics. The general picture of performance by candidates planning to study in all these faculties is that Metaphorical expression, Text Genre and Vocabulary seemed the most challenging for them and that performance on the remaining subdomains was relatively better. However, it is also clear that students in all these faculties would benefit from academic literacy support in all the subdomains that are assessed in the NBT AL.

As can be seen in Figure 29 below, candidates who intended to enrol in the Allied Healthcare/Nursing faculty scored the lowest on Metaphorical expressions, Text Genre and Vocabulary. It is also clear from the graph that the highest proportion of these candidates did not score in the Proficient band on the remaining subdomains, an indication that they would struggle with the discourse demands of academic education and that they would need support in all areas of academic literacy.

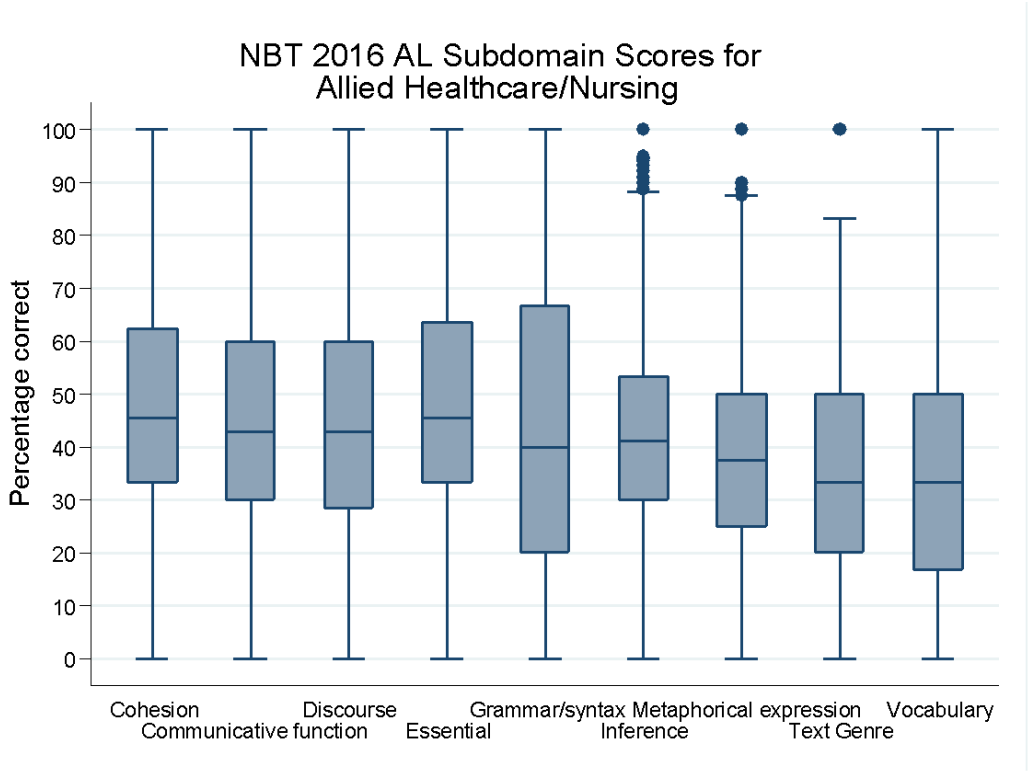

Figure 29 Allied Healthcare and Nursing sub-domain AL performance, NBT 2016

A graphic representation of the AL performance of the candidates who planned to enrol in courses in the Art and Design faculty is captured in the boxplots in Figure 30 below. It is clear from these boxplots that the performance of these candidates was the lowest on Vocabulary and Text Genre. It is also clear, however, that performance by the majority of these candidates on the rest of the other subdomains was not classified as Proficient by the test. This suggests that most students in this faculty would struggle with the language demands of university education and that they would benefit from academic literacy intervention focusing on all these subdomains.

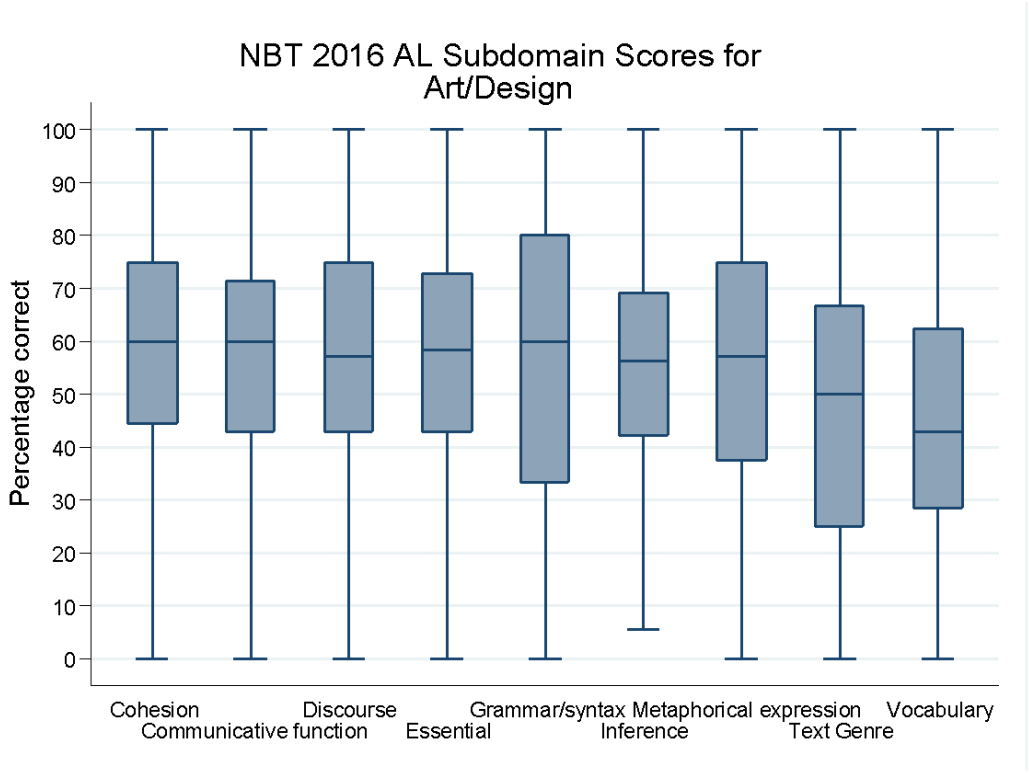

Figure 30 Art and Design sub-domain AL performance, NBT 2016

In the boxplots in Figure 31 below, the NBT AL sub-domain performance of candidates who were planning to apply for admission to the Business/Commerce/ Management faculty is graphically presented. What is evident in the boxplots is that performance was the lowest on Metaphorical expression, Text Genre and Vocabulary. It is also clear from the graph, however, that the largest proportion on the remaining subdomains fell below the Proficient band. The general picture therefore is that most of the candidates would need instructional support in all the NBT AL sub-domains and that these could help them reach required proficiency levels in AL.

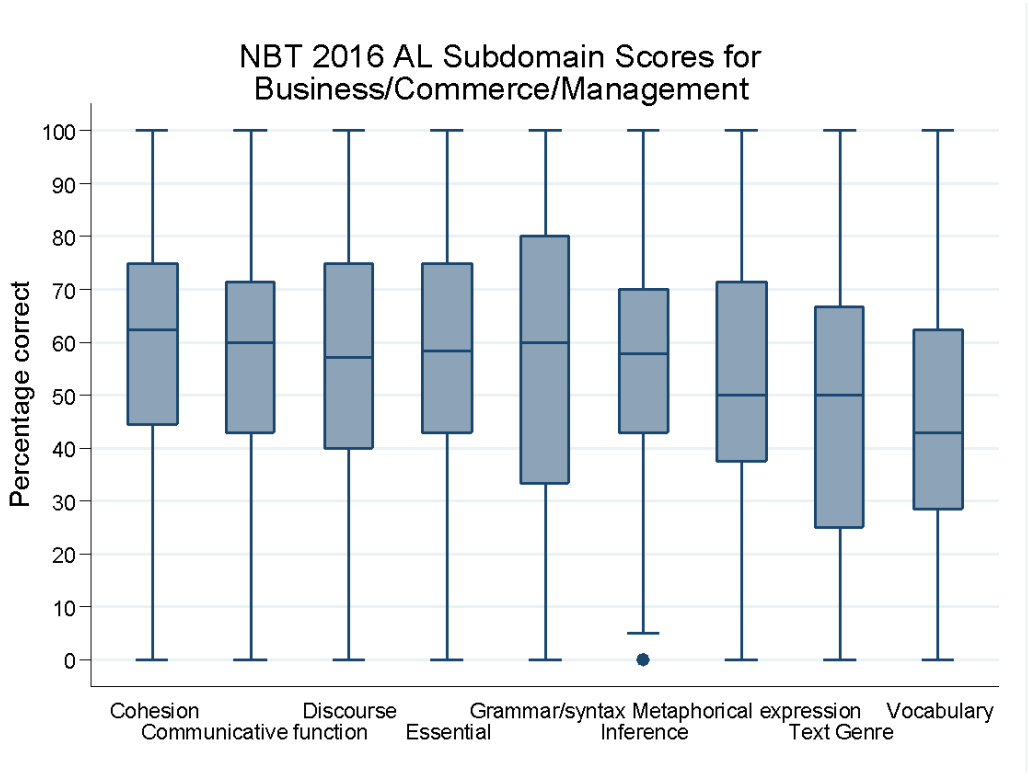

Figure 31 Business/Commerce and Management, AL performance NBT 2016

The performance of those who indicated that they intended to apply for admission to the faculty of Education on the subdomains of the NBT AL is presented in the boxplots in Figure 32 below. It can be seen from these boxplots that these candidates tended to obtain lower scores on Metaphorical expression, Text Genre and Vocabulary. In general, however, the median performance of this group of candidates in all sub-domains was below what would be expected from prospective educators. These candidates were mainly in the Intermediate bands. An AL instructional support course would help boost their academic literacy levels and would, in turn, improve their chances of success at academic study and better equip them to become effective educators.

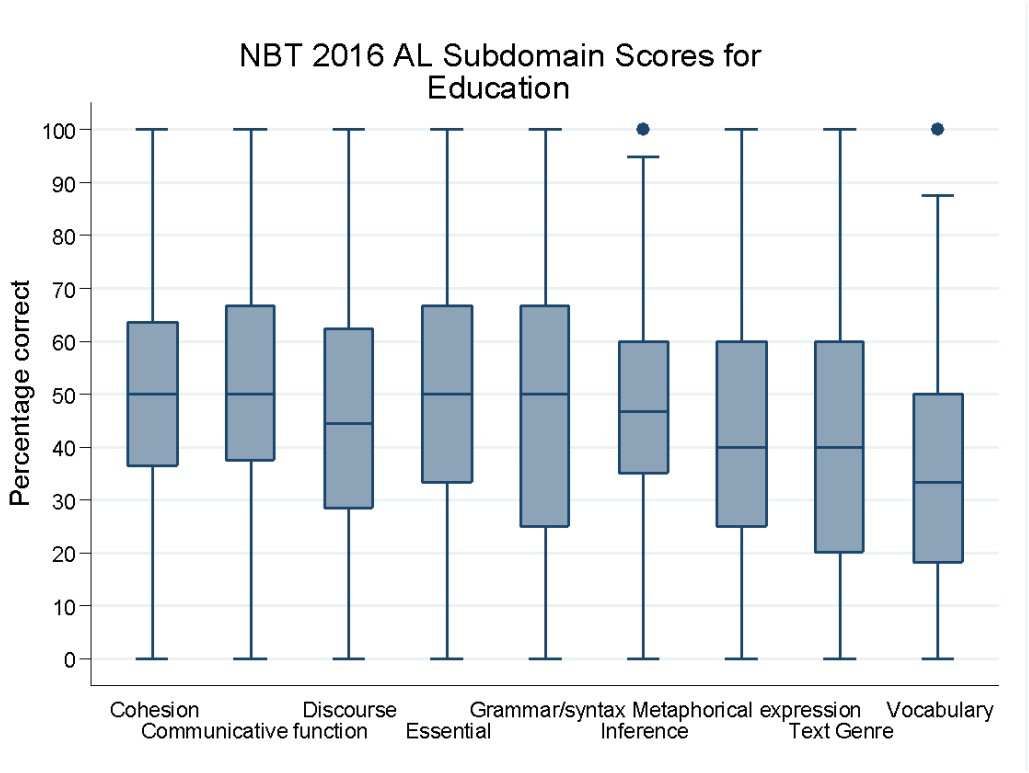

Figure 32 Education, AL performance NBT 2016

Figure 33 below contains a boxplot representation of the NBT AL subdomain performance of candidates who intended to apply for studies in the Faculty of Engineering and Built Environment. The boxplots show that these candidates' performance was the lowest on Metaphorical expression, Text genre and Vocabulary. It is also clear from the boxplots, however, that most of these candidates also scored below the Proficient band and mainly within the Intermediate band. This suggests that these candidates would need extra support in the domain of academic literacy as a whole if they are to cope sufficiently with the AL demands of academic study. Arguably, the three AL sub-domains in which these candidates have shown low proficiency may not be the most important AL sub-domains for Engineering students; however, shortfalls in any of the sub-domains could impede comprehension, and any AL curriculum intervention for those who enrol in these areas should give attention to all these sub-domains.

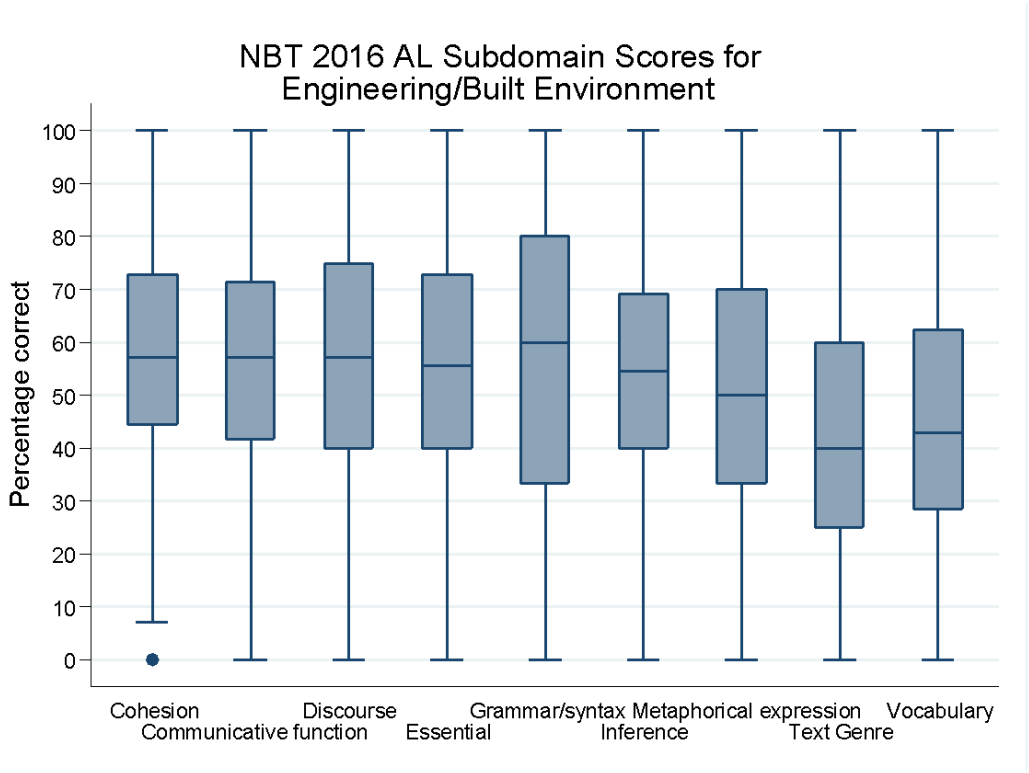

Figure 33 Engineering and Built Environment, AL performance, NBT 2016

The NBT AL sub-domain performance by candidates who intended to apply for courses in the Health Sciences is graphically presented in the boxplots in Figure 34 below. It is clear from the boxplots that performance by this group tended to be lower on Metaphorical expression, Text Genre and Vocabulary. As can also be seen from the graph, the median scores on the remaining subdomains were all higher than 50%. The overall picture, however, is that most of the scores fell within the Intermediate band, an indication that most of these candidates would struggle with the demands of academic literacy that are typical of higher education, and that they would need relevant intervention to increase their chances of success at academic study.

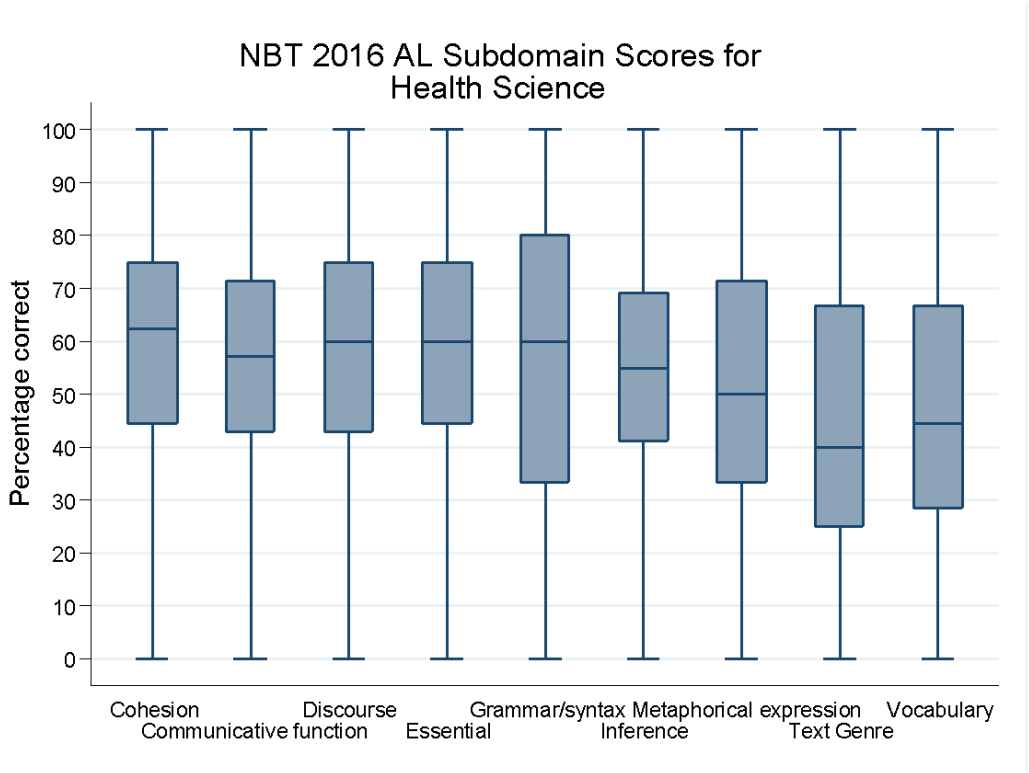

Figure 34 AL sub-domain scores for Health Science

Figure 35 below is a graphic representation of performance by candidates who intended to pursue studies in the Faculty of Hospitality and Tourism Management. As can be seen from this graph, the lowest median scores for this group were on Metaphorical expression, Text Genre and Vocabulary. It is also clear from the graph, however, that while the median scores on the other subdomains were higher, the largest proportion of the scores on these subdomains were mainly in the Intermediate band. This suggests that an academic literacy intervention that focuses on all AL subdomains would help these candidates cope with the language demands of their courses.

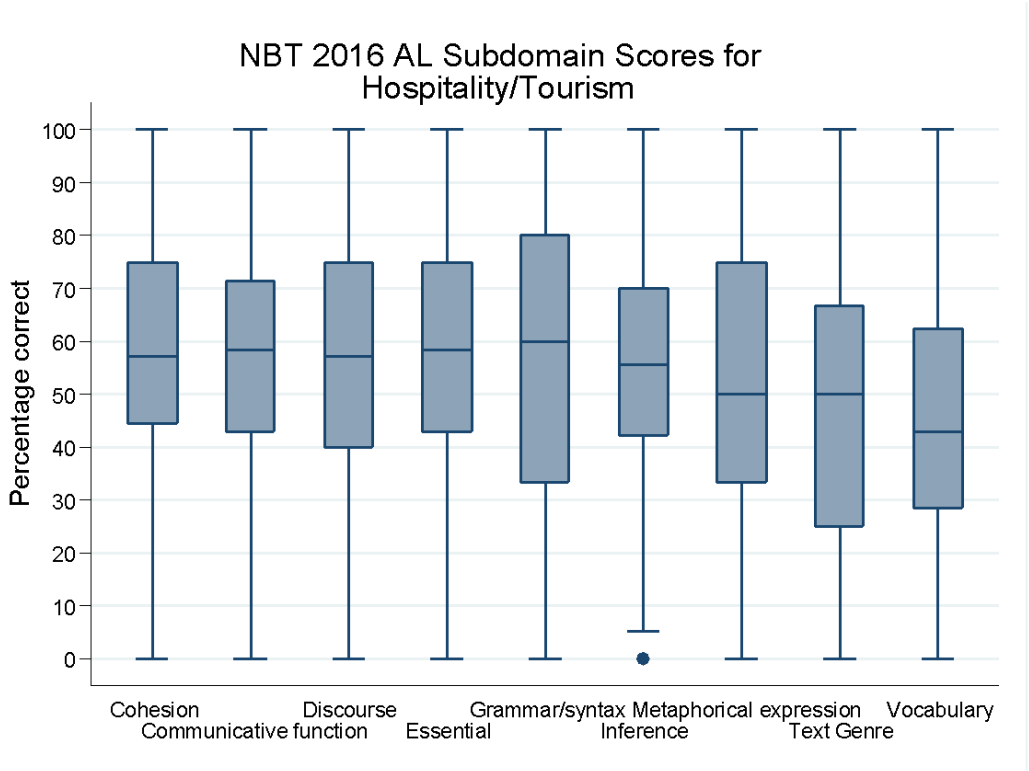

Figure 35 AL sub-domain scores for Hospitality/Tourism

The NBT AL performance by candidates who intended to apply for admission to the Humanities faculty is captured in Figure 36 below. It is clear from this representation that performance by these candidates was the lowest on Metaphorical expression, Text Genre and Vocabulary. In general, however, the majority of these candidates scored below the Proficient band and mainly within the Intermediate band. The ability to process stretches of texts is key to success in most courses offered in the Humanities. It is a cause for concern therefore that the majority of candidates who intended to pursue their studies in this faculty were not proficient in academic literacy. This suggests that these candidates would therefore need extra support in academic literacy to succeed at university.

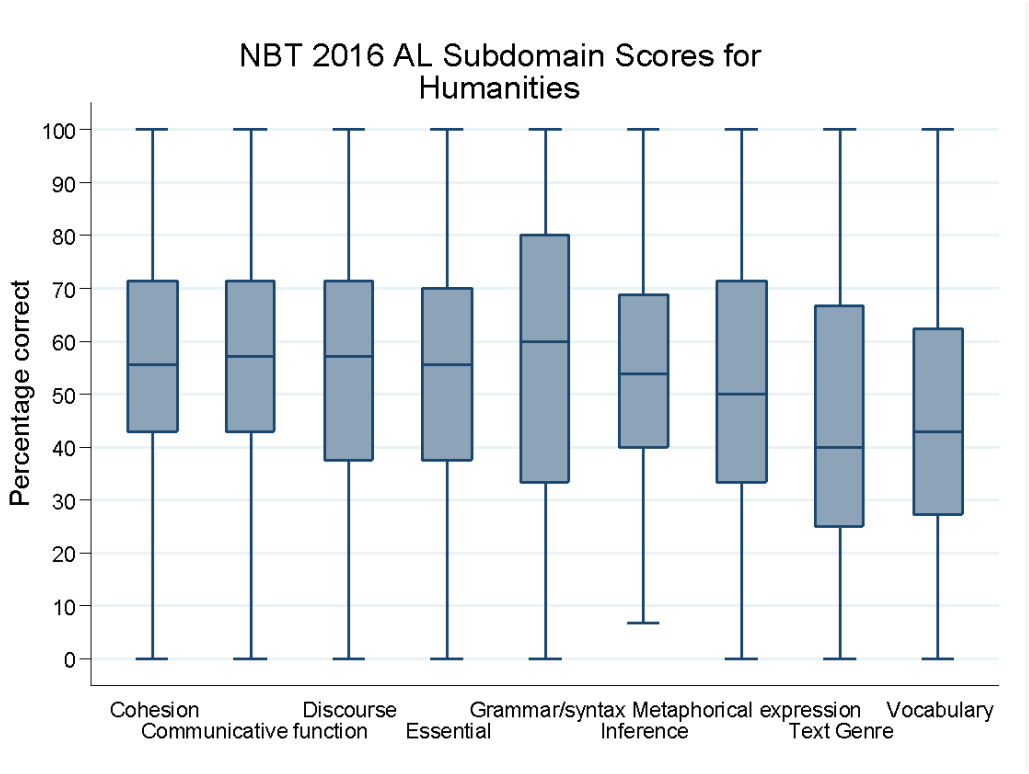

Figure 36 AL sub-domain scores for Humanities

Performance in the subdomains of the NBT AL by candidates who planned to enrol for courses in Information and Communication Technology is captured in Figure 37 below. As can be seen from this graph, performance by these candidates was also the lowest on Metaphorical expression, Text Genre and Vocabulary. As it has been the case with the other groups dealt with so far, however, the largest proportion of the scores on all subdomains for the current group fell within the Intermediate band, an indication that most of them would struggle with the academic literacy challenges of university education. The overall picture therefore is that these candidates would benefit from instructional support on all subdomains, including those in which performance was not quite poor.

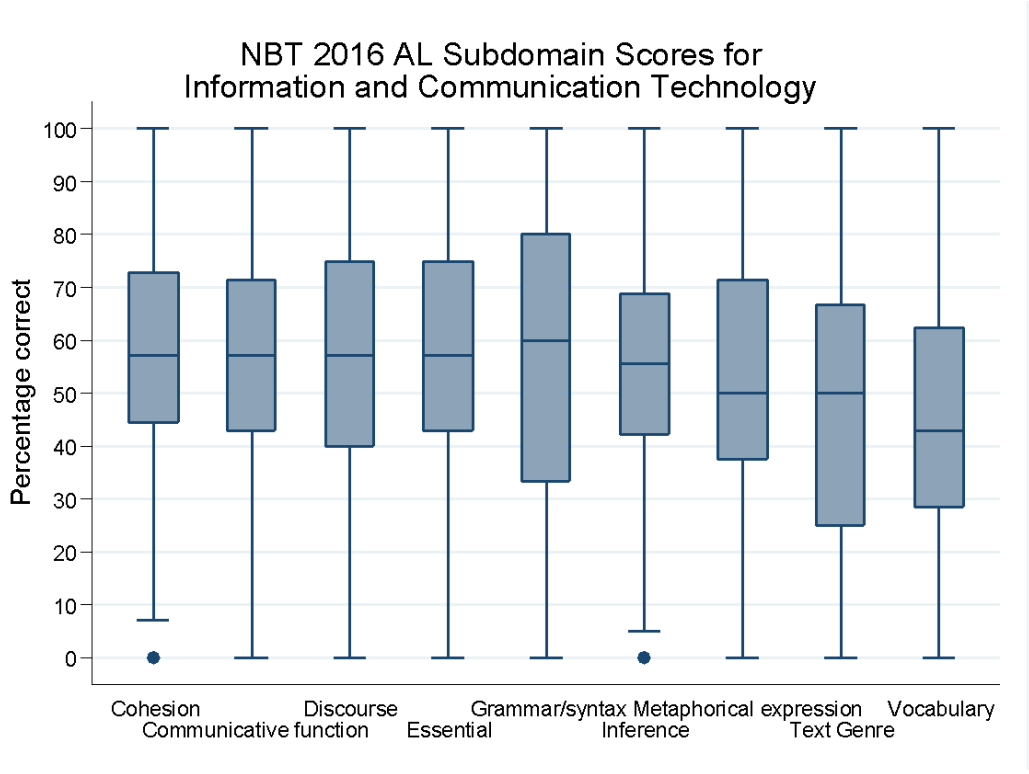

Figure 37 AL sub-domain scores for Information and Communication Technology

The NBT AL performance by candidates who intended to study Law is captured in the boxplots in Figure 38 below. It is clear from these boxplots that performance by these candidates was the lowest on Metaphorical expression, Text Genre and Vocabulary. Although the median scores for this group on the remaining subdomains were visibly higher, a substantial proportion of the scores were in the Intermediate band, an indication that a substantial proportion of this cohort would face language-related difficulties in their studies and that they would need assistance in this regard.

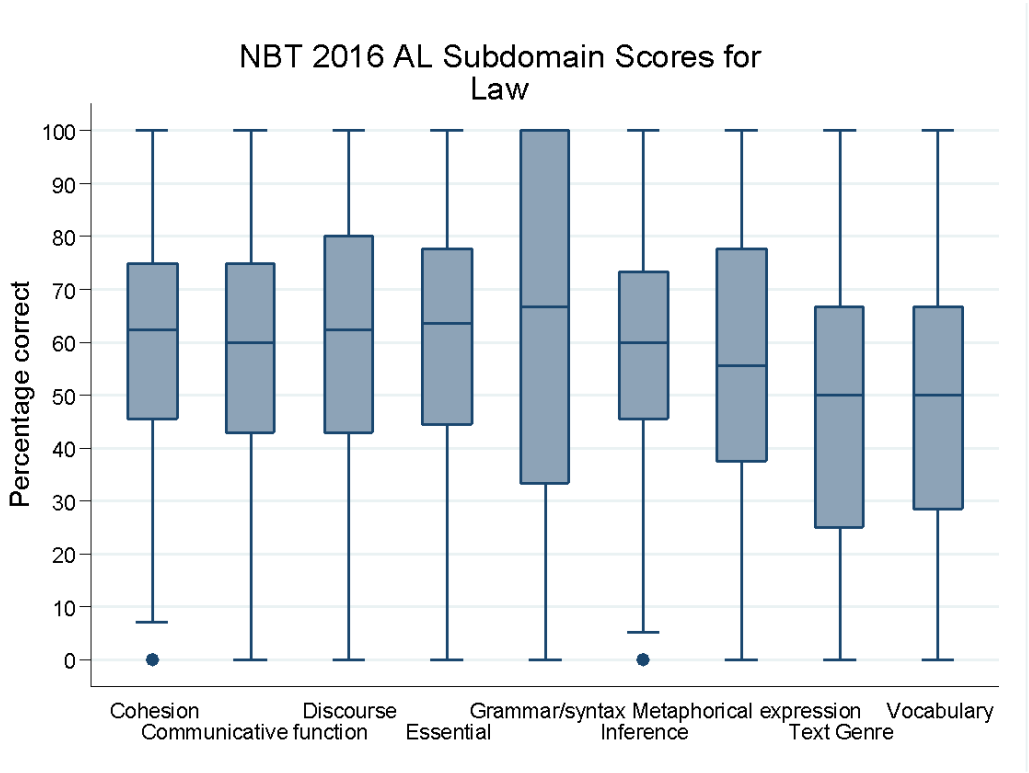

Figure 38 AL sub-domain scores for Law

The NBT AL sub-domain performance of candidates intending to enrol for Science/Mathematics is visually presented in Figure 39 below. It is clear from this graph that these candidates tended not to perform well on Text Genre and Vocabulary. It is also clear from the graph that the median scores for this group were the same and just average on Discourse Relations, Grammar/Syntax and Metaphorical expression. In the case of these candidates too, the largest proportion of the scores were in the Intermediate band. This suggests that most of these students were not adequately ready to cope with the academic literacy demands of academic education and that they would need support in academic literacy so that their chances of academic success are improved.

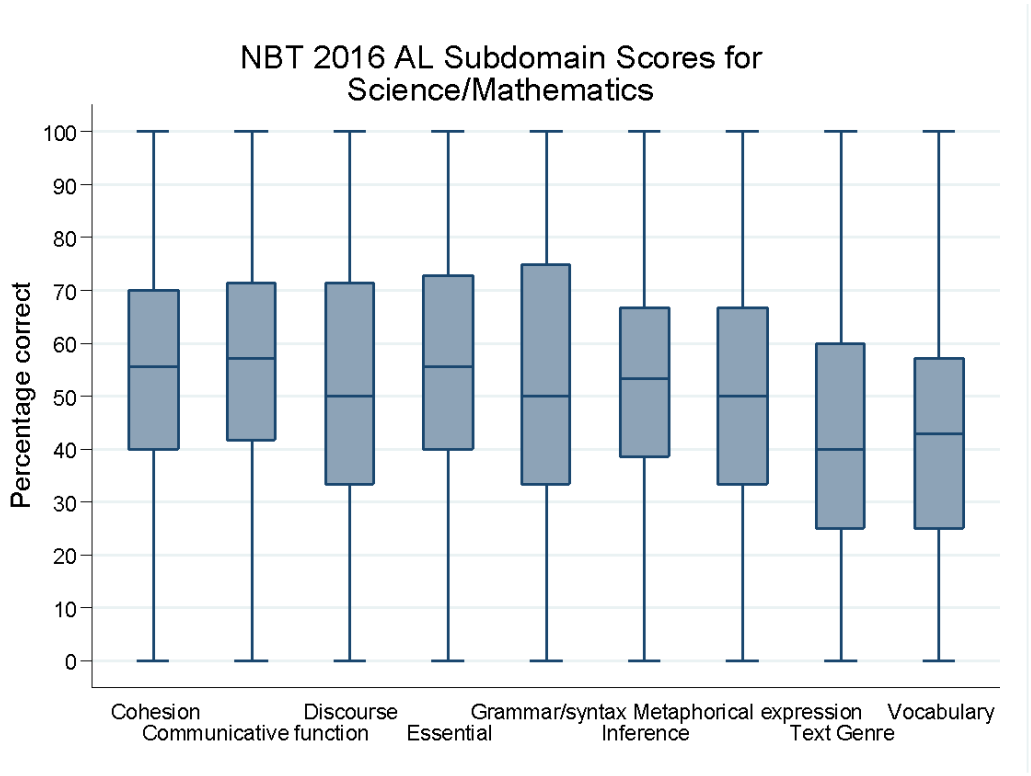

Figure 39 AL sub-domain scores for Science/Mathematics

THE CONSTRUCT OF THE QL TEST

The definition of quantitative literacy that underpins the NBT QL test is as follows:

> Quantitative literacy is the ability to manage situations or solve problems in practice, and involves responding to quantitative (mathematical and statistical) information that may be presented verbally, graphically, in tabular or symbolic form; it requires the activation of a range of enabling knowledge, behaviours and processes and it can be observed when it is expressed in the form of a communication, in written, oral or visual mode. (Frith and Prince, 2006:30)

The development of this definition was most strongly influenced by the definition of numerate behaviour underlying the assessment of numeracy in the Adult Literacy and Lifeskills (ALL) Survey (Gal, van Groenestijn, Manly, Schmitt & Tout, 2005:152) and the New Literacies Studies' view of literacy as social practice (Street, 2005; Street & Baker, 2006; Kelly, Johnston & Baynham, 2007). Lynn Steen (2004: 25) describes Quantitative Literacy as "QL is not a discipline but a literacy, not a set of skills but a habit of mind." He goes on to say that "…quantitative literacy is not really about [algorithmic abilities] but about challenging college-level settings in which quantitative analysis is intertwined with political, scientific, historical or artistic contexts. …" The items in the Quantitative Literacy test are grouped into sub-domains according to the six main mathematical and statistical ideas dimension tested by the questions. Table 14 gives a description and specification of the mathematical and statistical ideas dimension of the construct tested by the QL test.

Table 15 Competency specification for the Quantitative Literacy test by Mathematical and Statistical Ideas

Skill Assessed	Description of skill
Quantity, number and operations.	• The ability to order quantities, calculate and estimate the answers to computations required by a context, using numbers (whole numbers, fractions, decimals, percentages, ratios, scientific notation) and simple operations (+, -, ×, ÷, positive exponentiation) on them. • The ability to express the same decimal number in alternative ways (such as by converting a fraction to a percentage, a common fraction to a decimal fraction and so on) • The ability to interpret the words and phrases used to describe ratios (relative differences) between quantities within a context, to convert such phrases to numerical representations, to perform calculations with them and to interpret the result in the original context. The ability to work similarly with ratios between quantities represented in tables and charts, and in scale diagrams.
Shape, dimension and space.	• The ability to understand the conventions for the measurement and description (representation) of 2- and 3-dimensional objects, angles and direction, • The ability to perform simple calculations involving areas, perimeters and volumes of simple shapes such as rectangles and cuboids.
Relationships, pattern, permutation	• The ability to recognize, interpret and represent relationships and patterns in a variety of ways (graphs, tables, words and symbols) • The ability to manipulate simple algebraic expressions using simple arithmetic operations.

Change and rates	• The ability to distinguish between changes (or differences in magnitudes) expressed in absolute terms and those expressed in relative terms (for example as percentage change) • The ability to quantify and reason about changes or differences. • The ability to calculate average rates of change and to recognise that the steepness of a graph represents the rate of change of the dependent variable with respect to the independent variable. • The ability to interpret curvature of graphs in terms of changes in rate.
Data representation and analysis	• The ability to derive and use information from representations of contextualised data in tables (several rows and columns and with data of different types combined), charts (pie, bar, compound bar, stacked bar, 'broken' line, scatter plots) graphs and diagrams (such as tree diagrams) and to interpret the meaning of this information. • The ability to represent data in simple tables and charts, such as bar or line charts.
Chance and uncertainty	• The ability to appreciate that many phenomena are uncertain and to quantify the chance of uncertain events using empirically derived data. This includes understanding the idea of taking a random sample. • The ability to represent a probability as a number between 0 and 1, with 0 representing impossibility and 1 representing certainty.

The boxplots that follow reflect information from the candidates of the NBT QL test in the 2016 intake year. The candidates were asked to indicate their first choice for field of study and the associated faculty at the institution they wish to study. The boxplots are for the eleven faculties and show the distributions of student scores on different sub-domains of questions in the Quantitative Literacy test.

The candidates who intended to study in the Allied Healthcare and Nursing Faculty fared consistently poorly across the six competence areas (sub-domains). The boxplots in Figure 40 indicate that the median scores varied across the six competence areas, ranging between 28% and 39%. The median scores for the six sub-domains all fall within the Basic performance band. The interquartile range (67% - 0%) was the largest for 'chance and uncertainty'. For the 'quantity, number and operations' sub-domain, there is a large tail of outliers indicating the few candidates obtaining scores between 60% - 95%. This large tail occurring outside the maximum value is also an indication of a skewed distribution with the majority of candidates performing poorly and a few candidates (outliers) falling within the Proficient band. For the 'data representation and analysis' sub-domain, the 75th percentile was 43%.

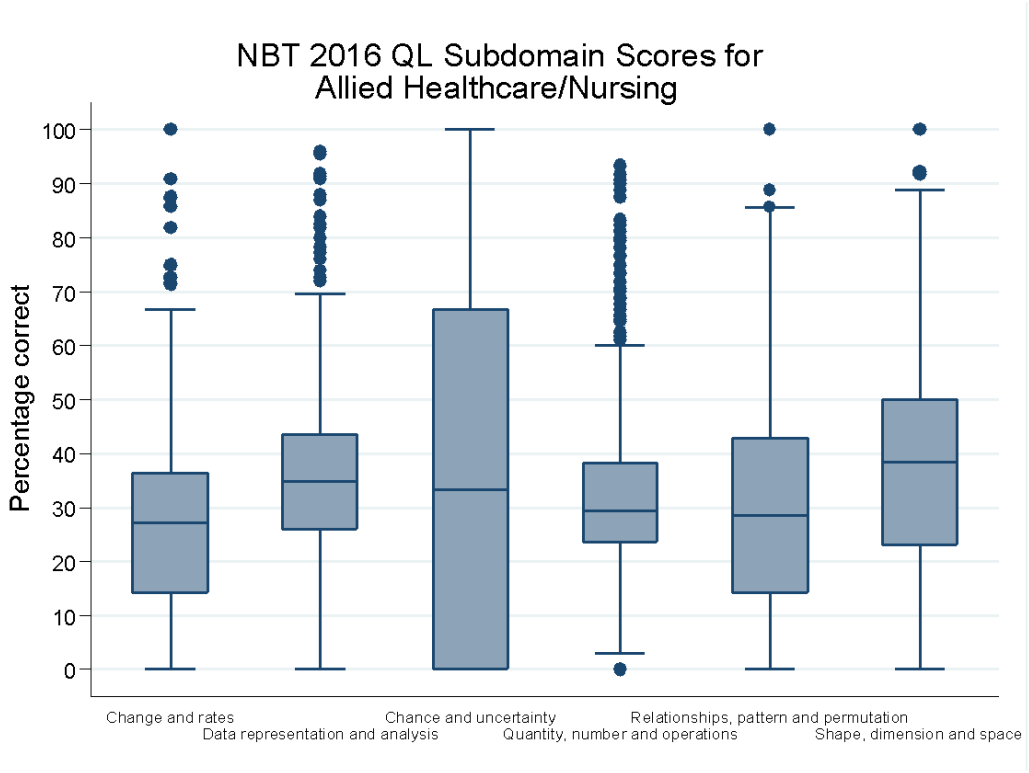

Figure 40 Allied Healthcare and Nursing subdomain QL performance, NBT 2016

The median score of 29% for the subdomain ‘change and rates’ was lowest for the candidates who indicated they intended to study Art and Design and this score falls within the Basic performance band. Overall the performance is poor, with median scores for the six subdomains ranging between 29% and 45% and the 75th percentile score of less than 55% for five of the six subdomains. The spread of scores in the box for the ‘chance and uncertainty’ subdomain is larger than the other boxes, indicating that 50% of the scores fall within this range. With such low median scores across the six subdomains candidates will require support in order to meet the academic demands of higher education.

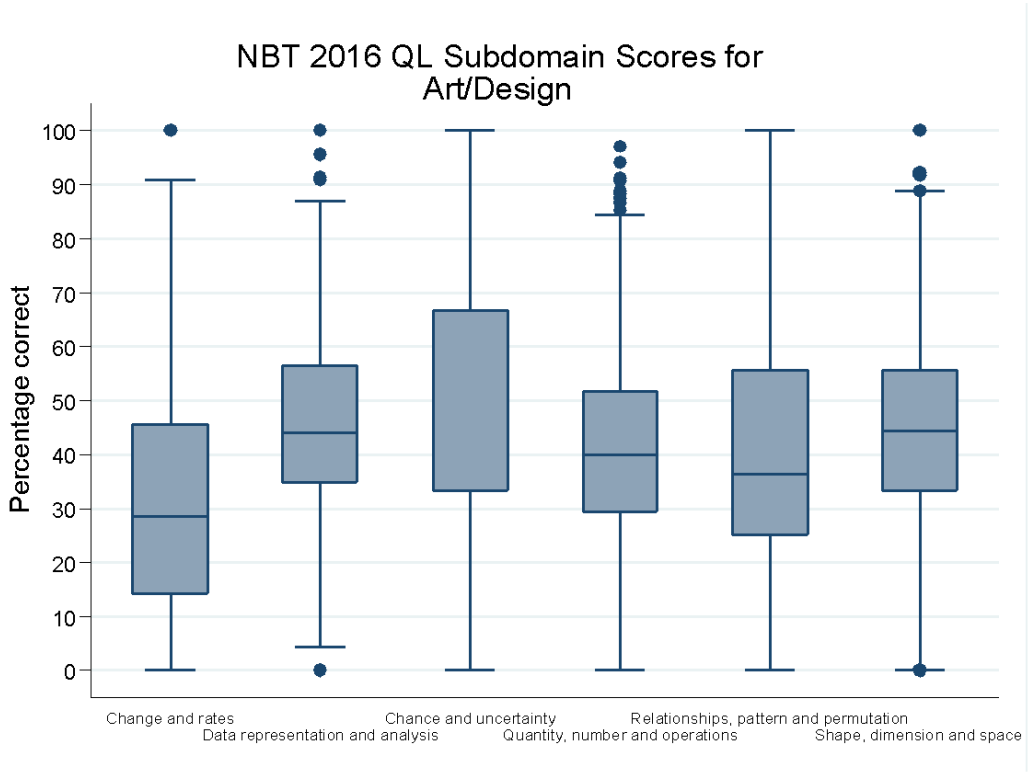

Figure 41 Art and Design subdomain QL performance, NBT 2016

The performance for candidates applying to the Business/Commerce and Management Faculty looked much better than the previous two faculties. The medians for the six subdomains ranged between 42% and 68%, which fall within the Intermediate performance band. The subdomain 'chance and uncertainty' has a median score of 68% and 50% of the scores are located between 32% and 100%. Most of the courses in this faculty have a large proportion of mathematical content (graphs, tables, computations) and candidates will need additional support in quantitative reasoning to meet the demands of higher education.

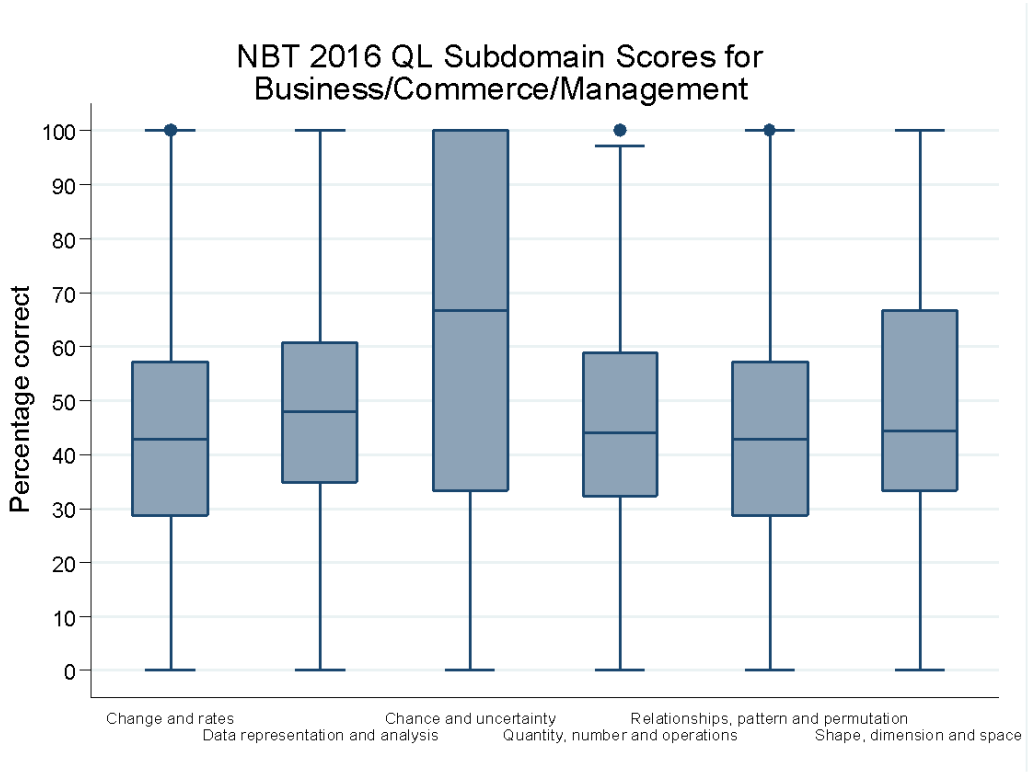

Figure 42 Business/Commerce and Management, QL performance NBT 2016

The QL performance of the Education candidates was very poor across the six subdomains and the medians were in the Basic performance band. For the subdomains ‘data representation and analysis’ and ‘quantity, number and operations’ there was a large tail (outliers) beyond the maximum values. For the subdomain ‘chance and uncertainty’ 75 percent of the scores range between 0% and 65% and shows a larger spread of scores, whilst for the subdomain ‘quantity, number and operations’ the spread of the scores is smaller as is evident in the box in Figure 43.

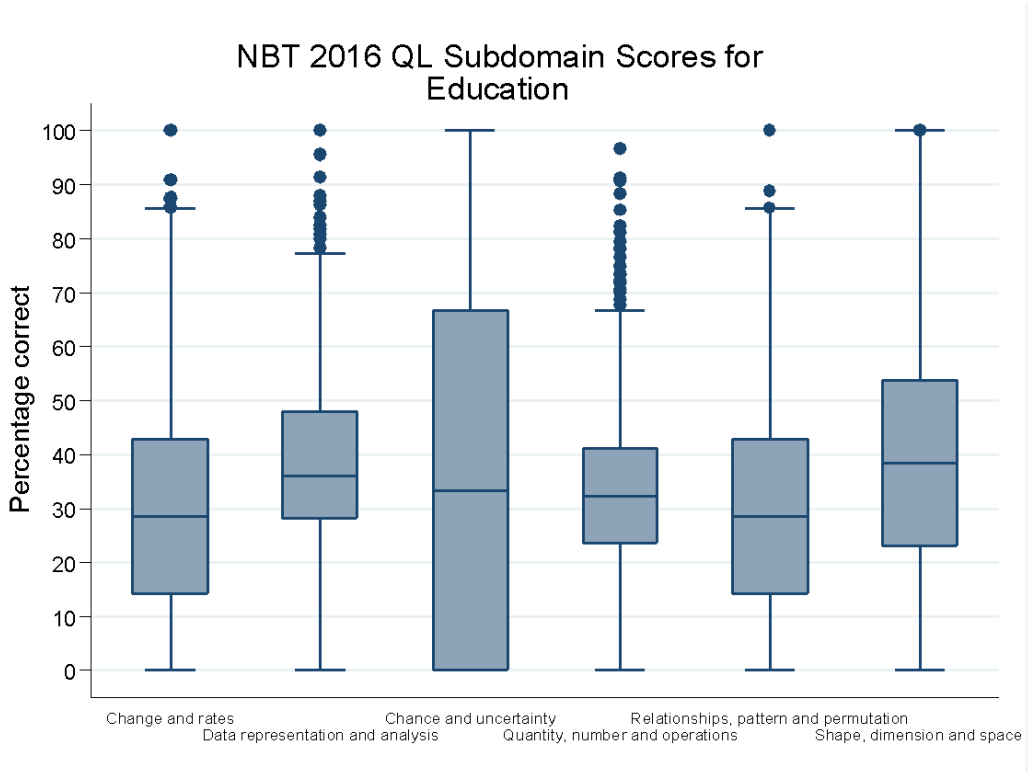

Figure 43 Education subdomain QL performance, NBT 2016

The QL performance of the candidates applying to the Engineering and Built Environment faculty was surprisingly low considering that all the course content is heavily reliant on mathematical and quantitative knowledge and skills. Across the six subdomains, the median scores were between 42% and 68% which is within the Intermediate performance band. Figure 44 shows that there were candidates who reported scores of 0% (minimum) and candidates who reported a maximum score of 100%. For the subdomains 'relationships, pattern and permutation' and 'shape, dimension and space' 25% of the candidates had scores above 68% and these candidates will more than likely be able to cope with the quantitative content of the courses.

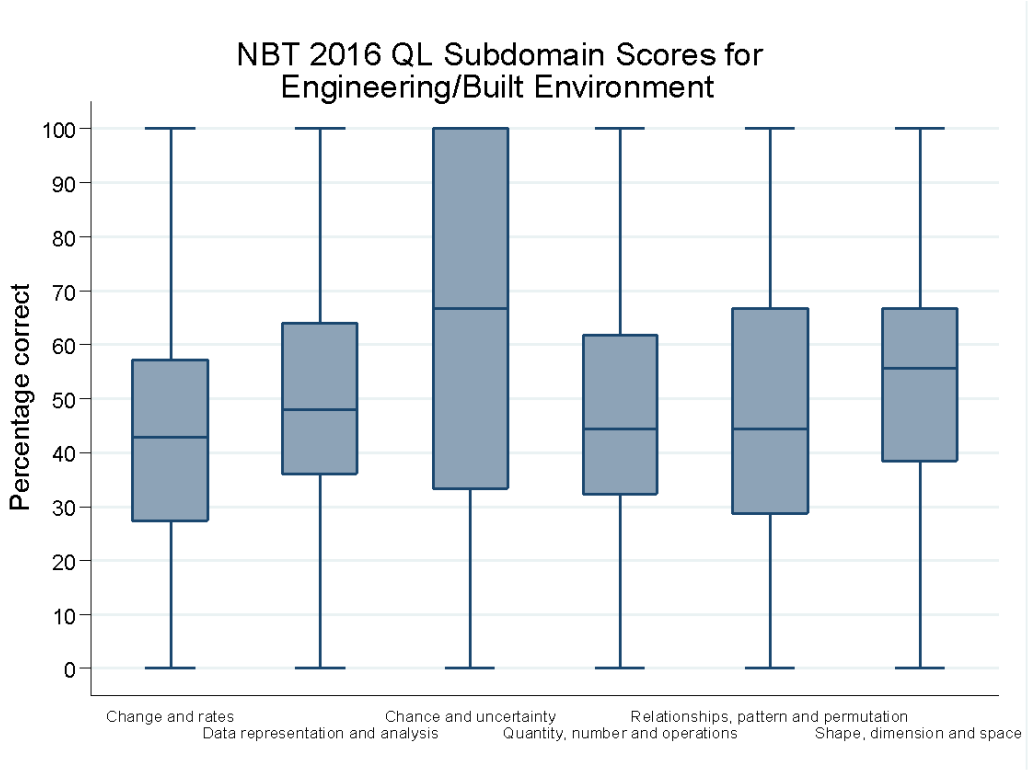

Figure 44 Engineering and Built Environment QL subdomain performance, NBT 2016

An interesting picture emerges for the candidates who applied to Health Sciences. There are candidates that obtained a minimum value of 0% and others obtained a maximum value of 100% for all six subdomains. The median scores are between 37% and 48%. The 3rd quartile points for the six subdomains were all nearly 60% with the exception of 'chance and uncertainty' which was 65%. Some candidates in this faculty would benefit from additional QL support as there would be some mathematical computation and mathematical knowledge required in their course work.

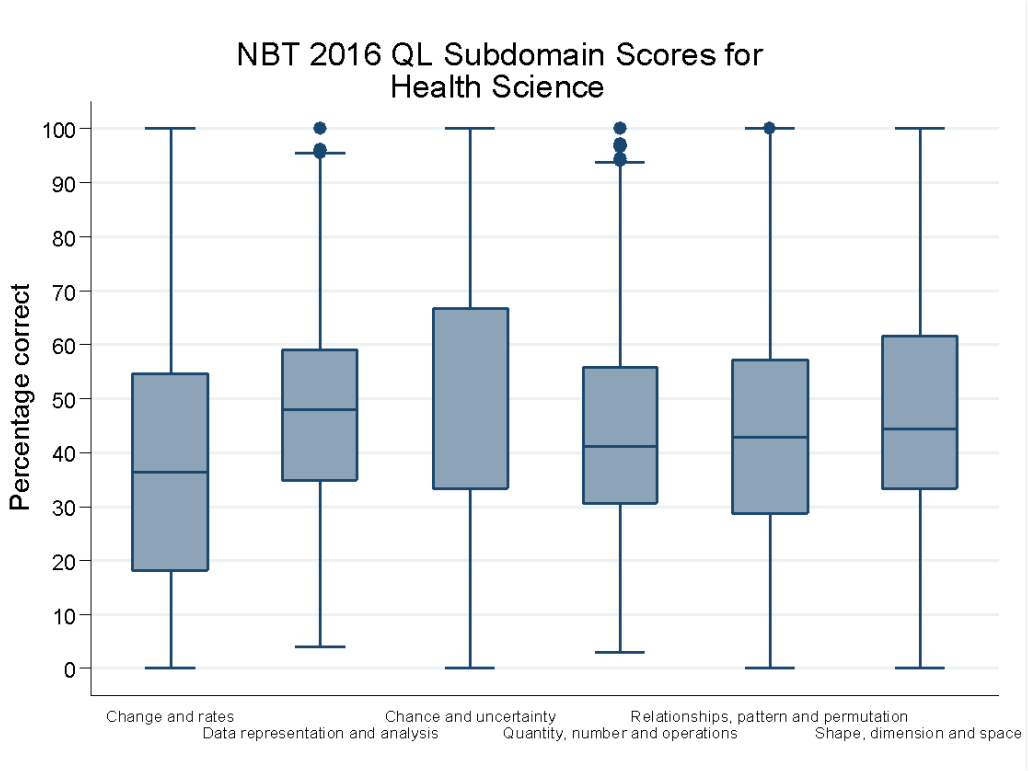

Figure 45 Health Sciences QL subdomain performance, NBT 2016

The median scores of the NBT QL candidates who indicated that they applied to the Hospitality and Tourism faculty ranged between 29% and 50% across the six subdomains. The subdomain 'quantity, number and operations' had a large number of outliers beyond the maximum value of 80%. Candidates in this faculty may be required to read graphs, charts and tables and hence the subdomain 'data representation and analysis' may be necessary for the candidates. This subdomain's median is 43% and the 3rd quartile point is 55%. Candidates in this faculty may not need extensive QL support as most of the courses are unlikely to be heavily reliant on QL.

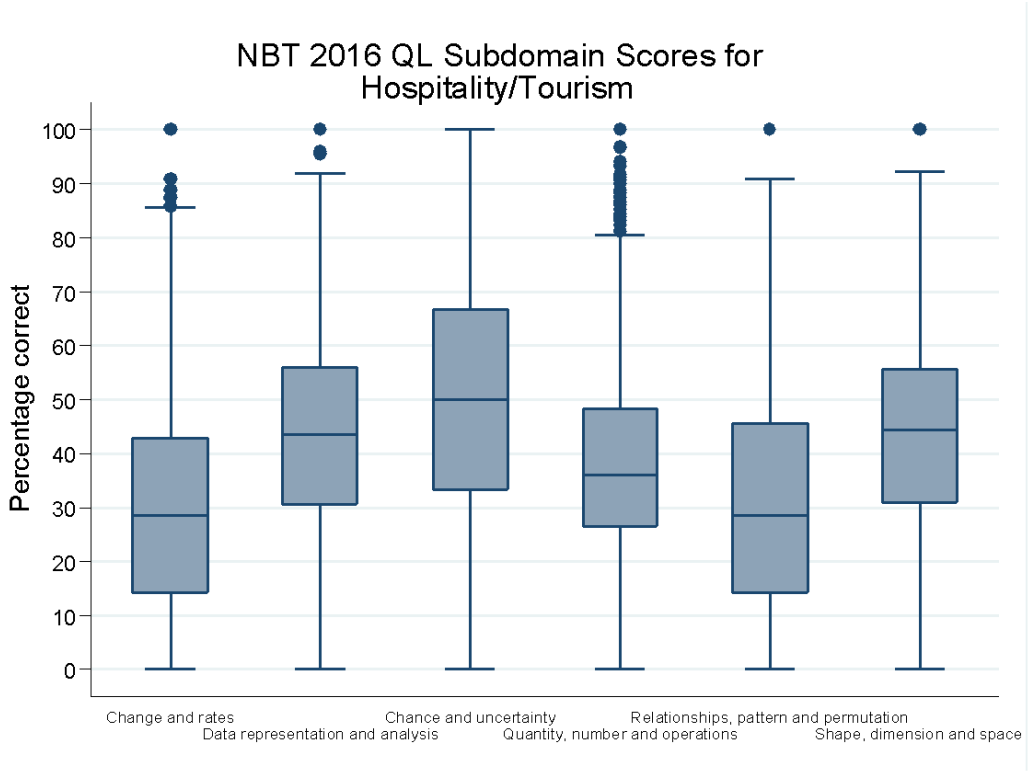

Figure 46 Hospitality and Tourism QL subdomain performance, NBT 2016

A similar pattern to that of Engineering and Built Environment faculty emerges for the Humanities candidates, with the boxplot stretching from a minimum value of 0% to a maximum value of 100%. The median scores across the six subdomains range between 38% and 68% which is within the Intermediate performance band. Some departments in this faculty may have a large proportion of work that requires quantitative reasoning and the performance across the six subdomains suggest that some candidates may fare better than others. The candidates performed better on the subdomain 'chance and uncertainty' than the other five subdomains, with a median score of 68% which indicated that 50% of the candidates were above this score. 'Data representation and analysis' had a rather low median score of 37% and 50% of the candidates located between 15% and 55% mark.

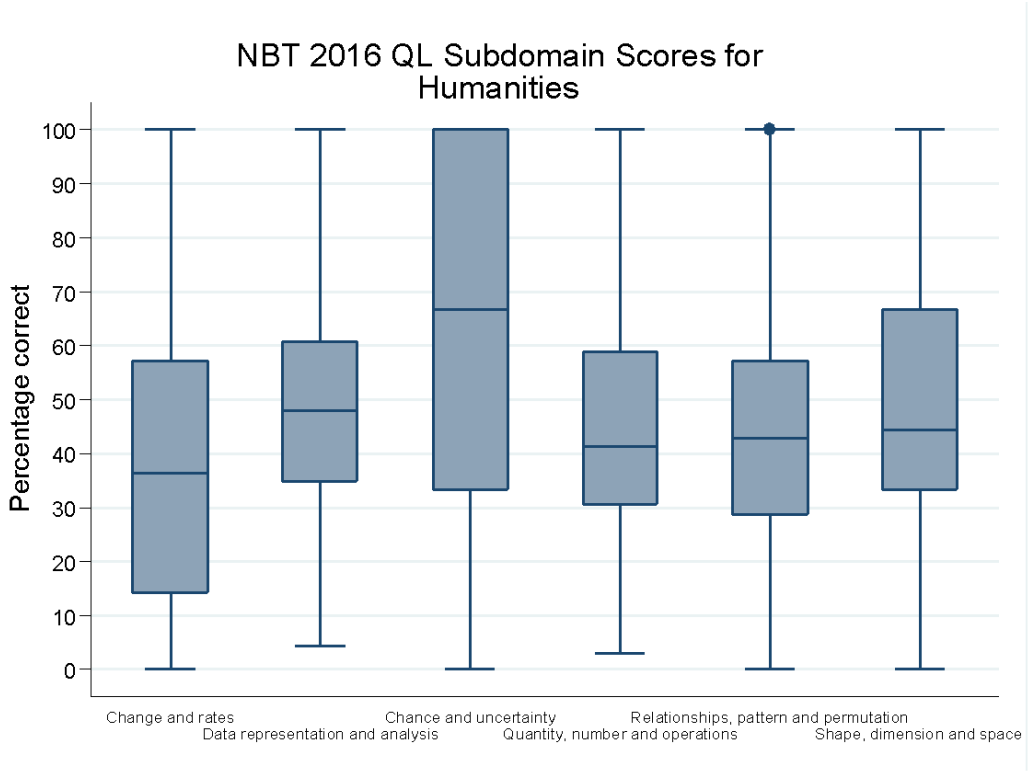

Figure 47 Humanities QL subdomain performance, NBT 2016

The median for the subdomain ‘chance and uncertainty’ is 50% and the medians for the other five subdomains were well below 50%. The QL performance on the subdomains is surprisingly low considering that candidates in this faculty are expected to have mathematical and quantitative reasoning as most of the courses require computations and quantitative manipulations. The subdomain ‘change and rates’ had the lowest performance, with a median of 39%. Many of these candidates would benefit from support or interventions in QL in order to meet the required quantitative demands.

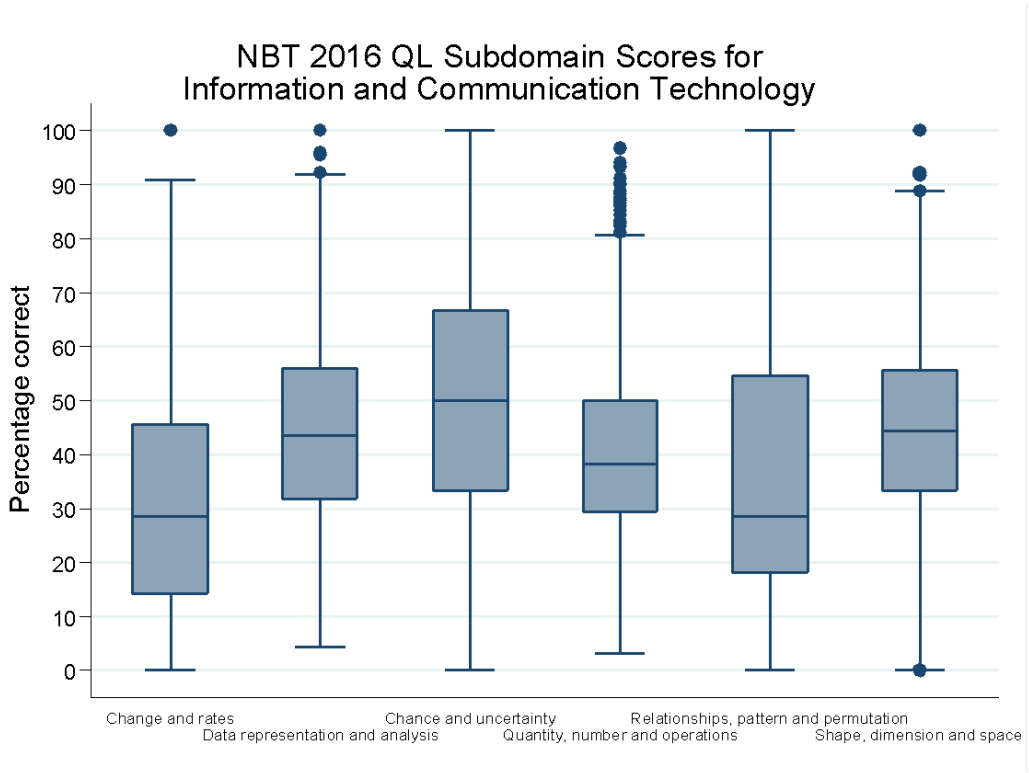

Figure 48 Information and Communication Technology subdomain QL performance, NBT 2016

Surprisingly, the QL performance of the candidates who applied to study Law was the best (despite the low medians) of all the faculties. The medians ranged between 42% and 68% across the six subdomains. For the subdomain 'relationships, patterns and permutation' the 3rd percentile point was above 70%, and for 'chance and uncertainty' the 3rd percentile point was the maximum value. The courses in the Law faculty may require some quantitative reasoning ability from the candidates but may not impede their academic success.

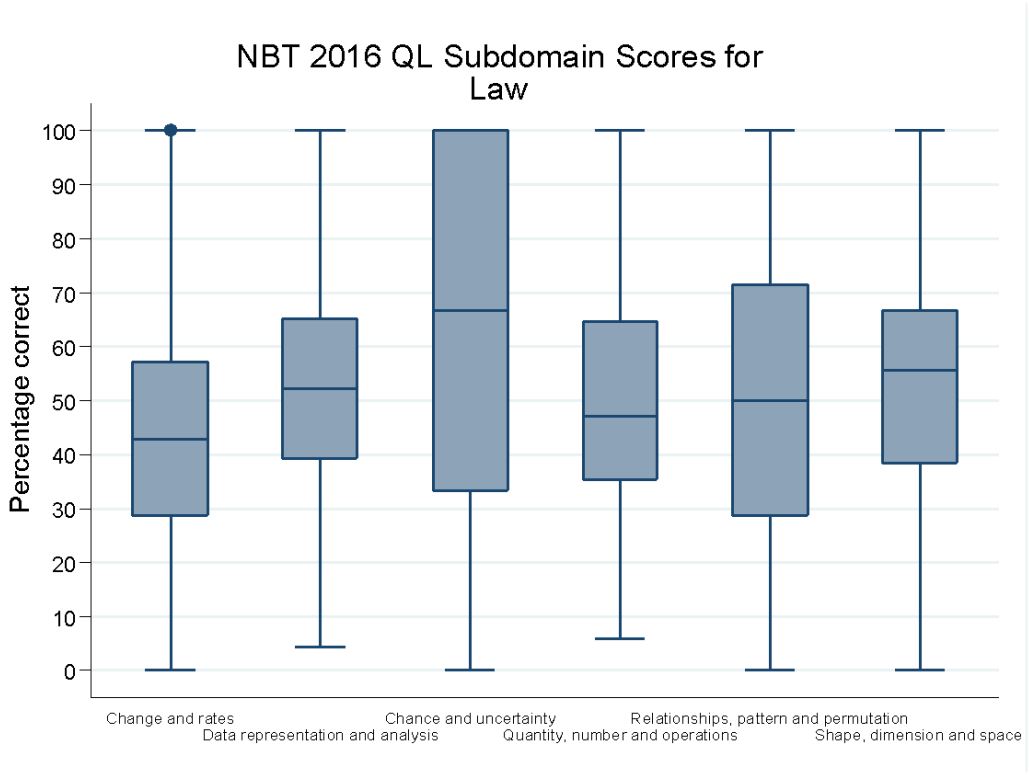

Figure 49 Law QL subdomain performance, NBT 2016

The performance for candidates in the Science/Mathematics faculties is rather disturbing. The course content in these faculties is heavily reliant on quantitative reasoning, mathematical knowledge and skills. Candidates will be doing mathematical computations and manipulations and a basic foundation of mathematics is required. The median scores ranged between 29% and 50% and are particularly low for subdomains 'change and rates', 'quantity, numbers and operations' and 'relationships, pattern and permutations'. The candidates will need a good grounding in quantitative skills, knowledge and understanding in order meet the demands of tertiary science or maths courses. These students may require additional QL support during their academic studies at universities.

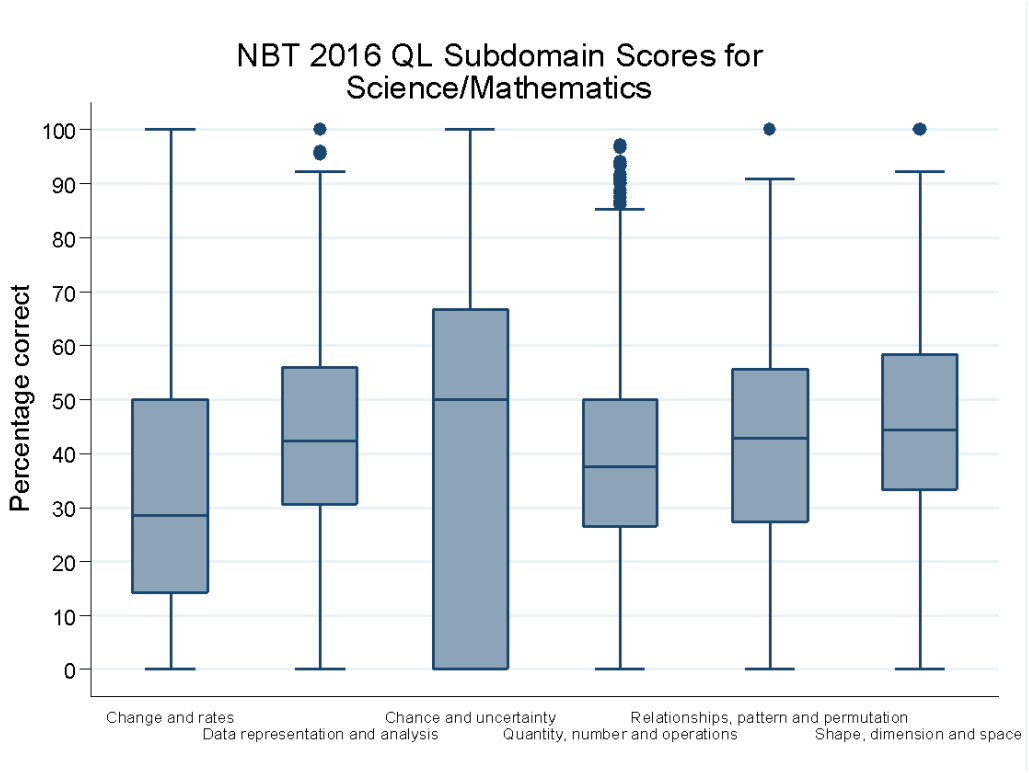

Figure 50 Science and Mathematics QL subdomain performance, NBT 2016

THE CONSTRUCT OF THE MAT TEST

The boxplots that follow later in this section reflect information from the candidates who wrote the NBT MAT test in the 2015 intake year. The candidates were asked to indicate their first choice for field of study and the associated faculty at the institution they wish to study. Eleven faculties are reflected. The boxplots show the distributions of student scores on different subdomains of questions in the Mathematics test.

The content of the MAT test is embedded in the NSC Mathematics curriculum (the CAPS, taking into account the pace-setter guidelines for teaching), but aligned with first year mainstream needs (content selected in consultation with academics teaching courses requiring mathematics). The MAT test specification comprises items which are distributed over six competence areas, subdivided into different sub-areas, and categorised according to cognitive level. For teaching and learning diagnostic purposes, different aspects are grouped together into five subdomains. The subdomains are 'algebraic processing', 'number sense', 'functions and graphs', 'trigonometric functions and graphs', and 'geometric reasoning'. It should be noted that the MAT subdomains 'number sense' and 'geometric reasoning' are associated with the QL subdomains 'quantity, number and operation', and 'shape, dimension and space' but are essentially different, especially in the sense that for QL no specific school curriculum knowledge is required, whereas the MAT subdomains are integrally related to the CAPS.

The NSC exam (school exit, norm-referenced) and NBT (university entry, criterion-referenced) are complementary but different forms of assessment. Not all school topics are necessarily tested in the MAT tests. The focus is on the areas that have most significance for first year mathematics courses.

The patterns of performance in the subdomains differ across faculties, with lower performance in the faculties of Art and Design, Humanities, Law and Education. In all cases the median values lie in the Lower Intermediate or in the Basic band, indicating a need for support in all mathematical subdomain areas for most students.

This analysis can also be done for a particular cohort of students (e.g. all those registered for a specific module), giving lecturers a useful tool for aligning their teaching with the needs of their students. The subdomain analysis for the various faculties gives an indication of the degrees of difficulty experienced within the different subdomains. This analysis highlights the subdomains in which prospective students may experience challenges when faced with mathematical courses and modules at university. An understanding of the difficulties that students/learners experience can improve teaching and learning practices at university; it can also aid educators at schools to change, adapt or improve their teaching strategies.

In a large number of institutions worldwide, for many years there has been an increased focus on preparatory, introductory or other support courses in Mathematics. In 1996 Hillel (see Hillel, 1996, in Mamona-Downs & Downs, 2002) noted that

> "The problem of the mathematical preparation of incoming students, their different socio-cultural background, age, and expectations is evidently a worldwide phenomenon. The traditional image of a mathematics student as well prepared, selected, and highly motivated

simply doesn't fit present-day realities. Consequently, mathematics departments find themselves with a new set of challenges" (p. 166).

Central to the issues of teaching and learning mathematics is the idea that mathematics has to be learnt through active engagement (Mason, 2002). The sub-domain information facilitates both prospective students' and lecturers' active engagement with the mathematical content they will need to deal with.

Table 15 Mathematical skills assessed in the NBT MAT

Skill assessed	Explanation of skill area
Algebraic processes	• Pattern recognition, sequences and series, use of sigma notation. • Operations involving relationships such as ratios and percentages. • Modelling situations by making use of mathematical process skills (translation from language to algebra, solution of problems). • Operations involving surds, logarithms and exponents, including solution of exponential equations. • Financial calculations (compound interest, appreciation, future value, etc.). • Number sense – manipulations/simple calculations involving integers, rational and irrational numbers. • Algebraic manipulation (includes expressions, equations, inequalities, simplification, factorisation, completing the square).
Functions represented by graphs and equations; 'functions' to include linear, quadratic, hyperbola, cubic, exponential and logarithmic. Other graphs such as circles are also included.	• Comprehension of function notation, substitution, domain, range. • Function representation (algebraic and graphic); properties of functions and graphs (such as intercepts, turning points, asymptotes); relationship between graphs and their equations; interpretation of graphical information. • Transformations of graphs of the functions noted above; solution of related problems; inverses of functions. • Applications of principles of differential calculus and related problems involving simple linear, non-linear functions (i.e. critical points, increasing/decreasing functions, tangents); interpretation of behaviour of function from derivative and vice versa.
Basic trigonometry, including graphs of trigonometric functions, problems requiring solutions of trigonometric equations and application of trigonometric concepts.	• Definitions of trigonometric ratios (sine, cosine, tangent). • Characteristics and interpretations of trigonometric functions and their graphs (e.g. domain, range, period, amplitude), including transformations of trigonometric functions. • Solving of trigonometric equations and using identities; simplification of trigonometric expressions using identities and reduction formulae where necessary; special angles; compound and double angles. • Application of area, sine and cosine rules • Application of trigonometric concepts in solving problems, including two- and three-dimensional problems.
Spatial perception including angles, symmetries, measurements, representations and interpretation of two-dimensional and three-dimensional shapes.	• Geometric objects • Properties of 2D figures and 3D objects (such as the circle, rectangle, trapezium, sphere, cone, pyramid). • Scale factor • Perimeter, area, volume (also of composite figures and objects) • Analytic geometry (linking geometric and algebraic properties in the Cartesian plane).

	• Circle Geometry • Cyclic quadrilaterals • Relationships between tangents, and chords, and angles in a circle
Data handling and Probability	• Measurement (and related interpretations). • Representation (such as histograms, line graphs, pie charts, ogives, box-and-whisker plots) and related interpretations). • Probability
Competent use of logical skills in making deductions and determining the validity of given assertions	

Some of the candidates who have applied to study in the area of the Allied Healthcare/Nursing may need to take Mathematics courses in order to study other subjects such as Physics, Chemistry and Biology. The boxplots show median scores of about 30% or less in all subdomains, i.e. in the Basic band. Apart from quite a large number of outliers in all subdomains other than 'number sense', the scores are a matter of concern, and these applicants will need fairly extensive support in all subdomains.

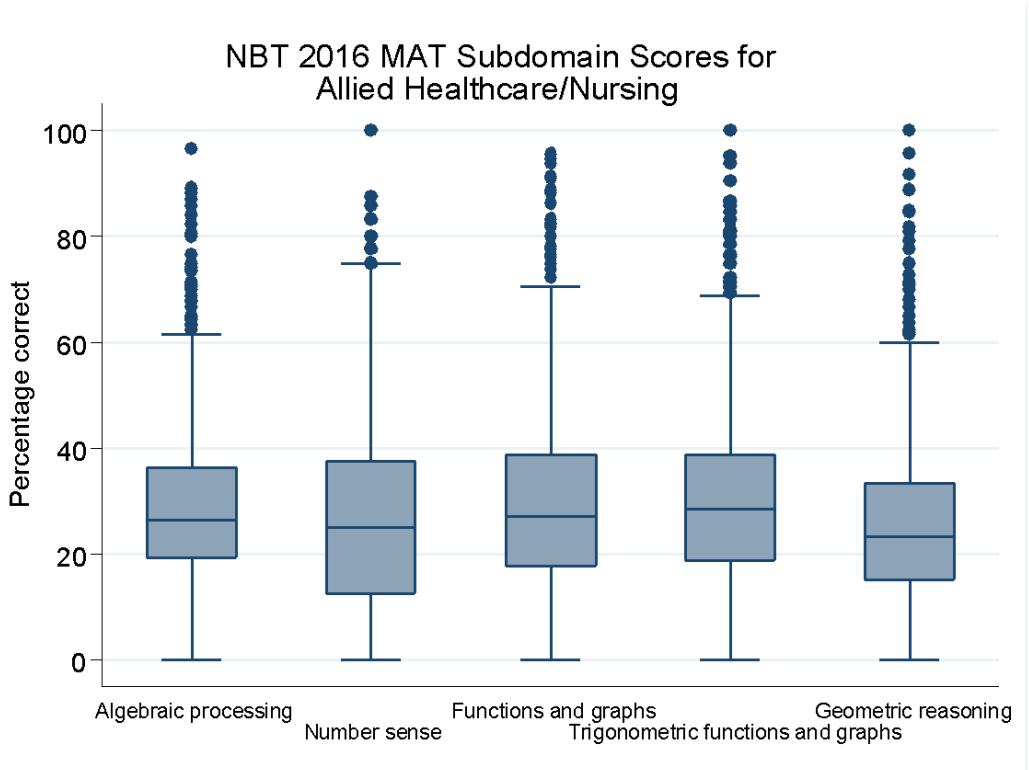

Figure 51 MAT subdomain scores for Allied Healthcare/Nursing

Applicants indicating the area of Art and Design as their first choice may well not have taken NSC Mathematics; many may have taken Mathematical Literacy and would therefore not have been equipped to write the NBT MAT test. Low scores in all subdomains represented in the boxplots should be interpreted with caution. It is however interesting that scores for this group are actually higher than those for applicants to the Allied Healthcare/Nursing group.

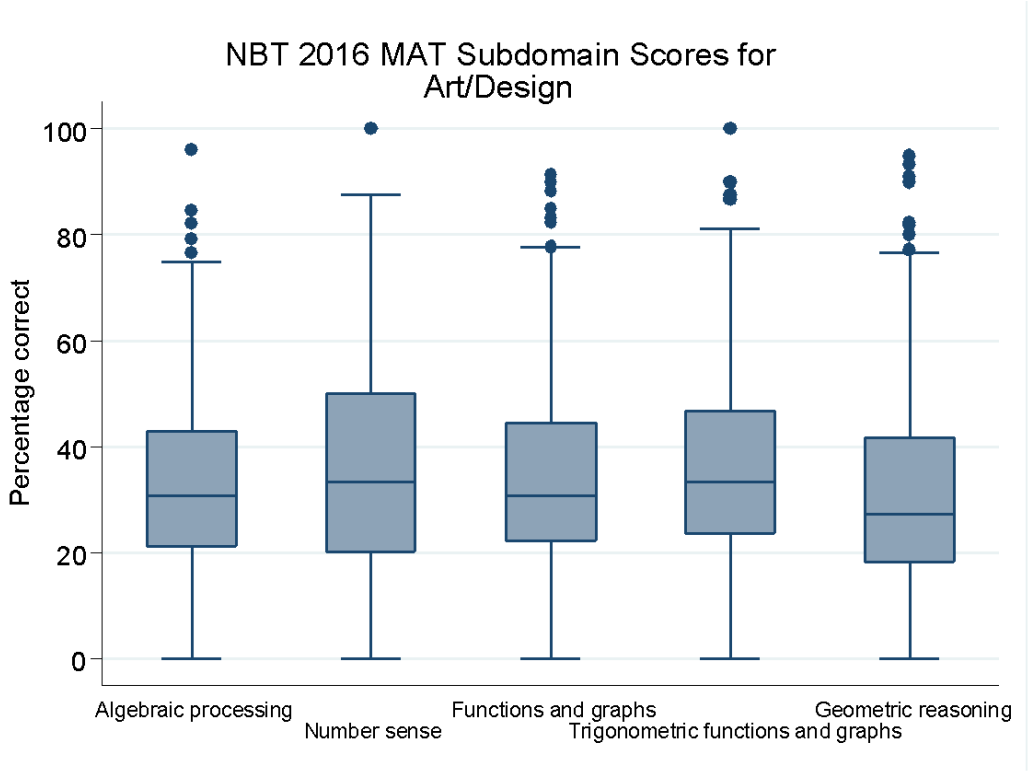

Figure 52 MAT subdomain scores for Art/Design

The median scores of candidates who applied to study courses in Business, Commerce and Management were less than 40% in all subdomains, i.e. in the Lower Intermediate band. Economics, in particular, is heavily dependent on the subdomains 'algebraic processing', 'number sense' and 'functions and graphs'. Once registered in these courses, students will need considerable support in order to cope with their mathematics studies.

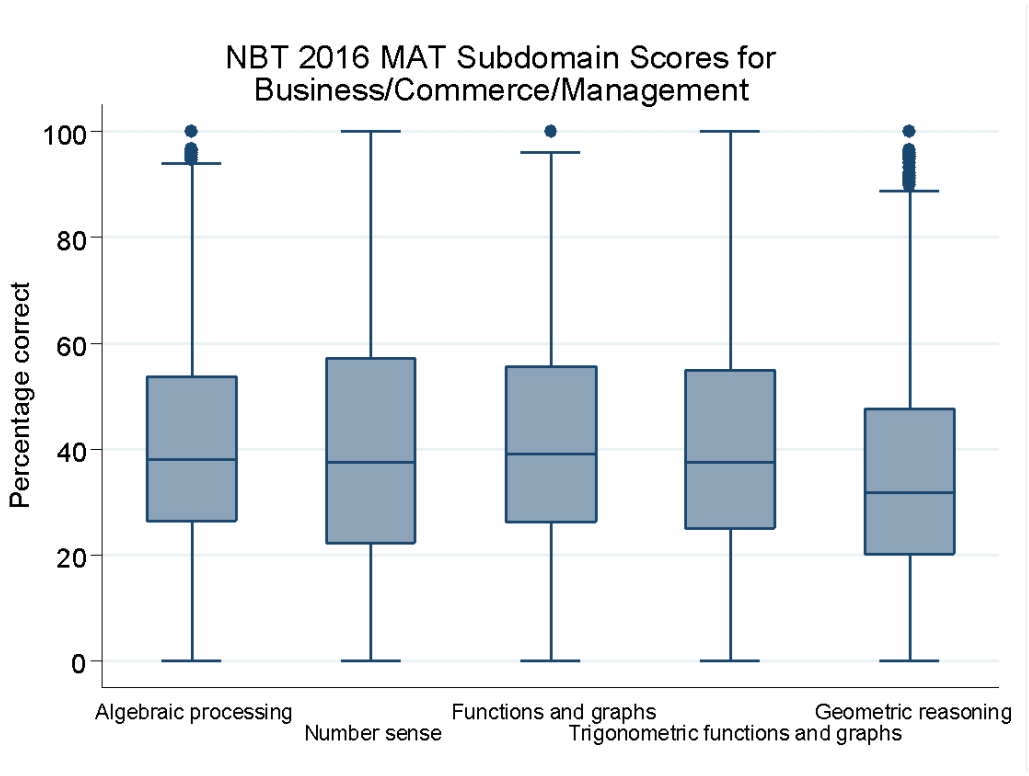

Figure 53 MAT subdomain scores for Business/Commerce/Management

The boxplots in Figure 54 below show the subdomain performance of those intending to study Education. These scores are generally low, with medians in the Basic band. These candidates' content knowledge will therefore need extensive remediation.

One of the reasons that so-called Euclidean Geometry was removed from the NSC curriculum was that there were too few educators able to teach it. The CAPS now includes this topic, and the 2015 NBT MAT tests assessed this new work, which was examined for the first time in Grade 12 in 2014 and in the NBT MAT tests in 2015. The 'geometric reasoning' subdomain includes aspects such as analytical geometry, and properties of geometric objects, that were in the old curriculum and are still in the CAPS; it also includes circle geometry, since this is now in the CAPS. Poor performance in this area may be attributed to lack of teacher exposure to the topics that are new to the curriculum. Much thought and planning needs to be given to addressing the poor performance in this subdomain.

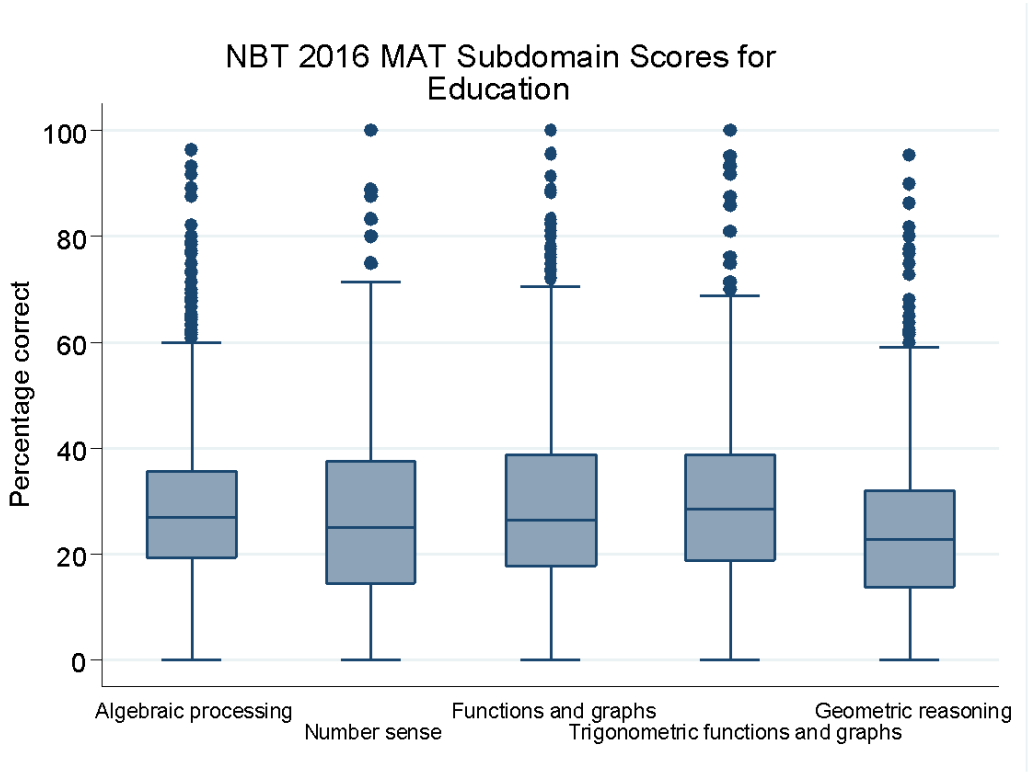

Figure 54 MAT subdomain scores for Education

The lack of outliers in the boxplots for all subdomains in the next figure shows that there was a greater spread of scores for those candidates who intended applying to the Faculty of Engineering and the Built Environment. Median scores in all subdomains were however low (in the region of 43% or less). A third quartile score of roughly 60% in all subdomains is a matter of concern: 75% of candidates applying to study courses which are heavily dependent on mathematics have NBT MAT scores that are below 62%. Mathematics is central to this area of study. Many of these candidates, if admitted to this area of study, will need extensive support in all subdomains. Considering the QL scores and MAT scores together, it seems that certain essential but missing building blocks in QL may be undermining mathematical performance; simultaneous and targeted support in both QL and MAT may be needed to address the problem.

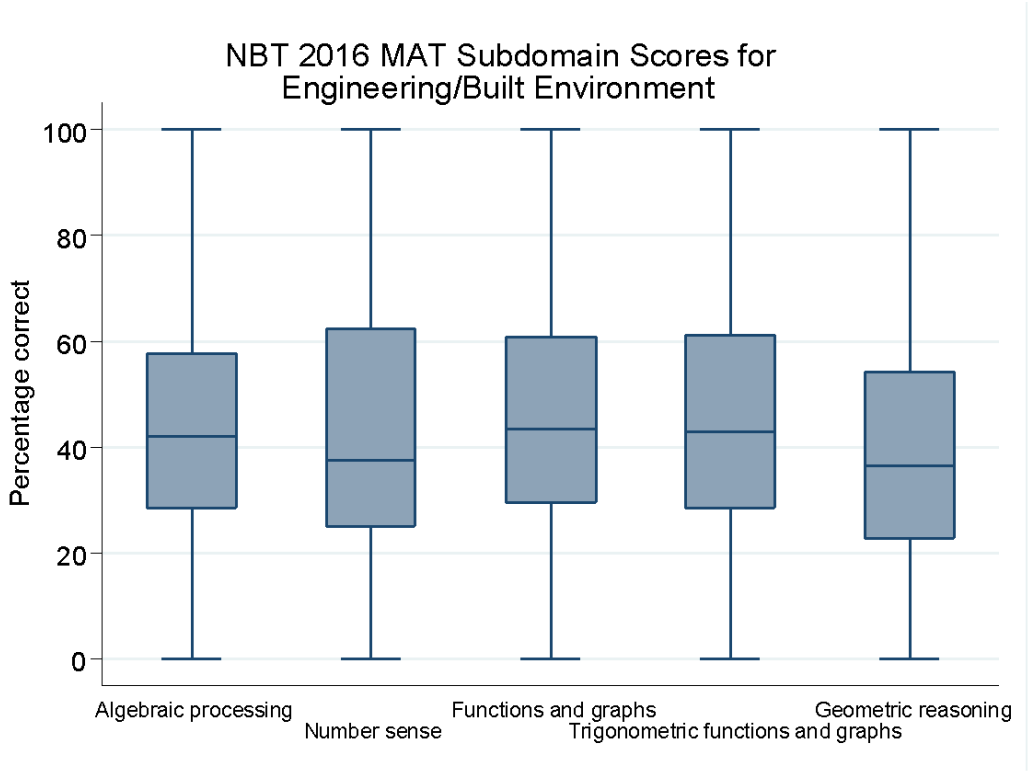

Figure 55 MAT subdomain scores for Engineering/Built Environment

The Health Sciences Consortium makes use of the NBT in its selection programme. However, there are many more applicants than can be accommodated, and only the top performing candidates can be accommodated. Those candidates who do not end up in their intended field of study will enrol in other areas. If they enrol for Science degrees, or for any other programmes where mathematics is a requirement, they will need support in all subdomains. The boxplots below show that in all subdomains the medians are in the Lower Intermediate band, indicative of substantial support requirements.

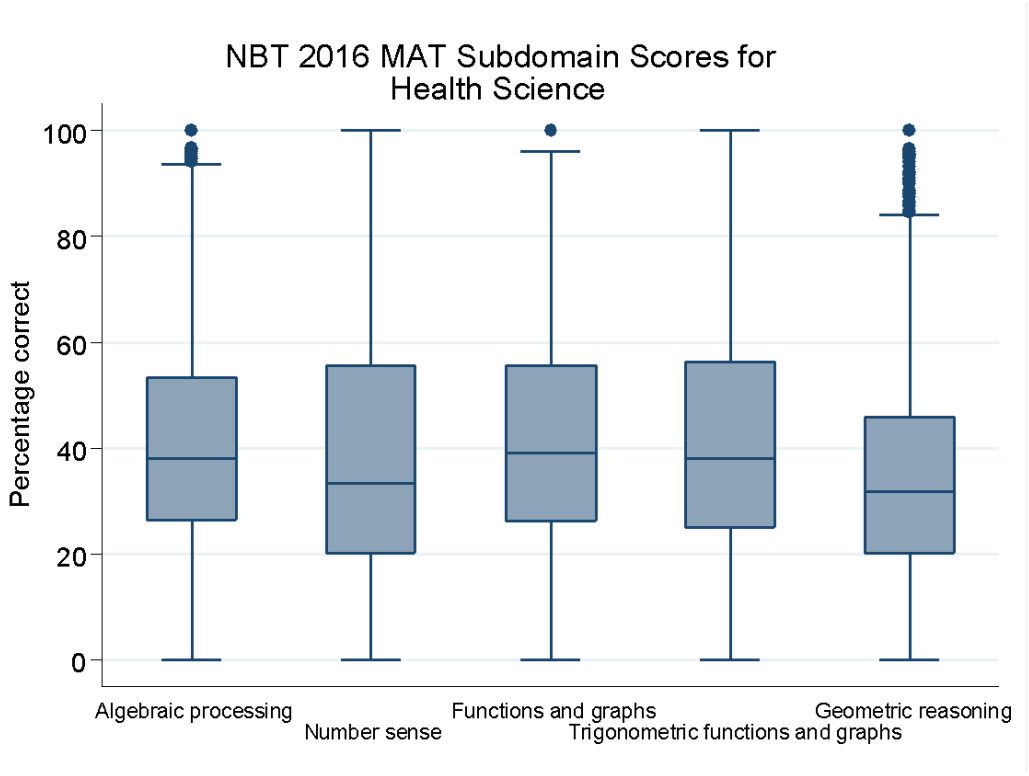

Figure 56 MAT subdomain scores for Health Science

It is possible that candidates intending to study in the area of Hospitality and Tourism did not take Mathematics at school, and may have taken Mathematical Literacy, which would not have equipped them to write the MAT test. It is difficult to interpret the scores below; however it is unlikely that these candidates will study mathematics courses.

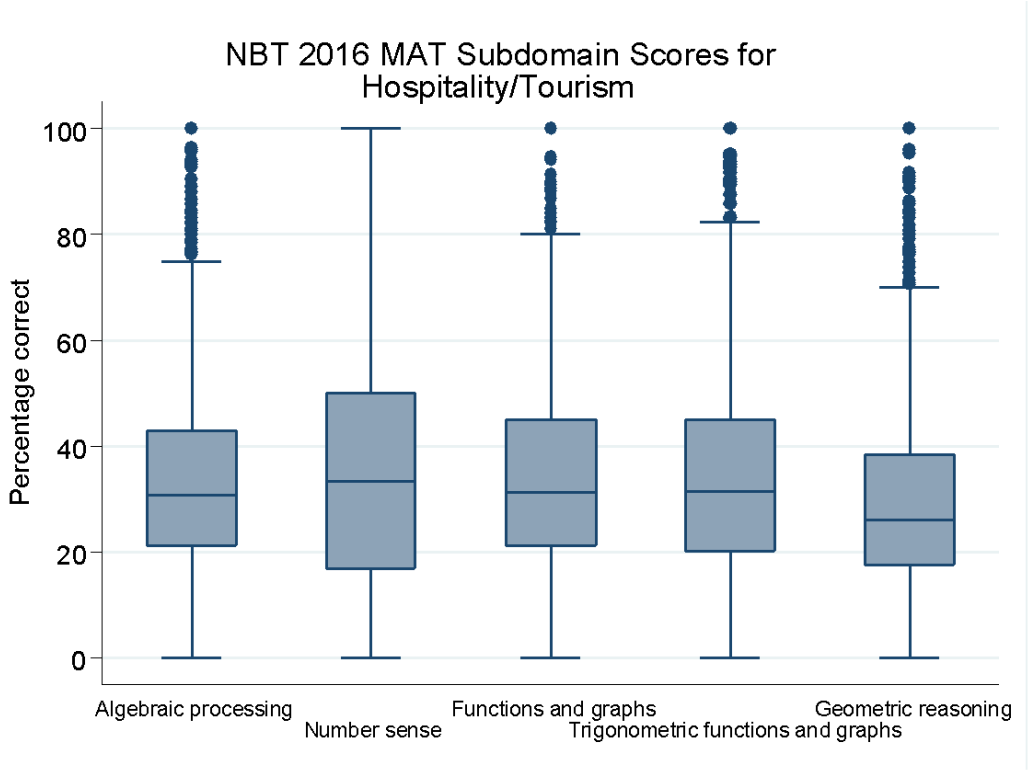

Figure 57 MAT subdomain scores for Hospitality/Tourism

Mathematics is not in general a requirement for Humanities. Since the majority of the candidates whose scores are reflected in the boxplots below are unlikely to be studying mathematics courses, it is not necessary to comment further on these scores.

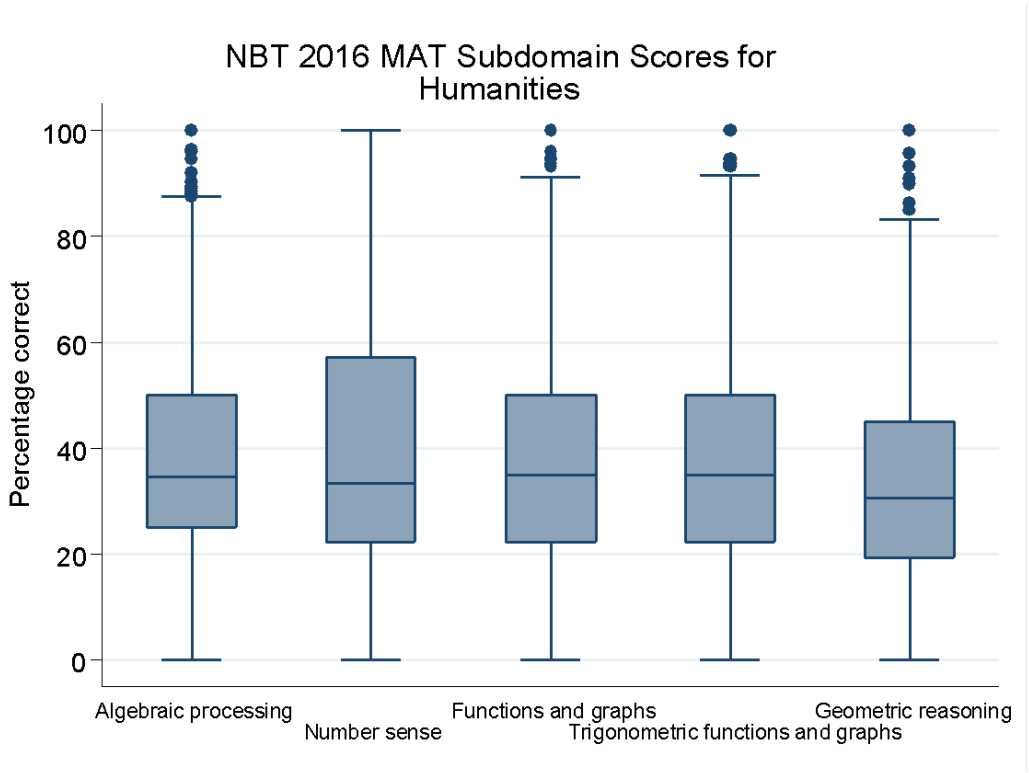

Figure 58 MAT subdomain scores for Humanities

In many institutions, Mathematics is a requirement for degrees in Information and Communication Technology. The high-scoring outliers in this group are unlikely to need support in mathematics. The median scores in all sub-domains reflected in the boxplots below are 35% or lower and thus fall in the Basic band. The low scores are indicative of the extensive mathematical support that will be needed by the candidates in this group in all subdomains, except possibly 'geometric reasoning'. The components of this subdomain (analytic geometry, angles and shape, area and volume, circle geometry) may not be important for ICT courses.

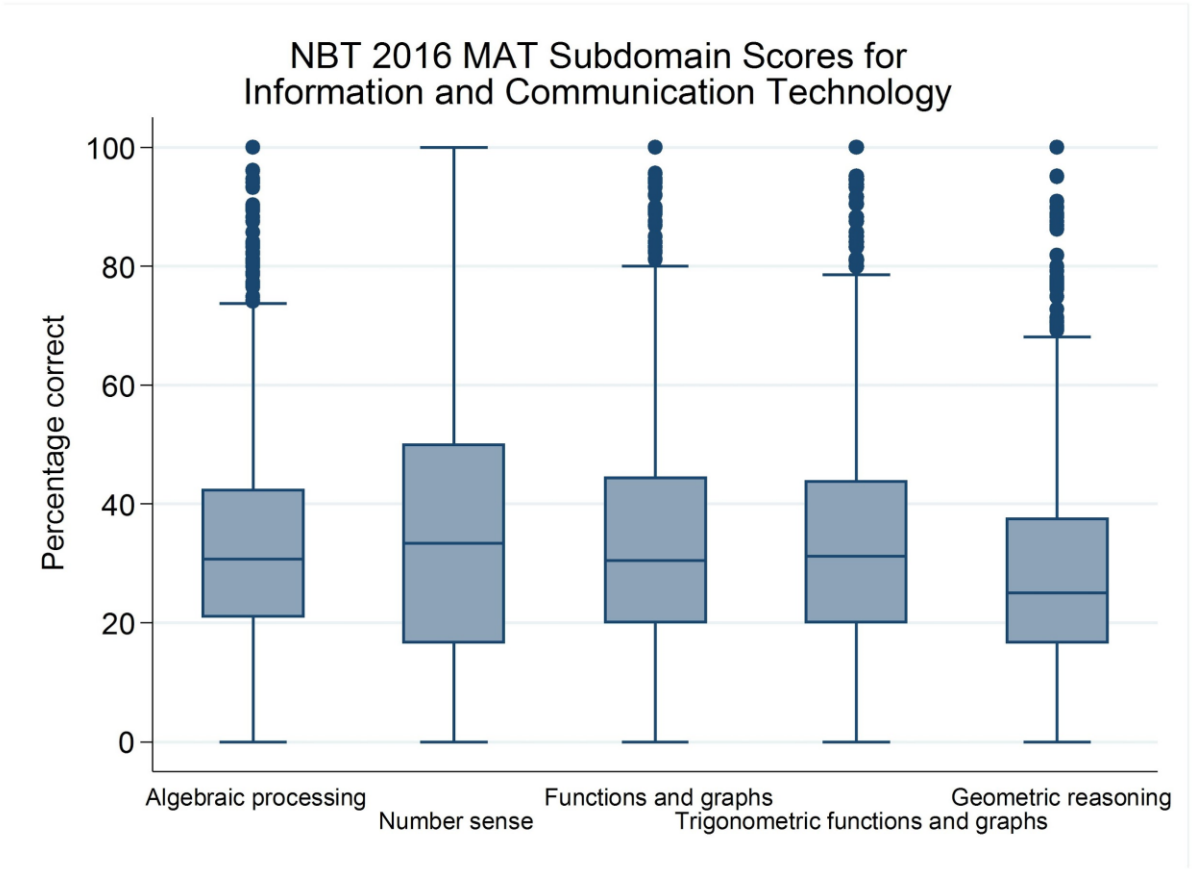

Figure 59 MAT subdomain scores for Information and Communication Technology

Mathematics is generally not a requirement for Law. Since the majority of the candidates whose scores are reflected in the boxplots below are likely to enrol for Law, and are unlikely to be studying mathematics courses, it is not necessary to comment further on these scores, apart from raising one specific concern: students in the Law faculty will need support (even if it is provided via QL support courses) in the MAT subdomain 'number sense' (median score in the Lower Intermediate band) if they are to be able to make logical decisions with regard to number relationships, orders of magnitude, etc.

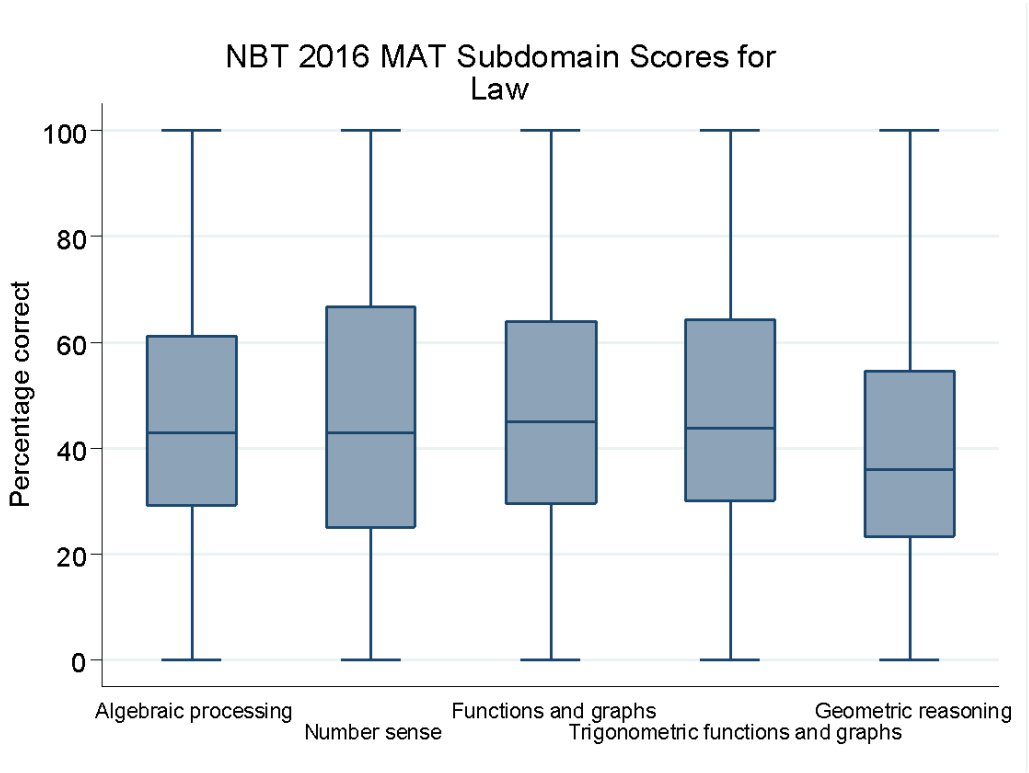

Figure 60 MAT subdomain scores for Law

Mathematics is a core course for Science and Mathematics courses. It is a matter of concern that for candidates intending to register for Science and Mathematics courses, the means in all subdomains are close to the Basic benchmark (35%). Clearly there are some high-performing candidates, but on the whole extensive mathematical support will need to be provided for those who enrol in these courses. Performance in 'geometric reasoning' (median below 30%) is particularly low, and this will have to be addressed if candidates are to cope with their mathematical studies. We point out again that low performance in this subdomain may be attributed to the change in curriculum.

These results are illustrated in Figure 61 below.

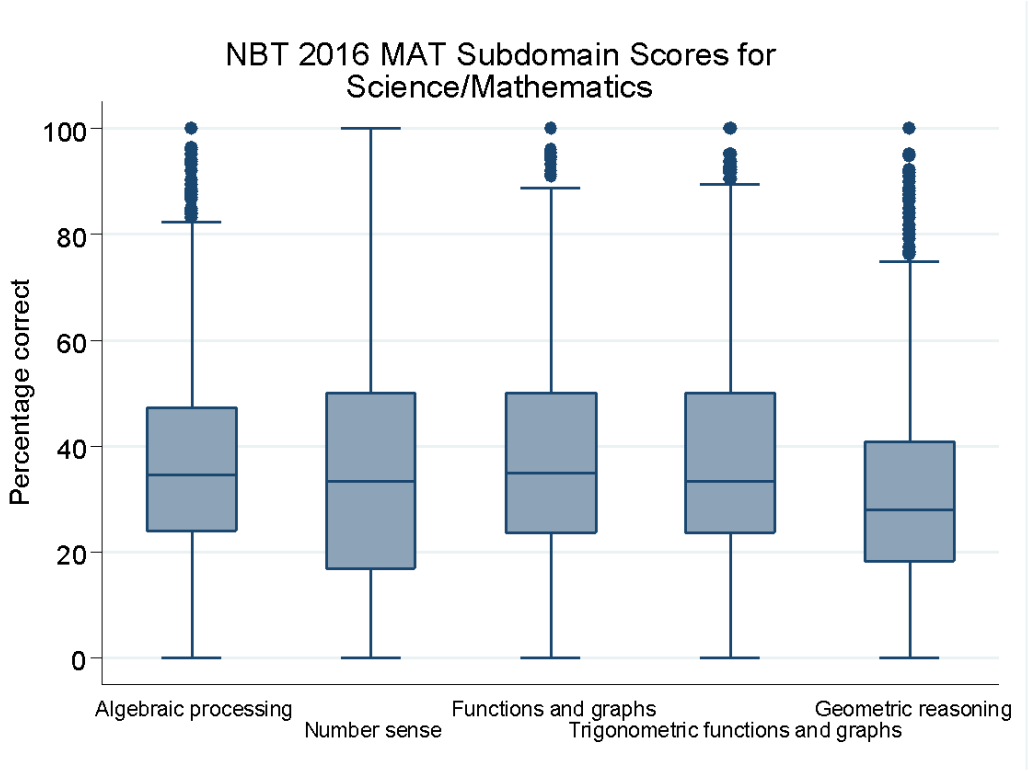

Figure 61 MAT sub-domain scores for Science/Mathematics

8. PERFORMANCE ON THE 2016 NBTP HE INTAKE CYCLE TESTING AND PERFORMANCE IN COGNATE NSC SUBJECTS IN 2015

This report now turns to the presentation and discussion of associations between the National Senior Certificate examination and the NBT. This is done principally to examine the extent to which the NBT might be said to provide complementary information to that provided by the NSC about the school-leaving cohort wishing to enter higher education.

The National Senior Certificate (NSC) is structured according to specific categories of subjects and rules of combination.

For a learner/candidate to obtain a National Senior Certificate, the learner must offer seven approved subjects and provide full evidence of School Based Assessment for each subject and he/she must:

(a) Complete the programme requirements for Grades 10, 11 and 12 separately and obtain the distinct outcomes and associated assessment standards of all three years;
(b) Comply with the internal assessment requirements for Grades 10, 11 and 12 and the external assessment requirements of Grade 12; and

The minimum requirements to obtain a National Senior Certificate are:

(a) Achievement of 40% in three subjects, one of which is an official language at Home Language Level;
(a) b) Achievement of 30% in three subjects; and
(b) Full evidence in the school–based assessment component in the subject failed.

Table 16 Scale of achievement/level descriptors

Achievement Level	Achievement Description	Marks %
7	Outstanding achievement	80 – 100
6	Meritorious achievement	70 – 79
5	Substantial achievement	60 – 69
4	Adequate achievement	50 – 59
3	Moderate achievement	40 – 49
2	Elementary achievement	30 – 39
1	Not achieved	0 – 29

Minimum Requirements for Admission to the Higher Certificate, Diploma and Bachelor's Degree

Minimum Higher Education Admission requirements in accordance with the three levels of undergraduate programmes are as follows:

(a) Higher Certificate

The minimum admission requirement is a National Senior Certificate with a minimum of 30% in the language of learning and teaching of the Higher Education Institution as certified by Umalusi, the Quality Assurance Council. Institutional and programme needs may require additional combinations of recognised NSC subjects and levels of achievement.

(b) Diploma

The minimum admission requirement is a National Senior Certificate with a minimum of 30% in the language of learning and teaching of the Higher Education Institution as certified by Umalusi, the Quality Assurance Council, coupled with an achievement rating of 3 (Moderate Achievement, 40% – 49%) or better in four recognised NSC 20-credit subjects. Institutional and programme needs may require additional combinations of recognised NSC subjects and levels of achievement.

(c) Bachelor's Degree

The minimum admission requirement is a National Senior Certificate with a minimum of 30% in the language of learning and teaching of the Higher Education Institution as certified by Umalusi, the Quality Assurance Body, coupled with an achievement rating of 4 (Adequate achievement, 50% – 59%) or better in four subjects chosen from the following recognised 20-credit NSC subjects (which will be known as the designated subject list):

Table 17 The Higher Education Designated Subject List

Accounting	Information Technology
Agricultural Science	Languages
Business Studies	Life Sciences
Consumer Studies	Mathematics
Dramatic Arts	Mathematical Literacy
Economics	Music
Engineering Graphics and Design	Physical Sciences
Geography	Religion Studies
History	Visual Arts

Notes on the sample used for the analysis in this section

Since it is not clear which result to keep if a candidate wrote the NBT multiple times, the scores of all candidates who wrote the NBT more than once were excluded from this subsample. Calculation of a correlation coefficient is based on the assumption that the data satisfy the assumption of independence of observations, i.e., observations are not influenced by each other. Repeat occurrences of one individual would be an example of observations that influence each other. NSC results were then matched. The resulting subsample came to 72,517 candidates. Nearly 83% (51,906) of these

candidates achieved the NSC with a Bachelors pass while the remaining 12,049 (17%) achieved the NSC with a Diploma or Higher Certificate pass.

Please note, list wise deletion was utilised when correlation coefficients were calculated and scatterplots were constructed. List wise deletion means that candidates were excluded from analysis if any single value for a particular calculation was missing. The sample was further analysed separately by HE Admission type (Degree; Diploma/Higher Certificate).

Caution should be used when interpreting the correlation coefficients. The scatterplots for the NSC ENFN against NBT AL, NSC MTHN against NBT QL, NSC MTLN against NBT QL, NSC MTHN against NBT MAT, NSC PSCN against NBT MAT show heterogenous variance. The point cloud of the scatterplot for NSC MTLN against NBT QL also show some non-linear trend.

NSC Subject codes:

MTHN = Mathematics

MTLN = Mathematical Literacy

ENHN = English Home Language

ENFN = English First Additional Language

PSCN = Physical Sciences

SELF-REPORTED DEMOGRAPHICS

The 2016 NBT – 2015 NSC cohort self-classified their biographical details. The cohort consisted of approximately 59% female and 41% male; approximately 60% were black and 21% white; approximately 98% were South African citizens and approximately 31% reported English as their home language while the vast majority had an African language as home language. 83% of the cohort achieved the NSC at a Bachelor's degree level and the remainder at Higher Certificate or Diploma level.

Table 17 Self-reported demographics

	Full Sample		Bachelors		Diploma	
	N	**%**	**n**	**%**	**n**	**%**
GENDER						
Male	29,596	40.81	24,987	41.32	4,609	38.25
Female	42,895	59.15	35,459	58.64	7,436	61.71
Other	26	0.0400	22	0.0400	4	0.0300
Total	72,517	100	60,468	100	12,049	100
POPULATION GROUP						
Black	43,353	59.78	33,750	55.81	9,603	79.70
Coloured	8,881	12.25	7,473	12.36	1,408	11.69
Indian/Asian	4,841	6.680	4,427	7.320	414	3.440
White	15,182	20.94	14,591	24.13	591	4.900
Other	260	0.360	227	0.380	33	0.270
Total	72,517	100	60,468	100	12,049	100
CITIZENSHIP						
South African	70,823	97.66	59,081	97.71	11,742	97.45
SADC country	896	1.240	740	1.220	156	1.290
Other African country	450	0.620	341	0.560	109	0.900
Other	348	0.480	306	0.510	42	0.350
Total	72,517	100	60,468	100	12,049	100
HOME LANGUAGE						
Afrikaans	9,187	12.67	8,303	13.73	884	7.340
English	22,339	30.81	20,220	33.44	2,119	17.59
isiNdebele	619	0.850	494	0.820	125	1.040
isiXhosa	9,222	12.72	6,760	11.18	2,462	20.43
isiZulu	8,722	12.03	7,220	11.94	1,502	12.47
Sesotho	5,424	7.480	4,031	6.670	1,393	11.56
Sesotho sa Leboa	5,060	6.980	3,955	6.540	1,105	9.170
Setswana	3,962	5.460	3,181	5.260	781	6.480
siSwati	1,596	2.200	1,272	2.100	324	2.690
Tshivenda	2,597	3.580	2,056	3.400	541	4.490
Xitsonga	2,805	3.870	2,158	3.570	647	5.370
Other Language	984	1.360	818	1.350	166	1.380
Total	72,517	100	60,468	100	12,049	100
GR12 LANGUAGE						
Afrikaans	8,729	12.04	7,834	12.96	895	7.430
English	62,352	85.98	51,570	85.28	10,782	89.48
Other	1,436	1.980	1,064	1.760	372	3.090
Total	72,517	100	60,468	100	12,049	100
*The sample includes 499 candidates that had results on both MTHN and MTLN						

HE ADMISSION		
Bachelor's degree	60,468	83.38
Diploma/Higher Certificate	12,049	16.62
Total	72,517	100

DESCRIPTIVE STATISTICS

Table 19 Descriptive statistics

	N	mean	Sd	min	p25	p50	p75	Max
TOTAL COHORT								
NBT AL	72462	54.75	14.24	14	43	54	66	95
NBT QL	72510	46.22	15.30	5	34	42	55	98
NBT MAT	53039	40.60	16.43	2	28	35	50	97
NSC MTHN	56662	57.84	18.64	3	44	58	72	100
NSC MTLN	16350	65.41	14.50	0	55	66	76	99
NSC ENHN	39698	67.27	10.30	34	60	67	75	100
NSC ENFN	32819	66.36	10.09	30	59	66	74	96
NSC PSCN	45204	57.78	17.59	10	44	57	71	100
BACHELORS DEGREE								
NBT AL	60413	57.02	13.81	20	46	57	68	95
NBT QL	60463	48.29	15.52	14	36	45	58	98
NBT MAT	45047	42.81	16.75	2	29	38	53	97
NSC MTHN	48118	61.66	17.14	3	50	62	74	100
NSC MTLN	12799	69.20	12.52	0	60	69	79	99
NSC ENHN	33993	69.26	9.280	41	63	69	76	100
NSC ENFN	26475	68.51	9.190	38	62	68	75	96
NSC PSCN	38315	61.69	15.91	11	50	61	74	100
DIPLOMA/CERTIFICATE								
NBT AL	12049	43.35	10.40	14	35	41	50	87
NBT QL	12047	35.80	8.370	5	31	33	38	91
NBT MAT	7992	28.11	5.280	7	25	27	29	83
NSC MTHN	8544	36.37	10.26	3	30	37	43	83
NSC MTLN	3551	51.76	12.84	17	43	50	61	94
NSC ENHN	5705	55.44	7.850	34	49	55	61	89
NSC ENFN	6344	57.41	8.670	30	51	57	63	92
NSC PSCN	6889	36.02	7.930	10	30	36	42	75
*The sample includes 499 candidates that had results on both MTHN and MTLN								

Figure 62 below highlights the differences in the purposes of the NSC and NBT. In measuring school exit levels, MTHN, MTLN and PSCN scores are markedly higher than NBT MAT and QL scores; ENHN and ENFN scores are markedly higher than NBT AL scores. Half the MTLN candidates score above 70%. This is in no way reflected in the QL, where the median is 42%.

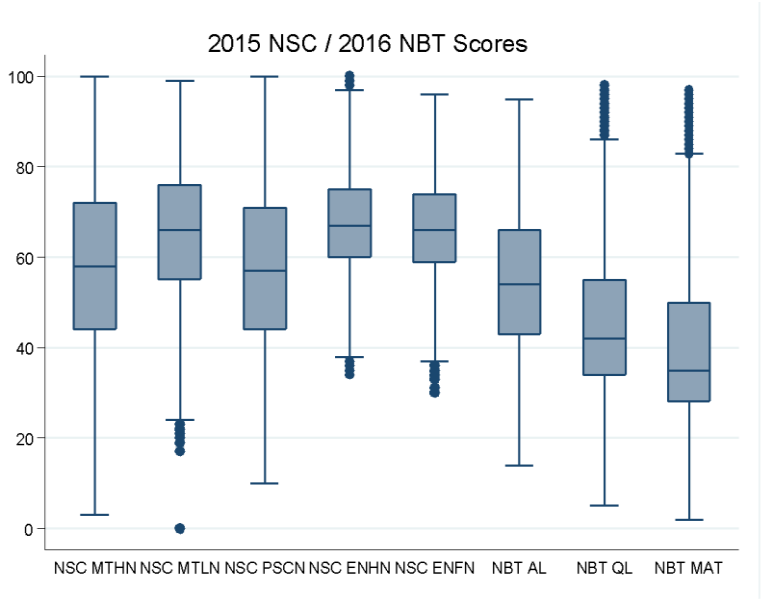

Figure 62 2015 NSC/2016 NBT scores

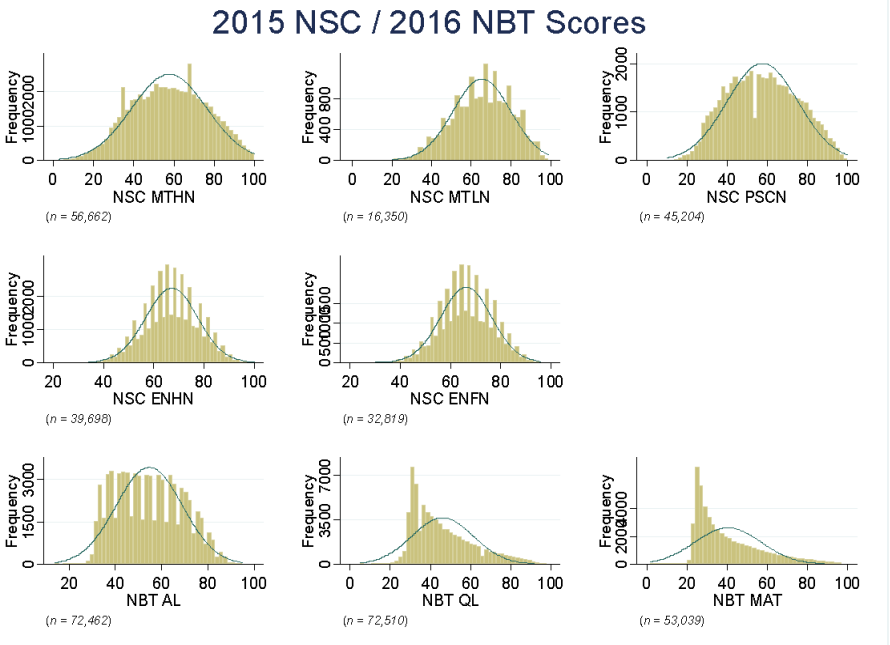

Figure 63 2015 NSC/2016 NBT scores

NBT BENCHMARKS

There are very noticeable differences in the NBT performance of candidates who passed the NSC at the Bachelor's degree level (classified using NBT degree benchmarks) and those who passed the NSC at the diploma/higher certificate level (classified using NBT diploma/higher certificate benchmarks).

For **AL**, while just over one third of Bachelor's degree candidates had scores in the Proficient band just 5% of the diploma/higher certificate candidates had scores in the Proficient band. Nearly two thirds of diploma/higher certificate candidates had scores in the Intermediate Lower band.

In **QL** the pattern is slightly different, with proportionally more diploma/higher certificate than degree candidates in the Basic and Intermediate Lower categories, and proportionally fewer in the Intermediate Upper and Proficient bands.

For **MAT**, about 10.5% of the Bachelor's degree candidates had scores in the Proficient band; just over 90% of the diploma/higher certificate candidates had scores in the Basic band.

These results are shown in Table 20 and Figure 64 below.

Table 20 Frequency tables of benchmark bands for the NBT domains

AL	Basic	Intermediate Lower	Intermediate Upper	Proficient	Total
AL					
Bachelors n	5,178	16,304	17,918	21,013	60,413
%	8.57	26.99	29.66	34.78	100
Diploma/Certificate n	345	7,855	3,232	617	12,049
%	2.86	65.19	26.82	5.12	100
QL					
Bachelors n	18,704	22,379	12,280	7,100	60,463
%	30.93	37.01	20.31	11.74	100
Diploma/Certificate n	6,597	4,291	964	195	12,047
%	54.76	35.62	8	1.62	100
MAT					
Bachelors n	18,801	13,643	7,879	4,724	45,047
%	41.74	30.29	17.49	10.49	100
Diploma/Certificate n	7,247	676	56	13	7,992
%	90.68	8.46	0.70	0.16	100

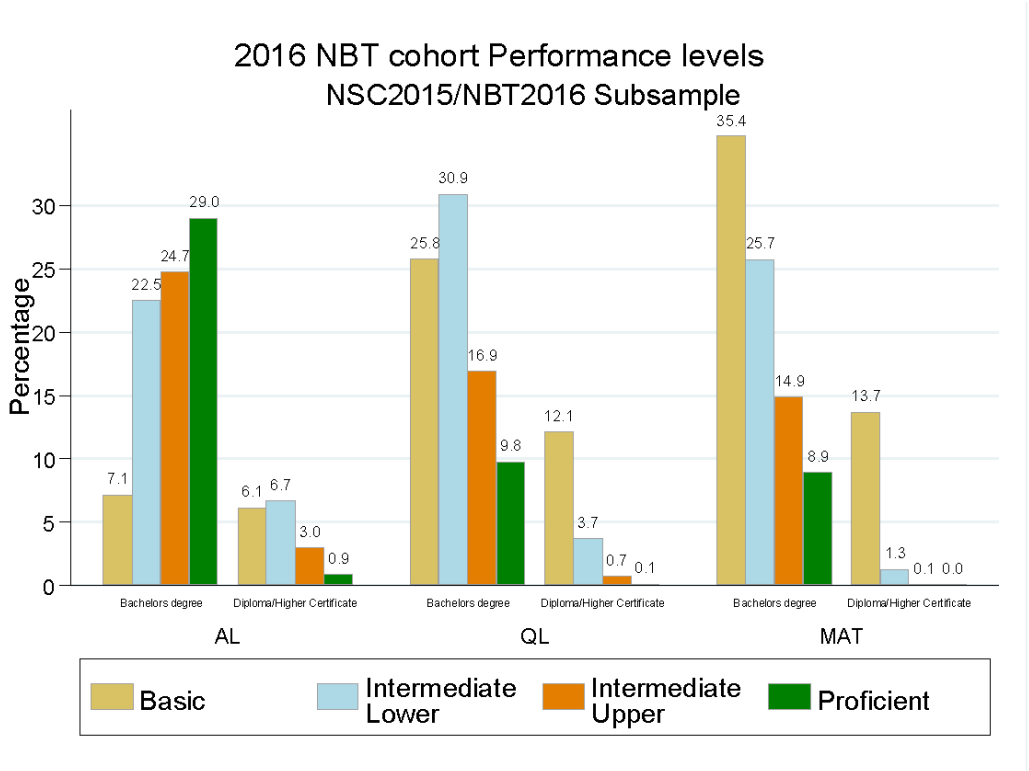

Figure 64 NSC cohort performance levels on NBT

ASSOCIATIONS BETWEEN SCORES ON THE NATIONAL BENCHMARK TEST IN ACADEMIC LITERACY AND THE NATIONAL SENIOR CERTIFICATE EXAMINATION FOR ENGLISH

Figures 65 and 66 (and Tables 21 and 22) depict associations between scores on the National Benchmark Test in Academic Literacy (NBT AL) and scores on the NSC English Home Language (NSC ENHN) and NSC English First Additional Language (ENFN) for two subgroups, those who achieved an NSC with a Bachelor degree pass and those who achieved an NSC with a Diploma or Certificate pass, of 2016 intake Higher Education students who wrote the NSC in 2015.

Figure 66 shows the scatterplot of NBT AL scores against NSC English Home Language (ENHN) scores for students who achieved the NSC with Degree-level pass as well as those who achieved the NSC with Diploma or Higher Certificate pass. There was a correlation of 0.718 between NSC English Home Language and NBT AL for those with a Bachelor's degree pass and a correlation of 0.639 between NSC English Home Language and NBT AL for Diploma/Certificate candidates. Candidates who obtained the NSC with a Bachelor's degree pass and performed well in the NSC English Home Language, (80% and above) had varying performances on the NBT AL. Candidates who achieved either a Diploma or Higher Certificate NSC pass performed fairly poorly on both the NSC English Home Language and NBT AL. The figure shows that these candidates, even though they did the NSC

English Home Language subject, are largely not prepared to cope with the typical academic literacy demands of academic study.

Table 21 Correlation matrix for the 2015 NSC and 2016 NBT results, Bachelor's degree

Bachelors	NBT AL	NBT QL	NBT MAT	NSC MTHN	NSC MTLN	NSC ENHN	NSC ENFN	NSC PSCN
NBT AL	1							
	60413							
NBT QL	0.7030	1						
	60409	60463						
NBT MAT	0.5250	0.6980	1					
	45046	45046	45047					
NSC MTHN	0.348	0.536	0.776	1				
	48078	48117	44067	48118				
NSC MTLN	0.596	0.664	0.444	0.519	1			
	12784	12795	1342	451	12799			
NSC ENHN	0.699	0.541	0.513	0.508	0.524	1		
	33944	33992	24150	26353	8079	33993		
NSC ENFN	0.684	0.515	0.417	0.339	0.468	.	1	
	26469	26471	20897	21765	4720	0	26475	
NSC PSCN	0.360	0.476	0.705	0.856	0.490	0.561	0.403	1
	38302	38314	36008	37824	692	19697	18618	

Table 18 Correlation matrix for NSC 2015 and NBT 2016 results, Diploma/Higher Certificate.

Diploma/ Higher Certificate	NBT AL	NBT QL	NBT MAT	NSC MTHN	NSC MTLN	NSC ENHN	NSC ENFN	NSC PSCN
NBT AL	1							
	12049							
NBT QL	0.621	1						
	12047	12047						
NBT MAT	0.255	0.414	1					
	7992	7992	7992					
NSC MTHN	0.127	0.250	0.443	1				
	8544	8544	7611	8544				
NSC MTLN	0.552	0.597	0.257	0.562	1			
	3551	3549	421	48	3551			
NSC ENHN	0.617	0.377	0.0675	0.107	0.357	1		
	5705	5704	3441	3769	1978	5705		
NSC ENFN	0.590	0.314	0.00380	-0.0117	0.333		1	
	6344	6343	4551	4775	1573	0	6344	
NSC PSCN	0.0879	0.133	0.256	0.543	0.465	0.110	0.0406	**1**
	6889	6889	6217	6696	228	2825	4064	**4,672**

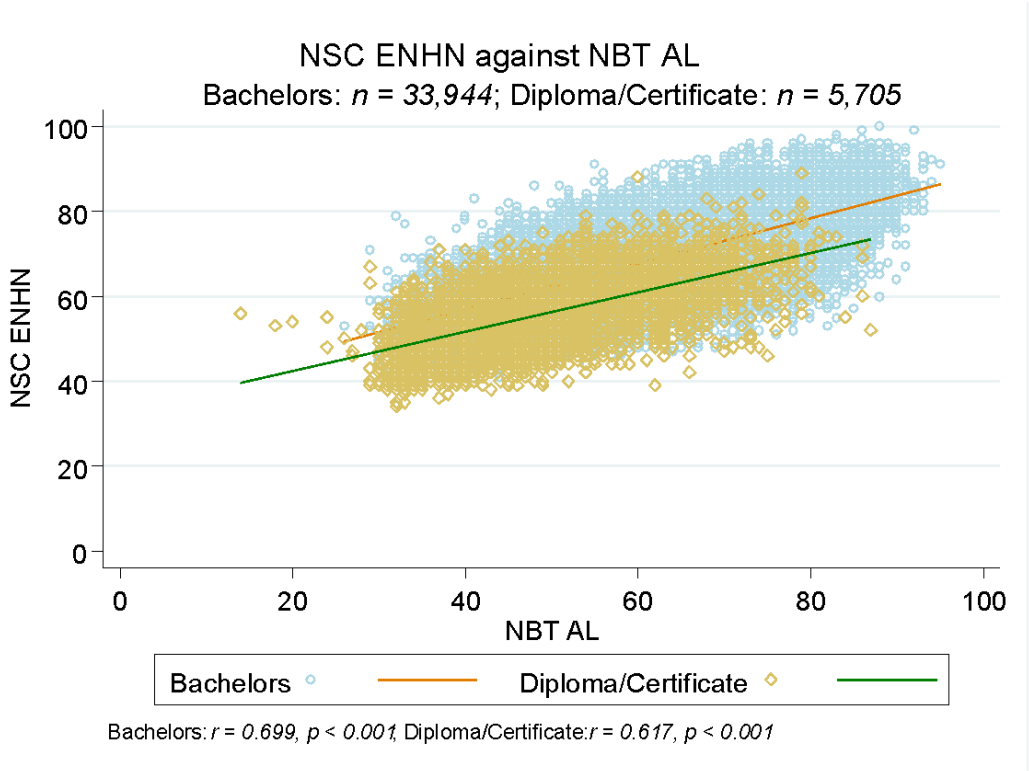

Figure 65 NSC ENHN against NBT AL

Figure 65 shows the scatterplot of NBT AL scores against NSC English First Additional Language (ENFN) scores for students who achieved an NSC with either a Bachelor's degree-level pass or diploma/certificate level pass who took the NSC English First Additional Language Examination.

The performance of the candidates who received a Bachelor's pass and performed at a Proficient level in the NBT AL also performed well on the NSC English First Additional Language examination. This is also supported by the reasonably strong correlation of 0.690 between the NSC English First Additional Language scores and NBT AL scores for the candidates that obtained a Bachelor's pass. The candidates who performed exceptionally well on the NSC English First Additional Language examinations with scores of 80% and above had varying scores on the NBT AL test. A large proportion of candidates with a Bachelor's pass fall within the NBT AL Intermediate band. Most of the candidates who obtained a Diploma/Certificate pass performed equally poorly on the NSC English First Additional Language and NBT AL test which is supported by the correlation coefficient of 0.596. The figure shows that the majority of these candidates, even though they did the NSC English First Additional Language as a subject, are largely not prepared to cope with the typical academic literacy demands of academic study and they will have severe challenges at university.

Figure 66 shows the scatterplot of associations between NBT AL scores and the NSC scores of those students achieving a Bachelor's level pass as well as those who achieved a Diploma/Certificate level pass and who took the NSC with English First Additional Language examination.

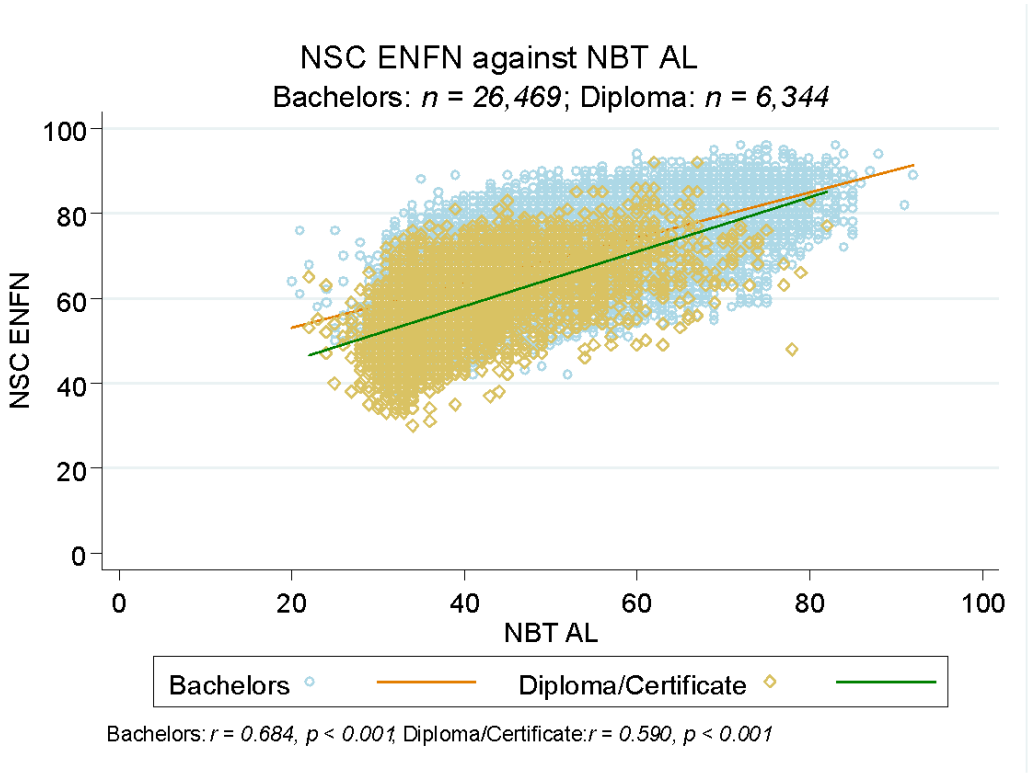

Figure 66 Scatterplot NBT AL vs NSC English First Additional Language

Associations between scores on the National Benchmark Test in Quantitative Literacy and the National Senior Certificate Examination for Mathematics and Mathematical Literacy

Figures 67 and 68 depict associations between scores on the National Benchmark Test in Quantitative Literacy (NBT QL) and scores on the NSC Mathematics (NSC MTHN) and NSC Mathematical Literacy (MTLN) for two subgroups, those who achieved an NSC with a Bachelor's degree pass and those who achieved an NSC with a Diploma or Higher Certificate pass, of 2016 intake Higher Education students who wrote the NSC in 2015.

Figure 67 shows the scatterplot of NBT QL scores against NSC Mathematics (MTHN) scores for students who achieved a degree-level pass as well as those who achieved a diploma/certificate-level pass who took the NSC Mathematics examination. There was a correlation of 0.575 between NSC Mathematics and NBT QL for the Bachelor's degree and a mere 0.260 correlation between NSC Mathematics and NBT QL for Diploma/Certificate candidates. Candidates who obtained the NSC with a Bachelor's degree pass and performed well on the NSC Mathematics examination, (80% and above), had varying performances on the NBT QL. This was the case for a large portion of these candidates. It can also be clearly seen that even though these candidates performed well on MTHN they will struggle with the quantitative literacy demands of higher education. This figure also clearly shows the complementarity of the information provided by the NBT QL to that provided by the NSC Mathematics (MTHN). Candidates who achieved a Diploma or Higher Certificate NSC pass performed poorly on both the NSC Mathematics and NBT QL. The figure shows that these candidates, even though they did the NSC Mathematics subject, are largely not prepared to cope with the typical quantitative literacy demands of academic study.

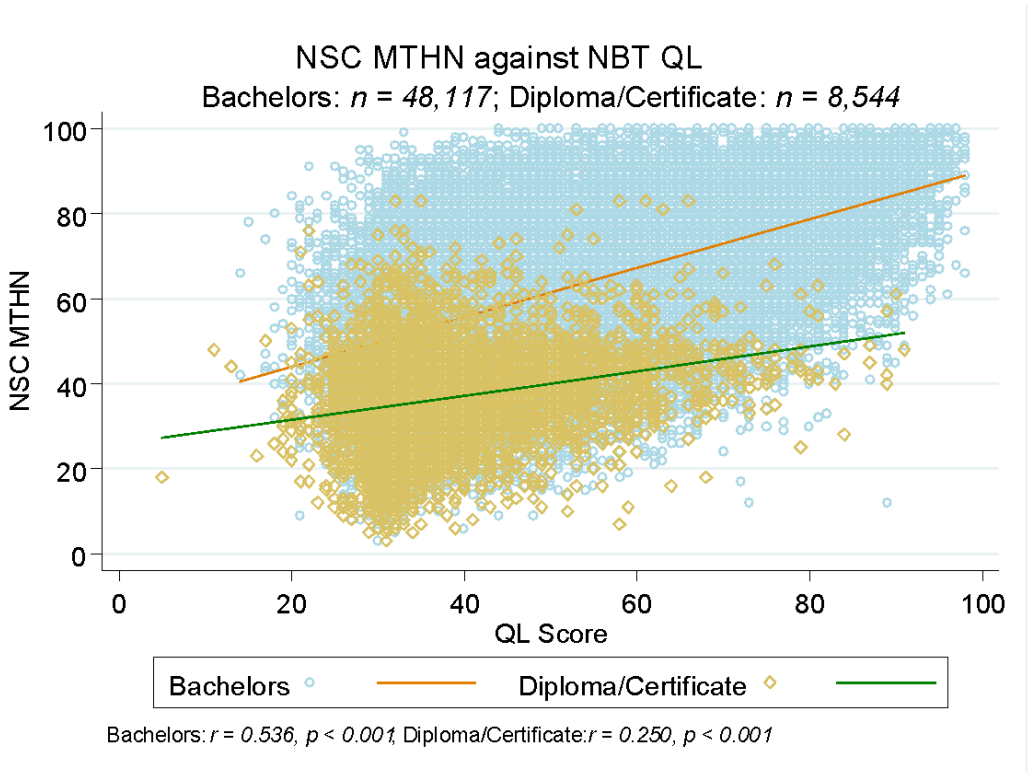

Figure 67 Scatterplot NBT QL vs NSC Mathematics

Figure 68 shows the scatterplot of NBT QL scores against NSC Mathematical Literacy (MTLN) scores for students who achieved an NSC with either a Bachelor's degree-level pass or a Diploma/Certificate level pass who took the NSC Mathematical Literacy examination.

A very small number of candidates who received a Bachelors pass and were Proficient in the NBT QL also performed very well in the NSC Mathematical Literacy test. The relationship between MTLN and QL is clearly not linear and so the correlation between them of 0.690 for the candidates who obtained a Bachelors pass must be interpreted with caution. The candidates who performed very well in the NSC Mathematical Literacy examination with scores of 80% and above had varying scores on the NBT QL test. A large proportion of candidates with a Bachelors pass falls within the NBT Intermediate band. Most of the candidates who obtained a Diploma/Certificate pass performed equally poorly on the NSC Mathematical Literacy and NBT QL test, which is supported by the correlation coefficient of 0.592. The figure shows that the majority of these candidates, even though they did the NSC Mathematical Literacy as a subject, are largely not prepared to cope with the typical quantitative literacy demands of academic study and they will have severe challenges at university.

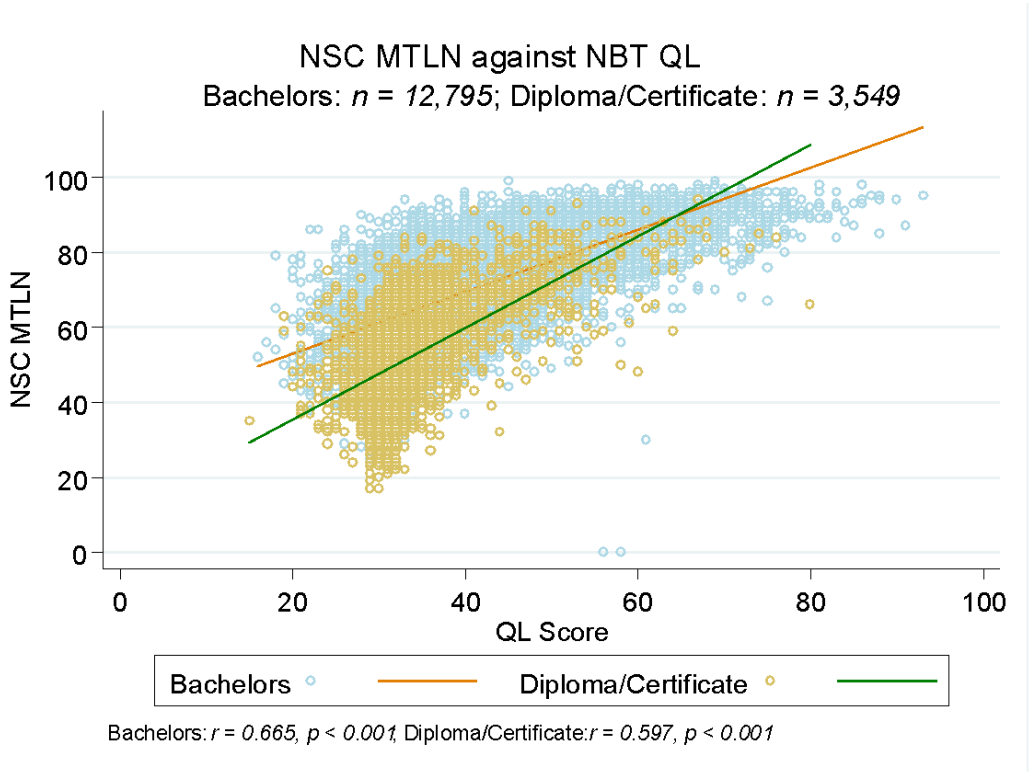

Figure 68 Scatterplot NBT QL vs NSC mathematical Literacy

ASSOCIATIONS BETWEEN SCORES ON THE NATIONAL BENCHMARK TEST IN MATHEMATICS AND THE NATIONAL SENIOR CERTIFICATE EXAMINATION FOR MATHEMATICS AND PHYSICAL SCIENCE

Figure 69 depicts the association between scores on the NBT MAT and scores on the NSC Mathematics (NSC MTHN) for those who achieved an NSC at a Bachelor degree level in 2015.

There was a correlation of 0.776 between NSC Mathematics and NBT MAT for the Bachelor's degree candidates. Candidates who obtained the NSC with a Bachelor's degree pass and performed well on the NSC Mathematics examination, (80% and above), had varying performances on the NBT MAT. The figure shows that there are many candidates who did well in the NSC Mathematics but lie in the Intermediate bands, and even some who are in the Basic band. This could be indicative of the fact that repeated exposure to past NSC MTHN examination papers may help candidates to be successful in passing an examination, but less successful in acquiring the skills and competencies needed for higher education. Many NSC Mathematics high achievers may in fact be unprepared for the typical mathematical demands of higher education. This figure clearly shows that the NBT MAT provides complementary information to that provided by the NSC MTHN.

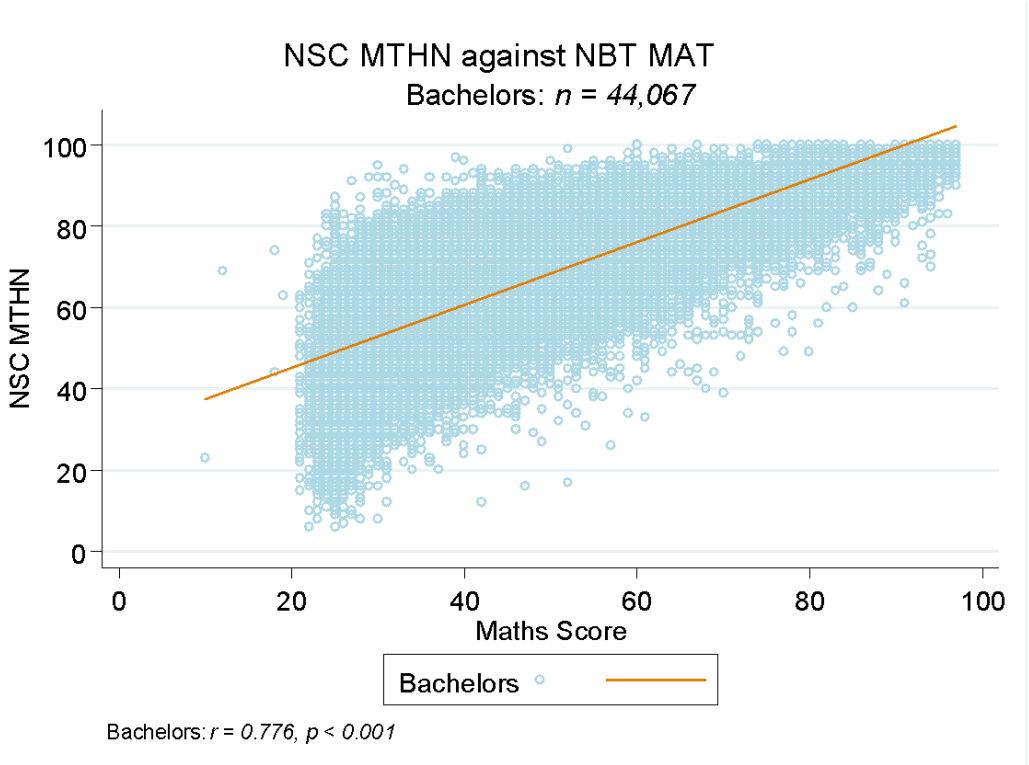

Figure 69 NBT MAT vs NSC MTHN

Figure 70 depicts the association between scores on the National Benchmark Test in Mathematics (NBT MAT) and the scores on the NSC Physical Science (NSC PSCN) for those who achieved an NSC with a Bachelor degree pass, of 2016 intake Higher Education students who wrote the NSC in 2015.

There was a correlation of 0.705 between NSC Physical Science scores and NBT MAT scores for the Bachelor's degree level candidates. Candidates who obtained the NSC with a Bachelor's degree level pass and performed well on the NSC Physical Science examination, (80% and above) again had varying performances on the NBT MAT. The figure shows that even candidates who did well in the NSC Physical Science (80% and above) are in the Intermediate and Basic NBT MAT categories. One of the strengths of the NBT MAT is its ability to spread the scores of the high-achieving students into bands that are more closely aligned with first year performance patterns. A large number of these students will need substantial support if they are to cope with the typical mathematical demands of science courses in higher education.

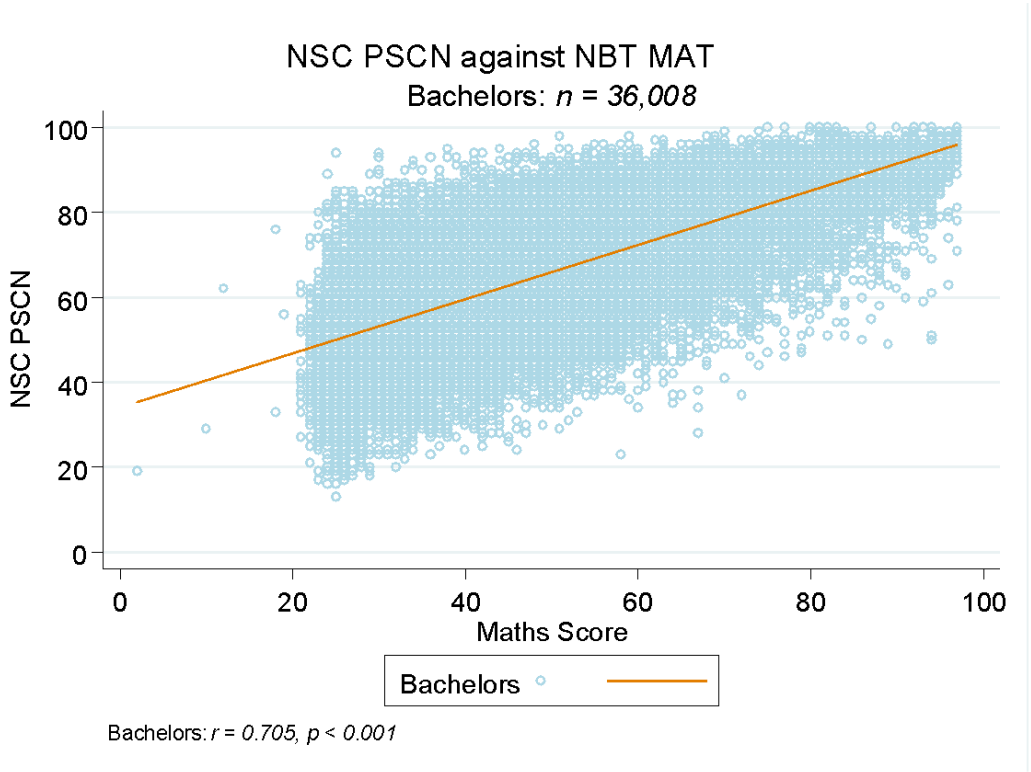

Figure 70 NSC PSCN vs NBT MAT

It is a matter of concern that school leavers (and the same applies to parents and educators) do not recognise the different purposes for which the NSC and NBT were designed. Many people are firmly of the opinion that a high school exit score is representative of adequate preparation for university study. The NBT MAT results resonate more with the experience of lecturers in first year mainstream

mathematics (and cognate disciplines) in that they more closely reflect the trends with regard to pass rates at that level.

9. CONCLUSION

There is evidence that the NBT is increasing its footprint in South African schools, as indicated by the increase in test sites and test scores between 2015 and 2016. Given data on actual students admitted at institutions, NBT diagnostic information, in the form of sub-domain analysis, can provide useful information on teaching and learning. The NBTP team has, since 2015, been running institutional teaching and learning workshops with the purpose of ensuring that the diagnostic information obtained from the tests translates into curriculum development.

This shows that the NBT are becoming increasingly important not only for informing student preparedness for university entry but also for guiding teaching and learning, particularly in the first year at university.

The national test score results for the 2015 and 2016 intakes are quite consistent and do not deviate much, thus providing supporting information in the reliability of the tests.

The 2016 intake results show that MAT performance is still poor. This remains a major concern. In general proficiency in all subdomains is below 50%, which is worrying, since most of those who wrote the NBT represent the cream of the students who will ultimately enter university study. Another concern is the extent to which institutions can provide the necessary support for the large number of students being admitted who are below the Proficient level in AL, QL or MAT.

More in-depth reports and discussion pieces using NBT data are available as CETAP working papers and can be requested from the Test Development Coordinator.

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APPENDIX A: BENCHMARK REPORT 2015

NATIONAL BENCHMARK TESTS PROJECT

as a national service to Higher Education

Report on the National Benchmark Tests Project Benchmarks set through the Standard Setting Workshops for Degree, Diploma and Higher Certificate Study for South African Higher Education

The National Benchmark Tests (NBT) Project

The National Benchmark Tests project was commissioned by Higher Education South Africa (HESA), now called Universities South Africa, in 2005 and draws on more than thirty years of educational measurement experience and reflects more than ten years of research and collaboration among leading content specialists and researchers from institutions of Higher Education across South Africa. The NBT Project is managed by the Centre for Educational Testing for Access and Placement (CETAP), previously called the Alternative Admissions Research Project, in the Centre for Higher Education Development at the University of Cape Town.

The National Benchmark Tests (NBTs) were designed to measure a writer's levels of proficiency in Academic Literacy, Quantitative Literacy and Mathematics as related to the demands of tertiary study. The NBTs also provide information to assist in the placement of students in appropriate curricular routes (e.g. regular, augmented, extended, bridging or foundation programmes) and with the development of curriculum for Higher Education programmes. In addition, they assist the Higher Education sector to interpret school-leaving results, such as those of the National Senior Certificate (NSC). The publications "Access and Entry Level Benchmarks: The National Benchmark Tests Project" and the "Annual National Benchmark Tests Project Report, 2015" have more information about the National Benchmark Tests project

The NBTs assess a writer's competence in three domains, Academic Literacy (AL), Quantitative Literacy (QL) and Mathematics (MAT). The AL and QL domains are tested in one three hour and five minute test and the MAT domain is tested in a separate three hour test. The tests are briefly described below:

1. The Academic and Quantitative Literacy Test (3 hours and 5 mins)
 	
The results of the two sections of the Academic and Quantitative Literacy test are reported separately as percentages and as benchmark levels.
	The test targets students'
	• capacity to engage successfully with the reading
	  ○ and reasoning demands of academic study in the
	  ○ medium of instruction
	• ability to manage situations or solve problems in
	  ○ real contexts that is relevant to higher education
	  ○ study, using basic quantitative information that
	  ○ may be presented verbally, graphically, in tabular or
	  ○ symbolic form as related to the NSC subjects
	  ○ Mathematical Literacy and Mathematics.

2. The Mathematics Test (3 hours) The results of the test are reported as a percentage and as a benchmark level.	The test targets students' ability related to mathematical concepts formally regarded as part of the secondary school curriculum, and tested in the NSC Mathematics subject.

The NBT Project Academic and Quantitative Literacy (AQL) Test

The National Benchmark Tests (NBT) project Academic and Quantitative Literacy (AQL) Test has seven sections, and each section is timed, for a total of three hours and five minutes' writing time. The AQL test is written by applicants to all programmes. The results of the two sections of the Academic and Quantitative Literacy test are reported separately as percentages and as benchmark levels.

The test targets students'

- capacity to engage successfully with the reading and reasoning demands of academic study in the medium of instruction
- ability to manage situations or solve problems in a real context that is relevant to higher education study, using basic quantitative information that may be presented verbally, graphically, in tabular or symbolic form as related to the new NSC subject Mathematical Literacy.

The test assesses the student's ability to:

- Make meaning from text, typical to that encountered in tertiary studies;
- Understand vocabulary related to academic study, in context;
- Identify and track points and claims made in texts;
- Evaluate evidence used to support writers' claims;
- Extrapolate and draw inferences and conclusions from text;
- Differentiate main from supporting ideas in the overall and specific organisation of a passage;
- Identify text differences that relate to writers' purposes, audiences, and kinds of communication;
- Understand and interpret information that is presented visually (e.g. tables and flowcharts); and Understand basic numerical concepts and information used in text.
- Select and use a range of quantitative terms and phrases;
- Apply quantitative procedures in various situations;
- Formulate and apply formulae;
- Interpret tables, graphs, charts and text and integrate information from different sources; Do calculations involving multiple steps accurately;
- Identify trends and patterns in various situations;
- Apply properties of simple geometric shapes to determine measurements;
- Reason logically; and
- Interpret quantitative information presented verbally, symbolically, and graphically.

The NBT Mathematics (MAT) Test

- Understand and apply properties of the real number system; Recognise and use patterns, including sequences and series; Apply relationships such as ratios and percentages in a variety of contexts;
- Use surds, logarithms and exponents in a variety of algebraic and numerical contexts, including solution of exponential equations and financial calculations;
- Carry out algebraic manipulations, and apply these in the solution of equations and inequalities; Solve problems using mathematical process skills;
- Understand function concept and identify properties of functions, such as domain and range,

in the context of straight lines, parabolas, hyperbolas, exponential and logarithmic graphs, and trigonometric graphs (sine, cosine, tangent);
- Identify relationships between graphs and their equations, or inequalities and the regions they describe;
- Interpret transformations of functions represented algebraically or graphically; Apply trigonometric concepts in solving problems;
- Understand and use trigonometric identities in solving equations;
- Understand properties and interpret representations of two-dimensional and three-dimensional shapes;
- Solve problems relating to perimeter, area, volume; Apply principles of analytic geometry;
- Interpret various representations and measures of data; and
- Use logical skills in making deductions and determining the validity of given assertions.

The NBTs aim to deliver information against benchmarked levels of performance for degree, diploma and higher certificate study at Institutions of Higher Education. The benchmarks are described in the figure below.

NBT Benchmarks for Higher Education Study

100% Proficient	Performance in domain areas suggests that academic performance will not be adversely affected. If admitted, students should be placed on regular programmes of study.
Intermediate	Challenges in domain areas identified such that it is predicted that academic progress will be affected. If admitted, students' educational needs should be met in a way deemed appropriate by the institution (e.g. extended or augmented programmes, special skills provision).
Basic 0%	Serious learning challenges identified: it is predicted that students will not cope with degree level study without extensive & long-term support, perhaps best provided through bridging programmes or FET colleges. Institutions registering students performing at this level would need to provide such support.

The score range at which the benchmarks are defined were previously set in May 2009 and September and October 2012 and the current benchmarks were set in October 2015 by panels drawn from across the country, comprising academics who are currently engaged in mainstream teaching relevant to the domain, who had not been involved in any NBTP test development processes previously. The standards-setting workshops were led by a senior psychometrician from the Educational Testing Service (ETS), Princeton, New Jersey. The table below shows the benchmarks for degree study as determined through the benchmark-setting exercise.

Degree Benchmarks set for the National Benchmark Tests in 2015

The revised benchmarks for degree study were determined through the degree benchmark-setting exercise in October 2015. Nearly forty academics representing all of the South African public higher education institutions participated in this process.

Revised Benchmarks for Degree Study

Performance Levels	Academic Literacy		Quantitative Literacy		Mathematics	
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
Proficient	100	68	100	70	100	69
Intermediate	67	39	69	40	68	35
Basic	38	0	39	0	34	0
Scores are reported as a whole number percentage.						

The table below looks at the Intermediate group split further by means of Upper and Lower boundaries. This division of the Intermediate category was not part of the benchmark-setting exercise in October 2015, but was previously found to be very useful to determine the extent of support that students require.

Revised Intermediate Performance Level for Degree Study Split into Upper and Lower Levels

Intermediate Level	Academic Literacy		Quantitative Literacy		Mathematics	
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
Intermediate Upper	67	54	69	55	68	52
Intermediate Lower	53	39	54	40	51	35
Scores are reported as a whole number percentage.						

The following table provides general guidelines for identifying the level of support that these students may require, based on the September 2012 benchmarks.

Assessment of Need

	Intermediate Upper	ASSESSMENT OF NEED	Intermediate Lower	ASSESSMENT OF NEED
AL	54 – 67	Students are likely to need complementary support (additional tutorials, workshops, augmented courses, language intensive work).	39 - 53	Students need to be placed onto an extended programme.
QL	55 – 69		40 - 54	
MAT	52 – 68		35 - 51	

Diploma and Higher Certificate Benchmarks set for the National Benchmark Tests in 2015

The table below shows the benchmarks for diploma study as determined through the benchmark-setting exercise in October 2015. This was the second time benchmarks were set for diploma and higher certificate level study and thirty four academics representing all of the South African public higher education diploma and higher certificate offering institutions participated in this process.

Benchmarks for Diploma and Higher Certificate Study

Performance Levels	Academic Literacy		Quantitative Literacy		Mathematics	
Proficient	100	61	100	66	100	67
Intermediate	60	33	65	34	66	38
Basic	32	0	33	0	37	0
Scores are reported as a whole number percentage.						

The applicant pool for which educational institutions should be prepared to provide additional educational support is represented in the table below. As was done with the degree benchmarks, this level is split into Intermediate Upper and Lower bands. This division was not set through the benchmark setting exercise in October 2015 but has been used to assist institutions that offer diploma and higher certificate study to determine the extent of support that students require.

Diploma and Higher Certificate Benchmark Performance Levels split into Upper and Lower Boundaries

Intermediate Level	Academic Literacy		Quantitative Literacy		Mathematics	
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
Intermediate Upper	63	47	65	50	66	53
Intermediate Lower	46	33	49	34	52	38
Scores are reported as a whole number percentage.						

The table below provides general guidelines for identifying the level of support that entering diploma students may require.

Assessment of Need

	Intermediate Upper	ASSESSMENT OF NEED	Intermediate Lower	ASSESSMENT OF NEED
AL	47 – 63	Students are likely to need complementary support (additional tutorials, workshops, augmented courses, language intensive work).	33 - 46	Students need to be placed onto an extended programme.
QL	50 – 65		34 - 49	
MAT	53 – 66		38 - 52	

Robert Prince

November 2015
NBTP Team: Carol Bohlmann, Alan Cliff, Natalie Le Roux, Naomi Msusa and Kabelo Sebolai

Appendix I:

NBT Benchmark descriptors and recommended educational responses

Bench-mark	Assessment of required institutional response	Description of benchmark category		
		ACADEMIC LITERACY	**QUANTITATIVE LITERACY**	**MATHEMATICS**
PROFICIENT	Performance in domain areas suggests that academic performance will not be adversely affected. If admitted, students may be placed into regular programmes of study.	**Writers at the *Proficient* level should be able to:** Select and use a complex range of vocabulary; understand and interpret non-literal language; understand and critically evaluate the structure and organisation of texts and ideas within these texts; evaluate and use a complex range of different text genres; develop academic arguments; evaluate and interpret the evidence for claims.	**Writers at the *Proficient* level should be able to:** Select and use a range of quantitative terms and phrases; apply quantitative procedures in various situations; formulate and apply complex formulae; read and interpret complex tables, graphs, charts and text and integrate information from different sources; do advanced calculations involving multiple steps accurately; identify trends/patterns in various situations; reason logically & competently interpret quantitative information.	**Proficient writers should be able to:** perform at the Intermediate level, and in addition should be able to demonstrate insight, and integrate knowledge and skills to solve non-routine problems. They should make competent use of logical skills (conjecture, deduction). Tasks typically require competence in multi-step procedures, represented in the framework outlined below: Modelling, financial contexts, multiple representations of functions (including trigonometric), differential calculus, trigonometric and geometric problems (2D and 3D), measurement, representation and interpretation of statistical data,.
INTERMEDIATE	The challenges in domain areas identified are such that it is predicted that academic progress will be affected. If admitted, students' educational needs should be met as deemed appropriate by the institution (e.g. extended or augmented programmes, special skills provision).	**Writers at the Intermediate level should be able to:** Derive word-meanings from context; recognise non-literal language; recognise the fundamental structural and organisational characteristics of texts; recognise and be able to use a specific range of text genres; understand difference between academic and everyday arguments; make conclusions on the basis of evidence given for claims	**Writers performing at the Intermediate level should be able to:** Select and use many quantitative terms and phrases; apply known quantitative procedures in familiar situations; formulate and apply simple formulae; read and interpret moderately simple tables, graphs, charts and text; do routine calculations accurately most of the time; identify trends/patterns in familiar situations; reason moderately in simple situations.	**Intermediate writers should be able to perform at the Basic level, and in addition be able to** integrate knowledge and skills to solve routine problems. Tasks involve multi-step procedures which require some information processing and decision-making skills, within the framework outlined below: Estimation, calculation, pattern recognition and comparison (in numerical, algebraic and financial contexts); solution of equations; use and interpretation of relevant functions represented algebraically or graphically; geometric properties of 2D- and 3D-objects; geometric and trigonometric problems in two dimensions; calculation and application of statistical measures; representation and interpretation of statistical data.
	Serious learning challenges identified: it is predicted that	**Writers at the Basic level should be able to**: Cope with a limited range of vocabulary; summarise	**Writers performing at the *Basic* level should be able to:**	**Basic level writers should be able to** carry out mathematical computations that require direct

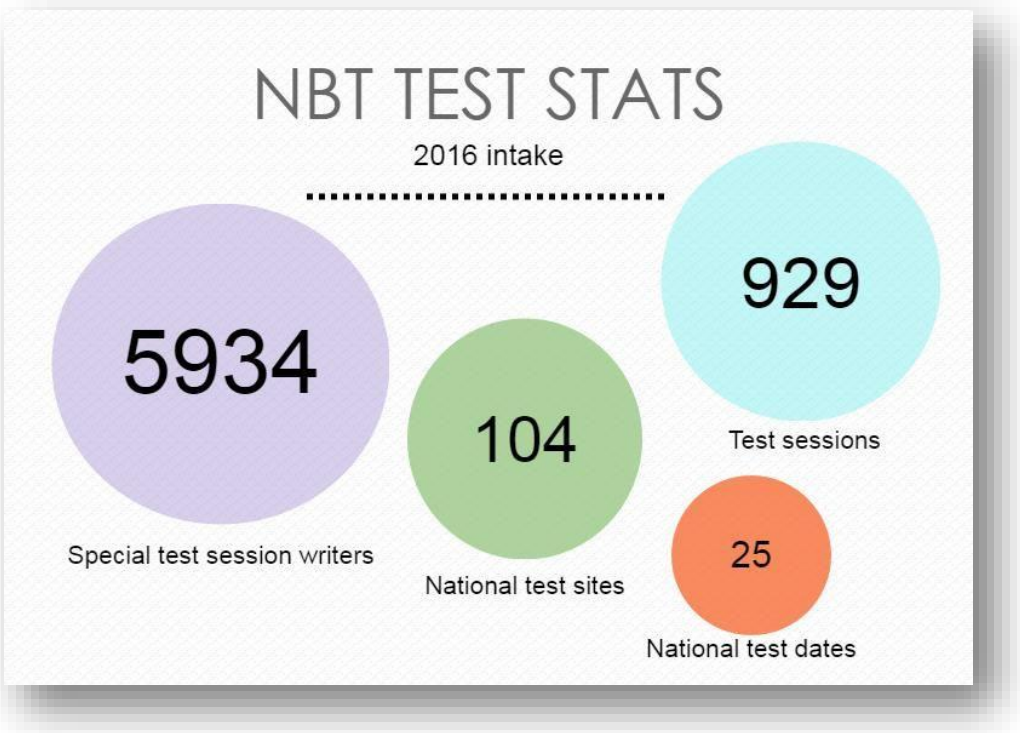
BASIC	students will not cope with degree-level study without extensive and long-term support, perhaps best provided through bridging programmes (i.e. non credit preparatory courses) or FET provision. Institutions admitting students performing at this level would need to provide such support themselves.	key ideas related to the organisational structure of texts; recognise that texts have different purposes; understand the fundamental syntactical features of English language; interpret textually explicit information	Select and use some basic quantitative terms and phrases; apply some known quantitative procedures partially correctly in familiar situations; formulate or apply simple formulae; interpret simple tables, graphs, charts and text; sometimes do simple calculations correctly; identify trends/patterns in familiar situations.	application of simple concepts and procedures in familiar situations. Tasks involve single-step problems requiring recall and reproduction of basic knowledge or procedures, within the framework outlined below: The real numbers system; simple algebraic contexts; single representations of relevant functions and recognition of their graphs; identification of 2D- and 3D - objects; geometric and trigonometric calculations; identification and use of some statistical measures; simple representation of statistical information.

APPENDIX B: 10 FACTS ABOUT THE ACCESSIBILITY OF THE NBT

NATIONAL BENCHMARK TESTS PROJECT

Ten facts about the accessibility of the NBT

1. Accessibility of venues



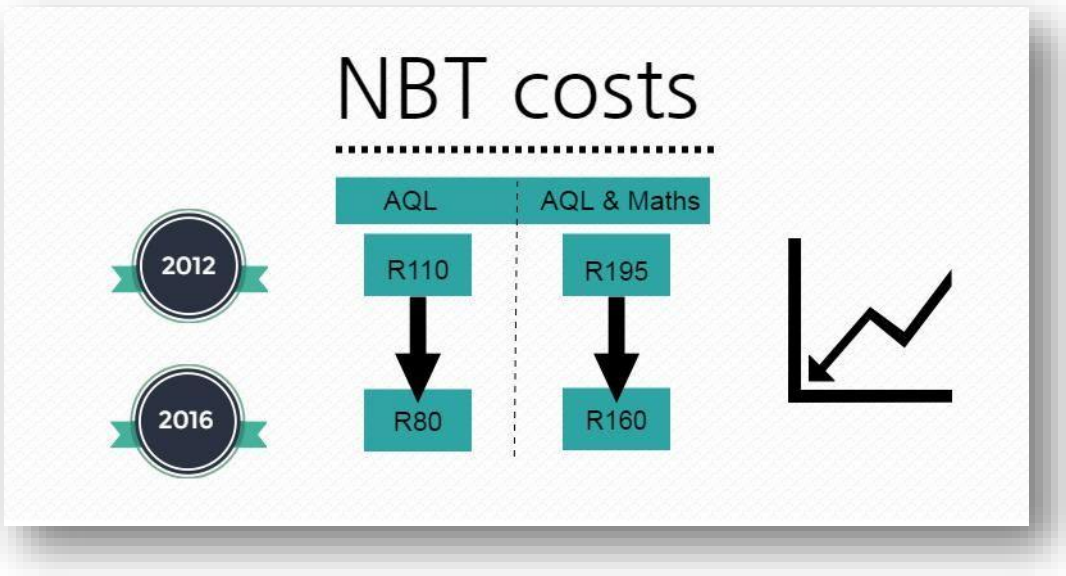
- **Test sessions** are the number of tests run.
- **National test sites** are the number of locations where tests are run and are distinct from Special test session sites.
- **Special test sessions** are tests requested by institutions to fulfil their own requirements.
- **National test dates** are the number of days per year on which tests are held.

2. Venues and sessions per province for 2016 intake

PROVINCE/REGION	NUMBER OF TEST SITES	NUMBER OF TEST SESSIONS
EASTERN CAPE	17	157
FREE STATE	6	72
GAUTENG	11	136
KWAZULU-NATAL	21	146
LIMPOPO	4	61
MPUMALANGA	8	68
NORTH-WEST	3	46
NORTHERN CAPE	6	35
WESTERN CAPE	13	141
SADC REGION	15	67

3. Test fees

The NBT test fees have been steadily declining over the years.



4. **Registering to write the NBTs**

   Registration and checking of results can be conducted via the web and web-enabled mobile devices.

5. **Call Centre support and assistance**

   The NBTP Call Centre employs dedicated agents who respond to queries about registration, payments, score reporting, and directions to venues.

6. **Disability**

   Provision is made for test writers with disabilities. We have successfully accommodated writers who are blind, visually, hearing or mobility/physically impaired, have a learning disability, or have a chronic illness that requires special accommodations. Time concessions, readers, scribes, and braille versions of the tests have been made available as required.

7. **Special sessions**

   A special NBT test session can be run when an institution requests one to fulfil their specific needs and requirements. All costs are borne by the institution that requests a special session.

8. **Remote sessions**

   Remote sessions are run when someone is unable to write at an institution that generally facilitates the national benchmark test sessions.

   Usually, these are for test writers in another country or in an area too remote to be able to make a trip of a reasonable distance to the nearest testing centre. A recent example includes the principal of a school in a remote area in the Western Cape who made us aware of three pupils who wished to write the tests. The test papers and an invigilator were flown up at no expense to the school or the test writers.

9. **Language**

   Tests may be written English and Afrikaans, depending on the language of instruction at institution being applied to. Tests have also been translated into Braille for visually impaired test writers.

10. **Increasing our reach**

    One of the main goals of the project is to increase the national test administration footprint by 10% of test sites to ensure equitable access to testing centres by rural and disadvantaged communities.