Apples and Oranges?

A comparison of school and college subjects

UMALUSI

COUNCIL FOR QUALITY ASSURANCE IN GENERAL AND FURTHER EDUCATION AND TRAINING

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Chapter One 1

Summary

INTRODUCTION

This research was conducted in an attempt to understand the relative standard of different courses in four subjects offered at FET colleges (technical colleges) and high schools in South Africa, and to understand the extent to which these different courses prepare learners for higher education. The research examined various Mathematics, Science, and English courses, as well as courses within the broad area of Hospitality currently offered in schools and colleges, in an attempt to understand whether or not the courses could be seen as equivalent to each other and the extent to which the courses prepared learners for higher education.

A variety of factors lead Umalusi to view this research as important at this time, despite the fact that both the current Senior Certificate and the current vocational programmes are going to be phased out, and despite the fact that the current vocational programmes have been the subject of much criticism, and are generally perceived to be of an inadequate standard. Umalusi felt that, notwithstanding imminent policy change, serious questions and debates will remain about the nature of curriculum change which is needed, particularly in vocational education, and the extent to which the old courses can continue to be used. In particular, Umalusi felt that a substantive understanding of the exact nature of these courses and potential problems with them would be a significant contribution to future policy reforms.

The education policy framework in South Africa also provided important impetus for this research. Historically South Africa has had a broad framework of equivalence at senior secondary level between high school qualifications (Senior Certificate) and technical college qualifications (National Senior Certificate). Subjects for the school qualification were generally offered on two main levels: Higher Grade which was supposed to be more cognitively challenging, and Standard Grade which was designed as an easier alternative. The college qualifications were seen as the equivalent of the school qualification, but at Standard Grade level. However, it was

hoped that the status of vocational education would be raised through the introduction of an ambitiously designed National Qualifications Framework (NQF). By designating that qualifications were all at level four on the NQF, the level of Grade 12 qualifications, it was thought that the status of all qualifications at that level would be the same and that all qualifications at level four could lead to higher education programmes, at least within the area of study of the respective qualifications. However, understanding what equivalence means in reality—comparing apples with oranges—as well as understanding whether or not current courses designated as equivalent are in fact equivalent, requires an in-depth look at the actual courses. It must be noted that this report does not take as its premise that equivalence is necessary or desirable, simply that it has been an important policy goal, and that formally, and from the point of view of information provided to learners, the qualifications currently are supposed to have a correspondence.

Qualification reform is not straightforward, and is likely to be a concern for some time to come. The relationship between vocational qualifications and general education qualifications at a senior secondary level is particularly tricky. Qualification reforms at senior secondary levels internationally have focused on trying to create equivalence between vocational and academic qualifications. In the United Kingdom, creating vocational qualifications that lead to higher education has played a significant role in encouraging learners to enrol for vocational programmes (Wolf, 2002). Countries with strong vocational programmes at secondary level, such as Germany, Austria, and the Scandinavian countries, tend to have established pathways into higher education programmes within the vocational area being studied. On the other hand, in South Africa learners studying in FET colleges have generally not intended to go to university, and most of the courses were not designed with higher education in mind. The courses were also often designed to cater for learners who had not succeeded in school, which made it even less likely that they would be designed from the point of view of higher education study.

This research was also seen as important with regard to Umalusi's various quality assurance mechanisms. Umalusi currently quality assures examinations, and accredits private providers as well as examination bodies, in order to be able to issue certificates for specific qualifications. However, Umalusi is expected to co-operate with quality assurance bodies which are constituted under the Sector Education and Training Authorities (Setas), which operate in a completely different quality assurance model, based on delegated assessment as opposed to examinations. Umalusi is also responsible for monitoring the suitability of standards for the qualifications that it certifies in the General and Further Education and Training Bands of the NQF. As such, a more specific understanding of the current programmes is very

important for Umalusi, in order for it to be able to engage more meaningfully with debates about pathways within senior secondary education.

In short, Umalusi wants to strengthen its current quality assurance mechanisms, as well as to develop new ones, and to develop meaningful ways of co-operating with other quality assurance bodies. Umalusi therefore designed this research to develop a better understanding of the current nature of vocational courses in South Africa—to determine whether they are in fact equivalent to school subjects at the same level and whether they prepare learners for higher education. Although preparation for the workplace is a crucial aim of vocational qualifications, it was not possible to include this aspect in this research; it will be the focus of a follow-up research project.

METHODOLOGY

Two teams of researchers commissioned by Umalusi examined courses in the different subject groups in order to provide answers to the two research questions. First, a team of four practitioner evaluators for each subject evaluated syllabuses, examination papers, memoranda, and marked scripts for the courses, as well as course packs for some of the new NQF courses. Each team consisted of two Grade 12 educators and two college lecturers who had produced consistently good results. One member of each group had participated in Umalusi's 2004 Investigation into the Senior Certificate Examination. Second, a team of four higher education experts, drawn from universities and universities of technology, evaluated the same data, as well as the reports of the practitioners.

Evaluators were asked to analyze the courses using three main categories of comparison: content coverage, key concepts and procedures, and expected outcomes. Criteria and guidelines within each category were developed, and evaluators were asked to rate examination questions on a scale of cognitive challenge. The three categories and the scales of cognitive challenge were used as the basis for judgements about both research questions—the equivalence of the courses, and the extent to which they prepare learners for higher education.

Evaluators worked jointly in workshops and individually to produce analyses of their subjects. A single report was produced by each of the two groups of evaluators in each subject area. Umalusi produced this report on the basis of synthesis and analysis of the subject reports.

LIMITATIONS

First, it must be noted that this research project was a pioneering one. An inherent limitation is that it did not draw on well-established tools and approaches. Furthermore, it is a limited study of four subject areas only. As such, it can in no way be read as presenting conclusive findings about the college curriculum in relation to the school curriculum, but rather as a first stab into understanding what the differences and similarities are, and where the problems might lie.

Second, curriculum is always a highly political area. Decisions about what should be taught at a senior secondary level are not straightforward, and there is often intense disagreement among experts within subject areas on issues such as what is appropriate at different levels and which areas should be focused on. Such debate and discussion is important, but not always easy to resolve. The opinions of four individual higher education experts were sought. This inevitably means that the particular views and preferences of those individuals about the focus areas of their particular subjects, or the broad approach which should be taken to their particular subject, dominate some of the findings. This was not a serious limitation from the point of view of answering the research question, but Umalusi would not advocate all the views represented here as the final word on what should or should not be in the curricula of the subjects in question; a broader, more inclusive and more rigorous process would be needed to take such decisions.

It is also worth noting that part of what made this research difficult, and in some senses incomplete, is the fact that each course is part of a total package. The location of the course within this package affects what the course is—that is, the role that the course plays in the development of the learner. The standard of the qualification obtained is a product of the combination of the different subjects taken; the subjects should not be looked at only in their own right. The vast majority of learners writing the Senior Certificate are studying six subjects at the same time. In general these subjects are part of a three-year programme—what is examined in the final examination is taught over the second and third years, with the first year in most cases laying the basis for the next ones. Learners writing N3 Engineering in colleges, on the other hand, may study for only one year in total, taking four subjects done in a series of three trimesters each (for N1, N2, and N3 respectively). The final examination for N3 is based on the last trimester only. Learners studying for the National Senior Certificate usually do six subjects over two years; the final examination is often based on the Grade 11 syllabus as well as the final year or Grade 12 syllabus, and sometimes even tests items taught in Grade 10. In some subjects only the Grade 12 syllabus is explicitly tested. Obviously, for the National Senior

Certificate, the National Certificate, and the Senior Certificate, the knowledge tested in the final year is cumulative, and builds on knowledge and abilities taught in earlier courses. From the point of view of preparation for higher education, this is particularly important. It could be possible, for example, that a course which provides training in memorization and organization of knowledge in an area like hospitality, without any conceptual or abstract thinking, could play some role in preparing learners for higher education, as long as the other courses that learners are taking develop the other skills and abilities required. It is thus difficult to make a judgement about a course on its own, in terms of higher education preparation.

Other limitations included having less time than we would have chosen in a perfect world, and data sets from the various subjects which did not always include everything required (this is discussed in more detail in the chapters containing the subject reports). Despite these limitations, Umalusi feels that this research provides significant and sufficiently rigorous answers to the questions at hand, as well as insight into other issues which emerged during the course of the study.

GENERAL FINDINGS

This research provides a much-needed insight into an issue which has been dealt with in overly general terms in South African education policy—the notion of equivalence. It became very clear during the course of the research that it is very difficult to talk about equivalence in generic terms—specific content areas and levels of cognitive challenge within content areas need to be investigated. The evaluators found, however, that it was quite possible to compare the different courses within the same broad subject area when a clear framework which looked at specified content and evaluated the difficulty level of examinations within specified levels of cognitive challenge was used. Based on the amount of knowledge to be learned and the level of cognitive challenge at which it is examined in the courses, the researchers argued that the courses are not equivalent. To extend the metaphor of the title, apples and oranges can be compared from the point of view of nutritive value—composition and amount of various dietary elements.

With regard to the research questions, as expected the research found that the school or Senior Certificate subjects were broader than the corresponding college or National Senior Certificate subjects, and the examinations for the former certificate were in general considerably more challenging. The results provides useful insight into the exact nature of the gaps and problem areas within the National Senior Certificate subjects, as well as within some of the Senior Certificate subjects. In

Science, Mathematics, and English (Home and Additional Language) there is clearly no equivalence between the school and college subjects—the National Senior Certificate courses are far less substantive and are tested through examinations which contain few challenging questions. The trimester system (which was developed for apprentices who would also have been learning in the workplace) is clearly no longer appropriate, and is particularly limited in terms of learners' chances of mastering a substantive body of knowledge. Question papers need to be more challenging and less predictable. In other words, to again work with the metaphor of the title, what was found was that the courses are not apples and oranges, but more like apples and half apples. Apples and oranges would imply that the courses are different in appropriate ways and good in their own terms. What seems to be the case, however, is that, particularly for Mathematics, Science, and English, the college subjects are weaker versions of the school subjects.

None of the four college subjects examined as part of this research prepare learners for degree study in higher education, and if indeed it is important that college courses lead to higher education then these courses need to be redesigned. However, many of the school subjects were also seen as seriously lacking in the content, skills, and levels of cognitive challenge required to prepare learners for degree study.

This research is also significant in that it showed clearly the problems of using only outcome statements as an expression of desired standards for a course. Dramatically different courses claimed to lead to the same or similar outcomes, and the outcomes themselves did not contain anything which could resolve this problem. As stated above, it was the evaluative framework, which consisted of comparing the breadth and depth of specified content as well as judgements about assessment instruments, that enabled any real understanding of the courses. The specification of outcomes is like the orange peel—there is nothing substantive that can be seen or judged from the outcomes alone.

Thus, probably the strongest message coming from this research is that urgent attention needs to be paid to curriculum development in South Africa—particularly the development of user-friendly syllabuses which provide clear indications to teachers about the key knowledge areas to be covered and the levels of cognitive challenge to be assessed. Syllabuses should also guide teachers with regard to teaching approaches for the key content areas; this is particularly urgent in vocational programmes. Various recommendations were made for the curriculum development for the new National Senior Certificate as well as future programmes for colleges. What is key, however, is the development of strong syllabuses which can be useful tools for teachers, textbook writers, and examiners. It is equally clear from this

research that stipulating only learning outcomes is not a viable approach to curriculum if any degree of standardization or equivalence is believed to be important.

Following from this, what will be essential for Umalusi in terms of its role in monitoring the adequacy and suitability of standards and qualifications is the consolidation of the categories and criteria used in this research into tools which can be used to make judgements about curriculum statements, syllabuses, and examinations.

The categories, criteria, and evaluative scales developed in this research and the 2004 Investigation into the Senior Certificate Examination will provide a substantive basis from which Umalusi should develop tools for the evaluation of syllabuses and examinations, something it needs to do in terms of its role in monitoring standards. The scale developed by the Science evaluators is particularly useful.

SUMMARY OF FINDINGS PER SUBJECT

This section contains the key findings which are discussed in detail in Chapters Three to Six. The original detailed subject reports are available from Umalusi on request.

SCIENCE

The following is a summary of the key findings in terms of the equivalence of Science courses.

- With regard to time allocated to the courses:
- The N3 Engineering Science course is taught over a dramatically shorter period than the Senior Certificate Higher and Standard Grades Physical Science courses, providing learners with insufficient time to master the content in question.

With regard to the intended curriculum:

- An overview of content shows substantial differences between the Senior Certificate Physical Science course on the one hand and the N3 Engineering Science course on the other.
- The most significant difference in terms of content is that the N3 Engineering Science course is essentially a Physics course, with the exception of one very

small and superficial Chemistry section. The Senior Certificate Physical Science course, on the other hand, contains 50% Chemistry, and 50% Physics. The N3 course does contain additional Physics topics and industrial applications not covered in the Senior Certificate course, but the inclusion of Chemistry in the Senior Certificate courses make them substantially broader.

- The Senior Certificate Physical Science Higher Grade course covers topics in the most depth, followed by the Standard Grade course; the N3 Engineering course covers topics in the least depth.

With regard to the examined curriculum:

- The Senior Certificate is examined through two papers, which provides greater scope for creative testing of the entire syllabus as well as for marking learners' thought processes in partly correct answers. In addition, the rigidly prescribed format of the N3 examination makes it more likely that this paper is highly predictable.
- Both Senior Certificate Science courses were tested through examinations which were more challenging than the N3 Engineering Science examination.

With regard to preparation for degree study at higher education level:

- The desirable analytical, problem solving, and mathematical skills required for the study of science in higher education are sufficiently well developed and examined in the Senior Certificate Higher Grade curriculum, less fully developed in the Standard Grade curriculum, and not well developed at all in the N3 curriculum. In particular, the lack of Chemistry in the N3 course is a problem.

MATHEMATICS

The following is a summary of the key findings in terms of the equivalence of Mathematics courses.

- With regard to time allocated to the courses:
- The N3 Mathematics course is taught over a substantially shorter time period than the Senior Certificate course.

With regard to the intended curriculum:

- An overview of content shows that the two courses are generally similar. There are two substantial sections in the Senior Certificate Standard Grade syllabus which are not in the N3 syllabus.

- Sequences and series and linear programming are worrying omissions from the N3 syllabus.
- Number and number relationships are not dealt with in any great detail in either syllabus. While this could be because this is taught more explicitly at earlier levels and knowledge is assumed at this level, both syllabuses spend too much time on algebra and do not pay enough explicit attention to this aspect of Mathematics. As such, they are unlikely to develop necessary numerical skills.
- Functions are treated inappropriately in both syllabuses, with little emphasis on the concept of functions, few links between different kinds of functions, and no indication of how they are used or why they are important.
- The development of spatial concepts and skills is weak in both syllabuses.
- Data handling, an important mathematical area in terms of practical applications, is absent from both syllabuses.
- Both syllabuses are inadequately structured, with no explicit mention of what are variously called mathematical skills, processes or practices, including estimation, generalization and justification as important parts of the syllabuses. As a result, it is highly unlikely that these skills will be explicitly taught or examined.

With regard to the examined curriculum:

- The two Senior Certificate Standard Grade Mathematics examinations test roughly the same content as the single N3 Mathematics course, but the former course has far more challenging questions. The rigid format of the N3 paper, as well as the restricted number of total marks, is likely to lead to greater predictability.
- Standard Grade candidates are expected to work more quickly and are examined on more work than the N3 candidates.
- The Standard Grade examinations contain more work on analysis of graphs, calculus, and trigonometry than the N3 examinations. These are sections which are crucial to higher education in scientific and technological fields.

With regard to preparation for degree study at higher education level:

- Neither the N3 nor the Senior Certificate Standard Grade Mathematics course prepares learners adequately for degree study at higher education. Important sections which are necessary for learners going into technological and scientific careers are not covered. The syllabuses are inappropriately compartmentalized, and both lack higher-order questions which develop the kinds of mathematical skills needed in higher education. The Senior Certificate course was seen as better in this regard, but still inadequate.

With regard to the NQF contextualized Mathematical Literacy course:

- It was not possible to make rigorous judgements about the content and level of the course merely on the basis of course packs. However, the course seemed to be too embedded in the context, and as such could lose sight of the mathematical competencies being built.

ENGLISH

The following is a summary of the key findings in terms of the equivalence of English courses.

- It was not possible to make meaningful comparisons between the Senior Certificate and National Senior Certificate courses on the one hand and the NQF courses on the other, due to the absence of summative assessment instruments in the NQF courses, as well as the fact that only unit standards are prescribed. On the basis of this finding, a decision was made not to pursue a detailed comparison. However, the finding is very significant because it implies that an approach to curriculum design in which only outcomes are specified will make quality assurance unreliable.

With regard to time allocated to the courses:

- In terms of teaching time, the Senior Certificate and National Senior Certificate courses are comparable, for both Home Language and Additional Language courses.

With regard to the intended curriculum:

- An overview of English Home Language content shows that the Senior Certificate course contains more prescribed reading and a greater variety of types of writing.
- An overview of English Additional Language content similarly shows more reading and wider variety of writing types in the Senior Certificate courses, although within transactional writing, the only writing type for Business English, there are more types of writing tasks.
- There is dramatically more reading in the Senior Certificate courses, and by far the most reading in the Senior Certificate Home Language courses.
- The Senior Certificate courses teach a greater variety of types of writing; argument and exposition are worrying omissions from writing in the Business English courses.

- There is some difference in form between all syllabuses, and a dramatic difference between both the Senior Certificate and National Senior Certificate on the one hand and the NQF courses on the other.
- The English syllabuses are in some disarray. This is cause for serious concern as English is the medium of instruction for most learners. Considerable effort should be expended on designing courses which build sufficient ability in the language to master academic study in English, and not just communicative competence in the language.

With regard to the examined curriculum:

- The Senior Certificate courses are examined through a writing portfolio and three external examinations, two of which are two-hour written papers. The National Senior Certificate is examined through two external examinations but a year mark also contributes to learners' marks.
- The Home Language Senior Certificate examinations were both considerably more challenging than the Business English course, with the exception of Business English Writing, where a higher standard of understanding and application is required.
- The Additional Language Standard Grade Senior Certificate examinations were less challenging than the Business English papers in some areas, but more challenging in others.
- The inclusion of a literature examination in the Senior Certificate courses means that dramatically more reading is tested, particularly in the Home Language courses, In addition, for the Home Language courses the level of cognitive challenge of questions testing reading in the Senior Certificate courses are both higher than the Business English course.
- All Senior Certificate examinations—Home Language and Additional Language at both Higher and Standard Grade—tested more challenging language items than the corresponding Business English examinations.

With regard to preparation for degree study at higher education level:

- The English Home Language courses are by far the most likely to prepare learners for degree study at higher education, although they also have shortcomings. The Business English courses as well as the Additional Language Standard Grade course are the least likely to prepare learners for higher education.

HOSPITALITY

The following is a summary of the key findings in terms of the equivalence of courses in the broad area of hospitality (Hotel Keeping and Catering in schools, and Catering Theory and Catering Practical in colleges).

- There are no formally equivalent courses in Hospitality across schools and colleges, although there is a lot of common content in the courses.

With regard to time allocated to the courses:

- The National Senior Certificate course is taught over a substantially longer period of time than the Senior Certificate course.

With regard to the intended curriculum:

- The syllabuses in both schools and colleges are in a state of disarray.
- A broad overview of content covered shows that the single Senior Certificate subject is broader than the two National Senior Certificate subjects combined. The narrowness of the college courses may be appropriate given that the courses are Catering and not Hospitality courses. However, there does not seem to be a corresponding balance in terms of depth of the syllabuses.
- The bulk of the content of both the National Senior Certificate courses and the Senior Certificate course consists of food preparation, and in this area the courses have similar content, although the National Senior Certificate course has more time for practical work.
- In terms of content specified in the syllabuses, none of the courses focus on conceptual development.

With regard to the examined curriculum:

- All the examination papers have few questions at a challenging level. The National Senior Certificate Catering Practical paper had the highest number of challenging questions. In general, the Hospitality examinations depend on recall of lists of facts, and are very superficial.

With regard to preparation for degree study at higher education level:

- Both the Senior Certificate and the National Senior Certificate courses do not prepare learners for higher education.

RECOMMENDATIONS

STANDARDIZATION

- Umalusi must urgently refine and consolidate tools for evaluating the levels of cognitive challenge of examinations and syllabuses.
- Umalusi's decision to issue certificates only to courses with external examinations is vindicated by this research.
- The predictability of examinations needs to be dealt with urgently.

CURRICULUM DEVELOPMENT

- Considerable effort needs to be expended in curriculum design, specifically in designing stronger, more user-friendly syllabuses, and examinations with appropriate mixes of levels of cognitive challenge.
- More thought should be expended in deciding what the appropriate differences between school and college subjects should be. There should be more co-ordination in curriculum design and moderation across these institutions.
- The subject reports contain useful suggestions and insights for future curriculum development in these subject areas, and should be utilized.
- English is a particular concern. Focused attention must be paid to the development of appropriate English syllabuses, with considerable energy being directed to ensuring that the English Additional Language syllabus enables learners to learn their other subjects in English. More thought needs to go into deciding on the appropriate differences between different English courses. Either literature needs to be included in all English syllabuses, or considerable energy must be expended in ensuring that texts which are sufficiently lengthy to develop sustained reading are included in English courses and available in all institutions.

QUALITY ASSURANCE

- Umalusi needs to continue to improve its moderation systems and approaches.
- If standardization and equivalence across college and school subjects is felt to be important, Umalusi should consider employing the same moderators to look at subjects across institutions.
- The standard of marking needs to be improved and monitored.

EDUCATOR TRAINING

- Adequate training of educators is essential if the levels of cognitive challenge in all subjects is to be raised.

FURTHER RESEARCH

- This research process investigated the extent to which courses provide access to higher education in a general way. While trends emerged in relation to degree study at higher education level, it does seem as if there are some pathways to higher education from most of the subjects concerned. Future research focused more narrowly on the extent to which college subjects give access to higher education and to which programmes in higher education they give access would be useful.
- Further research and thought needs to be invested in developing the most appropriate approach to the development and presentation of syllabuses.
- This research pointed to possible problems with the standard of marking, and this should be followed up in future research.
- Already planned is research to understand the extent to which these courses are sufficient to supply the theoretical knowledge needed for practical application in industry at the intended levels.

Chapter Two 2

Background, research questions, and methodology

INTRODUCTION

This research was conducted in order to understand the relative standard of different courses in four subjects offered in FET colleges (technical colleges) and high schools in South Africa. The research examined the different Mathematics, Science, and English courses, as well as courses within the broad area of Hospitality, offered in schools and colleges in an attempt to understand whether or not the courses could be seen as equivalent to each other, as well as the extent to which the courses prepare learners for higher education. The research also attempted to examine newly developed courses against unit standards registered on the NQF in these subject areas.

For learners in schools, the four subjects above form part of the Senior Certificate, for which learners are currently required to do six subjects including two languages. [1] This qualification is taken by the vast majority of learners who complete their senior secondary education, and other qualifications at this level have been generally defined in comparison with it. Despite the public criticism and debate about the standards of the Senior Certificate, as Umalusi (2004:ix) argued in a previous research report,

> The Senior Certificate (SC) examination, or Matric as it is popularly known, represents a high point of learning in South Africa. It holds great significance as a rite of passage, as it marks the culmination of twelve years of schooling. It is still by far the most popular determinant of access to higher education and, to a lesser extent, to the world of work. Perceived as

[1] 'Currently' here refers to the Senior Certificate, which is the certificate which was available at the time of writing this report, and will be phased out after 2007.

a "high stakes" examination, the Senior Certificate end-year examination attracts a great deal of public interest.

Learners in colleges doing the above subjects would be studying towards either a National Senior Certificate or a National Certificate. The National Senior Certificate includes two languages, and is formally considered to be the equivalent of the Senior Certificate on Standard Grade. The National Certificates consist of four subjects and do not include languages. The National Senior Certificate and National Certificate courses are usually referred to as N3 courses, and both terms are used in this report. [2] The National Senior Certificate and National Certificate courses do not share the prestige of the Senior Certificate described above, and seem to be regarded by the general public as inferior options. There is also a vast range of new qualifications that have been developed through the structures and processes of the South African Qualifications Authority (SAQA) and registered on the NQF. A few of these qualifications are currently being offered in colleges, and where possible these new courses were included in the research.

LEARNER ENROLMENT AND PASSES, 2004

In order to understand the current place of the courses in question in the South African education system, the learner numbers for 2004 are supplied below for the courses in the study. The information was obtained from two reports published by the Department of Education (Department of Education, 2004a, 2004b).

By far the largest group of learners were enrolled for the Senior Certificate.

In 2004 a total of 471 080 learners wrote the Senior Certificate examinations. Of these, 330 717 learners passed the Certificate as a whole—85 117 learners passed with university endorsement and 245 600 passed without endorsement. With regard to the subjects under consideration in this study, the numbers are as follows:

Physical Science
Higher Grade: 55 969 learners enrolled, 14 451 failed, 26 295 passed, and 14 543 were converted to passes on Standard Grade.

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[2] N1, N2, and N3 programmes are roughly regarded as the equivalent of Grades 10, 11 and 12. There are also N4, N5 and N6 programmes, which are called higher education programmes and which have been provisionally allocated to level five of the NQF.

Standard Grade: 105 245 learners wrote, 27 220 failed, 59 400 passed, and the remainder were converted to Lower Grade passes.

Mathematics
Higher Grade: 39 939 learners enrolled, 9 853 failed, 24 143 passed on Higher Grade, 5 943 were converted to Standard Grade passes.
Standard Grade: 236 155 learners enrolled, 109 446 failed, 103 721 passed, and the remainder were converted to Lower Grade passes.

English Home Language
Higher Grade: 61 361 learners enrolled, 137 failed, 58 152 passed, 3 072 were converted to Standard Grade passes.
Standard Grade: 15 291 learners enrolled, 35 failed, 15 027 passed.

English Additional Language
Higher Grade: 384 178 learners enrolled, 29 733 failed, 279 665 passed, 74 780 were converted to passes on Standard Grade.
Standard Grade: 18 474 learners enrolled, 661 failed, 12 446 passed.

Hotel Keeping and Catering
Standard Grade: 6 398 learners enrolled, 39 failed, 6 105 passed, 254 were converted to passes on Lower Grade.

Far fewer learners enrolled for the National Senior Certificate and National Certificate courses. The numbers are as follows (totalled across the different examination sessions for 2004):

Engineering Science
28 565 learners wrote, and 13 012 passed.

Mathematics
32 416 learners wrote, and 17 210 passed.

English Home Language
3 744 learners wrote, and 2 162 passed.

English Additional Language

6 124 learners wrote, and 3 854 passed.

Catering Theory
205 learners wrote, and 81 passed.

Catering Practical
185 learners wrote, and 133 passed.

No information was available for the new courses designed against unit standards registered on the NQF. It is understood that SAQA is currently in the process of conducting research on take up of qualifications and unit standards, and it is hoped that this information will become available soon.

THE POLICY CONTEXT AND THE IMPORTANCE OF 'EQUIVALENCE'

A range of imperatives made Umalusi view this research as a priority at this point.

Raising the status of vocational courses

South Africa, like many other countries, would like to encourage learners to enter vocational programmes. Internationally governments see vocational education programmes as necessary for combating unemployment and increasing economic growth, and have been trying, in various ways, to encourage more movement towards vocational training and away from academic programmes. Directing learners into vocational programmes is also seen as a way of coping with the rapid massification of senior secondary education provision, as in most countries senior secondary school systems were designed for a relatively small elite. However, in many countries, particularly in the Anglophone world, vocational education programmes are usually seen by the general public as inferior alternatives to general education.

The relationship between vocational qualifications and general education qualifications at senior secondary level is thus of great importance, and qualification reform at senior secondary levels has focused on trying to create equivalence between the two types of qualifications. In the United Kingdom, creating vocational qualifications that lead to higher education has played a significant role in getting learners into vocational programmes (Wolf, 2002). Countries with strong vocational programmes at secondary level, such as Germany, Austria, and the Scandinavian

countries, tend to have established pathways into higher education programmes, although this is mainly within the vocational area being studied. It is likely that the relationship between higher education programmes and senior secondary programmes in specific vocational areas also plays a role in raising the actual standard of the latter programmes, and not just their status. However, in South Africa, as in many other countries, vocational programmes are often not designed with higher education in mind.

As such, Umalusi felt that it was important to develop a substantive understanding of the nature of vocational courses in South Africa with regard to these two issues—the extent to which they are in fact equivalent to and different from school subjects at the same level, as well as the extent to which they prepare learners for higher education.

The NQF and current qualifications at the senior secondary (or FET) level

The education policy framework in South Africa has provided an important impetus for this research. Historically, South Africa has had a broad framework of equivalence at senior secondary level between high school qualifications (Senior Certificate) and technical college qualifications (National Senior Certificate). The Senior Certificate subjects were generally offered on two main levels: Higher Grade, which was supposed to be more cognitively challenging, and Standard Grade, which was designed as an easier alternative (there was also a Lower Grade below the Standard Grade). The National Senior Certificate was regarded as the equivalent of the Senior Certificate on Standard Grade. The National Certificates could be converted to a National Senior Certificate by adding two languages courses.

However, it was hoped that the status of vocational education would be raised through the introduction of an ambitiously designed National Qualifications Framework. Through the introduction of the NQF, policy makers attempted to ensure that the status of all qualifications at any particular level would be the same. Thus, a series of qualifications was designated to be at level four on the NQF, the level of Grade 12 qualifications. It was thought that because they were all at NQF level four, they would be equivalent, and they would all be able to lead to higher education programmes, at least within the area of study of the respective qualifications.

Initially, through the National Qualifications Framework, there was an attempt to create one qualification type for all learning programmes at NQF level four or the senior secondary level. The idea was that all learners at this level would be able to

obtain a Further Education and Training Certificate (FETC). The Department of Education later decided not to call the qualification for schools an FETC, but rather to use a variant of the old name, and to call it the National Senior Certificate. (For purposes of clarity in this report, it is referred to as the new National Senior Certificate, in order to distinguish it from the National Senior Certificate which is currently offered in colleges.) At the time of writing this report, a new college qualification was still being designed, probably to be called the FETC (Vocational). There will be a distinction between the FETC (Vocational), which will be funded by the Department of Education and issued by Umalusi, and other vocational qualifications which are currently registered on the NQF and funded as well as quality assured by the Sector Education Training Authorities. There is little empirical evidence that suggests that dividing vocational education up in this way is appropriate. It seems that what is missing in South Africa is sufficient understanding of where appropriate similarities and differences should lie.

It should also be noted that the current articulation pathway between colleges and higher education is complicated because there is already a so-called higher education programme within colleges. Mostly, when the former technikons (now universities of technology) take people from colleges, they take them at level N6. This makes the discussions about articulation even more complicated. In the past these 'higher education' college programmes were seen as post-secondary education and not higher education. The introduction of the NQF has made this tricky, as according to NQF levels colleges offer higher education.

Umalusi's role with regard to standards and equivalence

Umalusi is responsible for monitoring the suitability of qualifications and standards. It is also the certification body which will ultimately issue many of the certificates discussed above. As such, a more specific and substantive understanding of the standard of current programmes is very important for Umalusi, in order for it to be able to engage more meaningfully with debates about pathways within senior secondary education.

This research does not start from the premise that equivalence is always necessary or desirable. It also accepts that equivalence is a very complex issue within education and training. However, the notion of equivalence—what makes one course equivalent to another—is of great concern in South African education. The National Qualifications Framework was created specifically to try to find a way of formally stating that courses at a certain level are in some way the same. Level descriptors have been seen as a significant mechanism to describe what is expected of a course at a specific level, and it has been thought that if levels can be described, then courses

can either be designed or matched against them. In theory, all courses offered at level four in a particular area should be seen as 'equivalent'. Thus, newly developed language courses at NQF level four such as 'English for Hairdressers' are, in theory, equivalent to English as a school subject. It was thought that this mechanism—designing courses against level descriptors—would ensure that all learners were taught to the desired standard.

However, that approach has proved to be more-or-less an attempt to create equivalence by decree, without really understanding what it might mean and how subjects can be seen to be equivalent with each other. This research was therefore designed to look inside the actual courses, instead of remaining at the level of prescribing outcomes and descriptors, in an attempt to understand how two different courses which officially are at the same level relate to each other, and to attempt to understand what equivalence might mean, as well as finding ways of evaluating equivalence. The question of whether or not a course prepares learners for higher education in this context provided a useful lens with which to examine the subjects, as it enabled an analysis of the respective depth and breadth of cognitive challenge of the different courses.

Equivalence is a particularly difficult notion when courses are designed to be different. For example, as was made clear through this evaluation, the Senior Certificate and N3 courses have different purposes, to cater for the needs of different learners. Thus, the Higher Grade Physical Science syllabus was designed to prepare learners academically for access into higher education institutions while the Standard Grade was designed for learners who wished to follow a similar syllabus at a less intense level, for access to some higher education institutions as well as post-secondary studies at FET colleges or other private learning institutions. In contrast to this, the N3 Engineering Science programme was designed to provide learners with the essential principles of Physical Science needed for further studies at college level in subjects like mechanical drawing and design, strengths of materials, power machines, mechanotechnics or electrotechnics. It also provides a general overview of engineering physics for apprentices wishing to remain within their chosen trade at the N3 level.

As stated above, this research does not start from the premise that equivalence is necessarily a good thing. It is quite plausible that non-equivalent courses may be desirable or necessary within our education system. It is important, however, that information provided to learners about the courses for which they enrol is accurate. Given the formal equivalence that the courses currently have, the fact that new

courses are to be developed, and given the aims of the NQF, it is necessary to understand whether or not the courses are equivalent and in what ways.

Policy makers, and indeed the general public, need to understand what a useful approach to equivalence might be, as well as which differences between different courses and programmes are appropriate. As the body responsible for monitoring standards and issuing certificates, Umalusi needs a way of knowing whether courses are 'different but equal', or whether in fact the differences are inappropriate.

One of the main arguments raised in the Investigation into the Senior Certificate Examination (Umalusi, 2004) was that there is an urgent need for some resolution to the problem of what the reasonable requirements of a school-leaving certificate should be as opposed to the requirements for higher education entrance, and how this issue could be handled for the forthcoming Further Education and Training Certificate. On the eve of the introduction of the new National Senior Certificate and a new vocational qualification, this question becomes increasingly urgent.

The research sought, therefore, to examine in what ways subjects leading to these two certificates can be seen as equivalent. It also sought to start to develop better ways of thinking about what equivalence could mean for subjects that do in fact have different aims and intentions.

There has been significant debate in South Africa about curriculum prescription, in terms of what should be prescribed, by whom, and in what forms. The mechanism introduced through the NQF was that of outcomes-based qualifications, whereby qualifications would be composed of outcome statements instead of being associated with syllabuses. Curriculum 2005 was introduced into schools as a curriculum for which teachers would select content based on prescribed outcomes. This was revised shortly after its introduction: The revised curriculum included the prescription of some content. However, the unit standards and qualifications being registered on the NQF are in most instances still designed on the basis of outcomes-based logic. This forms a significant part of the context of this research, not least because some of the courses under scrutiny were based on unit standards with prescribed learning outcomes and no prescribed content.

Why now?

This research was conducted on the eve of the phasing out of the Senior Certificate and as a new qualification for vocational education was being developed. The research is thus situated in between the reality of historical provision and the aspiration of reform which was attempted through the NQF. Umalusi felt that

despite imminent policy change, serious questions and debates about the nature of needed curriculum change and the extent to which the old courses could still be used would continue. A substantial analysis of the courses is seen as a significant contribution to future policy reforms.

Unfortunately there were not really up-and-running new programmes based on NQF qualifications and standards against which the subjects could be compared. What could be found, however, was introduced into the research, primarily in English. The one exception to this is within Hospitality, where there some colleges offer a new course based on unit standards. Unfortunately, we were not able to utilize this course for the comparison, because, firstly, we were unable to access sufficient data for it, and secondly, it was felt, by experts in the area, to be too different from the school course to be worth comparing.

Preparation for the workplace

As discussed above, ensuring that vocational programmes prepare learners for higher education has played a role internationally in making such programmes more attractive to learners as well as in raising the standard of the programmes. The extent to which vocational programmes prepare learners for higher education was a focus of this research for the reasons discussed above. In the design of this research, Umalusi was very cognisant of the fact that vocational programmes are supposed to prepare learners for the workplace. However, ascertaining whether or not a learning programme prepares learners for the workplace is complicated, as 'the workplace' in fact is extremely heterogeneous—different industries and companies have very different requirements. In addition, as employers are not educationalists. They are often able to describe in general terms what they want to see in an employee but are not necessarily able to analyze what an educational programme should look like in order to produce the required competencies. As such, it was felt that research into whether or not current vocational programmes prepare learners for the workplace would need a significantly different methodology, and this aspect was allocated to a next phase of the research.

QUALITY ASSURANCE AND SENIOR SECONDARY LEVEL CERTIFICATES

As part of the background to this research, it is necessary to understand the role of quality assurance and certification bodies in further education and training in South Africa. The discussion below concentrates on Umalusi's role in the system, as Umalusi aims with this research to be able to improve its own systems and

approaches. It also provides a brief overview of the broad approach to quality assurance of the Setas.

Umalusi is the body which currently quality assures and certifies the majority of qualifications which were the focus of this research—the Senior Certificate, the National Senior Certificate and the National Certificates. The Setas also have quality assurance components, and are supposed to be responsible for quality assurance (and possibly certification) within their respective sectors of the economy. The ongoing review of the NQF means that it is not clear exactly which quality assurance bodies will ultimately be responsible for which qualifications, but currently Umalusi does not quality assure or certify qualifications without external examinations. This is the major difference between Umalusi's approach to quality assurance and that of the Setas. These differences will have a major impact on how 'equivalence' is understood in further education.

UMALUSI'S QUALITY ASSURANCE MECHANISMS

Umalusi's focus has until now primarily been on the moderation of examinations, and this is discussed below. In addition to the moderation of the examinations discussed above, Umalusi is also developing systems to accredit certain providers. According to its governing act, Umalusi must accredit private schools and FET colleges, as well as assessment bodies. Criteria and processes have been set in place for this accreditation, which has started recently.

Umalusi has another significant function, in which it is only beginning to develop capacity. This is the monitoring of the suitability and adequacy of qualifications and standards. This has historical precedence, as one of Umalusi's predecessors, the Joint Matriculation Board, besides issuing certificates and monitoring the examinations, had the function of providing 'for control over the norms and standards of subject matter and examinations' (Muller, 2004:231). However, since its creation in 2001 Umalusi has had to concentrate on the quality assurance of the examinations, as well developing and starting to implement its systems for accreditation. It is only now able to start to develop an appropriate and workable model to monitoring standards, and has to do so in a considerably different policy environment to its predecessors.

Quality assurance of examinations

The quality assurance of examinations have remained, and will remain, a significant focus in terms of Umalusi's quality assurance and certification requirements. Umalusi focuses on the quality assurance of the external examinations and internal assessment, called continuous assessment (CASS) in schools and simply 'year mark'

in colleges. The quality assurance activities undertaken by Umalusi include moderation of question papers, monitoring the conduct of the examinations, moderation of marking, standardization of results, and verification and moderation of school-based continuous assessment. However, these functions are performed separately at Umalusi for colleges and schools—there is currently no relationship between the moderation of the two qualifications. Umalusi's roles are described in more detail below.

Moderation of question papers

Umalusi utilises the services of external moderators who are highly qualified and experienced professionals in their respective subjects. The moderation process focuses on ensuring that question papers are of an acceptable standard, cover the appropriate content as prescribed in the syllabus, and are presented in a professional manner.

Moderators use similar criteria for papers for both school and college examinations, which include aspects such as:

- standard of question paper;
- coverage of core syllabus;
- presentation of question paper;
- instructions to learners;
- language usage;
- competence of examiners;
- internal moderation;
- number of times question paper had to be externally moderated; and
- time allocation.

For the Senior Certificate, 69 subjects are moderated. Subjects with very low learner numbers are not moderated. For the National Senior Certificate and National Certificates only selected subjects are moderated, and this has only happened since 2003. These are: Applied Accounting, Business English L1 and L2, Sake Afrikaans L1 and L2, Computer Practice, Office Practice, Public Administration, Small Business Management and Entrepreneurship, Engineering Drawing, Engineering Science, Industrial Electronics, Mathematics, and Mechanotechnology. Another difference is that for learners in Engineering programmes there are usually exams in April, August, and November for N1, N2, and N3. (If there is a small enrolment, learners might only write in August or November.) For the general studies there are exams in June (for selected subjects) and November. There is a supplementary examination in February. Umalusi currently moderates the August and November examinations for

Engineering (now called Natural Sciences) and moderates June and November exams for General Studies. Language examinations are only written in November.

Monitoring the conduct of examinations

Umalusi also monitors the writing of the exams. With regard to the Senior Certificate, the National Senior Certificate, and the National Certificates, this consists of three functions:

- auditing the assessment bodies' monitoring systems;
- monitoring their state of readiness to administer the examination; and
- monitoring the administration and conduct of the examination itself.

Moderation of the marking process

Umalusi moderates the marking of scripts by deploying external moderators to marking centres during the marking process to ensure that:

- the memoranda are correctly interpreted;
- the standard of marking and internal moderation of scripts is maintained across all examining bodies/marking centres and throughout the marking process;
- all the systems and processes that relate to marking are in place and effective; and
- the product of marking is a true reflection of the performance of individual candidates.

There is also a centralized moderation of a sample of scripts.

For the Senior Certificate, the National Certificates, and the National Senior Certificate a selection of sites is chosen each year.

Verification and moderation of continuous assessment

Since 2001 school-based continuous assessment marks have been included in the Senior Certificate examination, counting 25% of the final mark in all subjects.[3] Inclusion of year marks was not new to the Senior Certificate examination: Under the previous dispensation, year marks counted 50% towards the final mark in the Natal Education Department and 33% in the Transvaal Education Department. Umalusi's approach to the verification and moderation of CASS currently looks only at specific subjects. Statistical moderation of CASS is undertaken per institution and per subject. The mean and standard deviation of the examination mark (from the written paper) is used in this process. After the examination scores have been standardized, the mean of the examination score of a particular subject at a particular

[3] In 2000 CASS was introduced on a voluntary basis, but since 2001 it has been compulsory.

centre is compared to the mean of the CASS score. If the mean of the CASS score is within a certain range of the examination mean, then the CASS mean is accepted. If the mean of the CASS score is either too low or too high, it is brought within a certain range of the examination mean.

For the National Senior Certificate and the National Certificates the year mark is standardized against the examination mark, with a tolerance of between 5% and 10%.

Statistical moderation of results

For the Senior Certificate, Umalusi standardizes both the examination marks and the CASS scores presented by the various schools in the country. Standardization is necessary to address the variation in the standard of question papers and marking that may occur from year to year and across examining bodies. Statistical moderation of examination marks consists of comparing the current mark distributions with the corresponding average distributions over the last three years. Standardization meetings take place between the completion of marking and publication of results. A detailed description of the standardization process can be found in Umalusi's (2004) Investigation into the Standard of the Senior Certificate.

For the National Senior Certificate and National Certificates, all the subjects from N1 to N3 are standardized. The standardization is done slightly differently but the same general principles apply.

THE SETA/NQF MODEL OF QUALITY ASSURANCE

The NQF model of quality assurance is based on decentralized assessment, without examinations. Umalusi has stated that it is unable to engage in this type of approach. However, many of the Setas are quality assuring using this decentralized model, whereby individual institutions design their own assessments and the Seta quality assures.

The Seta model of quality assurance, which should probably be seen as the model which was intended with the creation of the NQF, is based on the accreditation of providers and on delegated assessment. Providers are accredited to offer specific qualifications which have been registered on the NQF. Each Seta has its own requirements for the accreditation of providers within its sector. Providers design their own learning programmes against the qualifications, on the basis of the learning outcomes and assessment standards which are in the registered qualifications.

Providers must have their programmes approved by the relevant Seta. As each learning programme is different, assessment is decentralized.

The mechanism that has been introduced to ensure that assessment is of a required standard is the registration of assessors. This is a process whereby either educators at the provider in question, or individual educators who operate on a freelance basis, or indeed any individuals who wish to, have to prove competence against unit standards that have been registered for assessment. Once they have been pronounced as competent, usually on the basis of a portfolio of evidence, they must register with the Education, Training, and Development Practices Seta to become 'registered assessors'. In order to assess specific courses, however, they need to register again with the relevant Seta, having proved that they have competence in the area of the course in question. Through this process they become 'registered constituent assessors'.

Setas also have differing approaches to the moderation of assessment, the detail of which is beyond the scope of this research. However, all of them use the general idea that a sample of assessments are moderated by 'registered moderators' through the Setas, and in turn a sample is verified by 'registered verifiers'. In some instances, for language and mathematics courses (fundamentals) moderation is done by the Independent Examinations Board, contracted by different Setas.

This quality assurance model works with two major mechanisms—the accreditation of providers, and the registration of assessors. It also operates on the assumption that 'standards', contained in either unit standards or full qualifications that are registered on the NQF, are a sufficient basis against which courses can be designed and learners can be assessed. It is clear, however, that in such a decentralized system, not all providers and all programmes can be scrutinized; the system depends on the mechanisms described above. Some Setas regard themselves as certification bodies, while others argue that accredited institutions must issue certificates.

By virtue of the fact that vocational qualifications fall both within a band of the NQF and a designated sector of the economy which is allocated to a Seta, co-operation between Umalusi and the Setas is essential for the quality assurance and certification of vocational programmes. At the time of writing this report, there were over 70 Further Education and Training Certificates registered on the NQF, and a further 422 qualifications registered at level four of the NQF. The Department of Education was busy with the development of an FETC (Vocational) and accompanying curricula for various subjects. In the current policy environment it is

still not clear which qualifications will be certified by which quality assurance bodies. It is imperative, however, for quality assurance bodies to reach some understanding of each others' quality assurance models, to develop ways of working with each other and to ensure that some kind of standardization can be achieved. However, the above discussion shows how different the models of Umalusi and the Setas are. Umalusi hopes that this research will contribute to its ongoing input into the resolution of these and other problems, as well as to strengthen Umalusi's input into other relevant policies.

RESEARCH AIMS AND QUESTIONS

This research aimed to provide clarity into the relative standard of a selection of subjects currently offered as part of the vocational and general FET qualifications (current college and school subjects), as well as subjects which are part of new vocational FET qualifications registered on the NQF. The research also aimed to understand the extent to which the old (but still in use) as well as newly developed vocational courses prepare learners for higher education.

While 'equivalence' is desired in terms of the NQF, Umalusi also hopes that this research will provide more insight into ways of thinking about the equivalence of similar subjects within different programmes at the same level.

This research intended to answer two specific questions:

- To what extent are the Senior Certificate subjects, National Senior Certificate and National Certificate subjects, and the newly developed NQF courses of the same standard? Another way of asking this question is: are these subjects equivalent?
- To what extent do these subjects prepare learners for higher education? (An elaboration of this question asked: what is the irreducible minimum which needs to be included in such subjects if they are to prepare learners for higher education?)

A problem which surfaced again and again during the research was how to understand and measure preparation for higher education. This was complicated by the fact that higher education is very diverse, and includes degree, certificate, and diploma programmes at universities, universities of technology (former technikons) and comprehensive universities (former universities and technikons combined). As such, the focus of the research was on the extent to which the courses prepared

learners for degree study, although preparation for other programmes was also included where pertinent. A further complication was whether a subject at senior secondary level prepares learners for study in that specific field, or whether it prepares learners in general for higher education study—for many subjects at higher education level, study in the specific field is not a prerequisite. Where relevant, the research looked both at whether the subjects under investigation in general prepared learners for the kinds of skills and cognitive practices required at higher education, and also at whether they prepared learners for further study within the specific discipline in question.

A follow-up phase of the research will attempt to answer the question:

- Do the vocational subjects and newly developed NQF courses prepare learners for the needs of the workplace?

RESEARCH METHODOLOGY

In 2004 Umalusi conducted an Investigation into the Senior Certificate Examination, which compared Matric exams over a period of ten years. That research used teams of expert evaluators who made judgements about the examinations using specified criteria. This current research built on that approach.

Two sets of teams of researchers external to Umalusi investigated the courses in four chosen subjects, with three main categories of comparison for both research questions. The three categories were: content coverage, key concepts and procedures, and expected outcomes. The subjects were Mathematics, Physical Science, English, and subjects within the area of Hospitality.

THE EVALUATORS

The first groups were composed of expert practitioner evaluators: two lecturers from FET colleges and two school teachers, all of whom were experienced and successful teachers as well as experienced markers of the external examinations. In addition, each group included an individual who had been involved in Umalusi's 2004 Investigation into the Senior Certificate Examination. In the Hospitality group, this individual was not a subject expert, as Hospitality had not been part of the Senior Certificate research, but she was included because of her involvement in the previous research, her expertise in higher education entrance tests and her knowledge of the generic skills required for higher education. The second groups were composed of higher education experts drawn from both universities and universities of

technology. All groups were composed with a balance of men and women, as well as of different 'racial' groups.

The 2004 research utilized subject teams consisting of one experienced and successful teacher, one subject expert, and one higher education expert. This could not be replicated in this project, as the numbers would have become unwieldy, given that we were comparing two different sectors and would therefore need twice the number of experts. In addition, it was felt that analyses of practitioner evaluators would be a useful starting point for the higher education experts. Thus, in order to ensure that the higher education experts were able to draw on the knowledge of the practitioners, but were also able to reflect on the subjects and analysis of the practitioners, the research was designed in two phases, with the first phase involving the practitioner experts and the second the higher education experts.

THE DATA

The courses selected were as follows:

Mathematics

- Senior Certificate Mathematics, Higher Grade and Standard Grade;
- N3 and N6 Mathematics; and
- 'Situated' Mathematics Literacy NQF level four (Mathematics for Hairdressers).

Notes:

- While Mathematical Literacy is not supposed to be equivalent to either Senior Certificate or N3 Mathematics, the 'situated' Mathematical Literacy course is supposed to be equivalent to the new Mathematical Literacy course in schooling, which is expected, in some ways, to play the role that Standard Grade Mathematics has played in the past. It was therefore included for the evaluators to comment on, but not as a serious component of the comparison.
- While N3 is supposed to be the equivalent of Senior Certificate Standard Grade Mathematics, N6 was included to see how it compared to Senior Certificate Higher Grade Mathematics, although this comparison was only conducted at a very cursory level, as the subjects are very different.

Science

- N3 Engineering Science; and
- Senior Certificate Physical Science, Higher Grade and Standard Grade.

English

- Senior Certificate English Home Language and Additional Language, Standard Grade and Higher Grade;
- National Certificate Business English, Home Language and Additional Language; and
- 'Situated' Communications NQF level four (including Language for Early Childcare Development and General Business Administration Practitioners).

Hospitality

- Hotel Keeping and Catering Senior Certificate; and
- Catering Theory and Catering Practical N3.

Intended and examined curriculum

The data for each course were divided into two sets—the intended and the examined curriculum.

The intended curriculum: For the Senior Certificate and National Senior Certificate courses, there was a syllabus to express the intended curriculum. For the newly developed NQF courses, there was a resource pack, including course activities and assessment tasks. It must be noted, however, that these resource packs are only one possible instantiation of the NQF courses; the learning outcomes are the only centrally prescribed component.

The examined curriculum: For the Senior Certificate and National Senior Certificate courses, there are Matric exams, including:

- question papers and marking memoranda, and in some cases moderators' reports; and
- one hundred learner scripts (but note that there are fewer for Hospitality).

For the newly developed NQF courses, the assessment tasks in the resource pack were examined as an indication of the examined curriculum for that particular course pack. There was no assessed learner work.

EVALUATION CRITERIA AND CATEGORIES

As discussed above, criteria were developed for the evaluators to use, adapted from the criteria used in Umalusi's 2004 Investigation into the Senior Certificate Examination. However, there are substantial differences in the research questions of the two projects. The 2004 research was focused on a comparison of different

examination papers, and the criteria were developed specifically for exams. The current research was relatively more complicated as not only examinations but also the intended curricula were being compared. The criteria from the 2004 research were therefore reduced into three key categories of criteria:

- content specification;
- key concepts and procedures; and
- outcomes.

'Outcomes' was not in fact a category in the earlier research project, but was added here as they have become a significant part of curriculum specification in South Africa. For the other two categories, guidelines were developed for the evaluators to use, based on those used in the research into the standard of the Senior Certificate. To evaluate levels of difficulty, evaluators were asked to use a scale similar to that of the Senior Certificate research.

The categories for the intended and examined curricula, as well as the further elaboration into guidelines, are described in the text below, but also diagrammatically represented in Annexure A.

As stated above, this research did not conduct an analysis of the formal requirements for higher education entrance. Instead, it asked evaluators to use the specified categories in order to make a judgement about whether the courses prepared learners for the kinds of cognitive practices required in higher education. In general, evaluators focused on preparation for degree study.

Content specification

Intended curriculum

Evaluators were asked to describe the intended curriculum, specified in the syllabus and/or learning programme and/or unit standards.

The guiding questions were:

- What are the key important areas in this subject?
- How are the different important areas of the subject weighted in the syllabus/unit standards/outcome statements/course pack?
- Do the syllabuses/unit standards/course packs represent an appropriate selection of the domain for this level?

Evaluators were also asked to draw from their knowledge of the subject if, for example, they felt that all the subjects neglected what in their view was a crucial component of the subject in question, and to document the differences. (Here and elsewhere they were asked to clearly indicate where analysis was based on personal experience, and where it was derived from the data.) It must be noted here that curriculum is always a political and highly contested area. Decisions about what should be taught at a senior secondary level are not straightforward, and there is often intense disagreement among experts within subject areas on issues such as what is appropriate at different levels and which areas should be focused on. Such debate and discussion is important, but not always easy to resolve. For the purpose of this research, the opinions of only four individual higher education experts were sought. This inevitably means that the particular views and preferences of those individuals about the focus areas of their particular subjects, or the broad approach which should be taken in their particular subject, dominate some of the findings. For example, the English evaluators did not focus strongly on oral communication, while the Mathematics evaluators felt that there was too much algebra in the syllabuses. It is quite possible that other higher education experts would argue differently on these points.

Evaluators were asked to make judgments about the relative standard of the various courses, as well as the extent to which they prepare learners for higher education, with regard to specified content.

Examined curriculum

Evaluators were then asked to provide a description of the content areas of each subject in terms of the examined curriculum. They were guided to look at two aspects: sampling and weighting. With regard to sampling, guiding questions were:

- Is the exam/assessment an accurate representation of the content and skills specified in the syllabus?
- Are all the important areas covered?
- Do the questions represent important details/issues in these areas?
- Are the questions phrased in a way that goes to the core of the issues?

With regard to weighting, additional elaboration was given, because, again based on the criteria used in the 2004 Investigation into the Standard of the Senior Certificate, weighting was looked at in two different ways. The first was in accordance with the relative importance of the syllabus area which the question covers. The second represented the difficulty of the question—among comprehension questions there are 'factual,' 'interpretive', 'evaluative' and 'synthesis' types of questions. It was pointed out to the evaluators that the 'evaluative' and 'synthesis' question are much more

difficult as they require the learner to use what she/he has learned in order to generate an opinion and to draw implications, and hence one would expect a fair distribution of marks and assessment tasks in correspondence to the type of question (or its level of complexity).

The following guiding questions were given in terms of these two aspects of weighting:

- Is sufficient attention/time/coverage given to the key areas of the subject?
- Are there appropriate numbers of questions for the different key areas in the syllabus?
- Are the questions from which candidates are to choose of equal difficulty levels?
- Are there appropriate numbers of questions for the different levels of ability?
- Is the mark allocation appropriate to the relative importance of the different key areas in the syllabus?
- Is the distribution of marks (mark allocation) or relative importance of the assessment task appropriate to the level of complexity of the different questions?

Evaluators were asked to make judgments about the relative standard of the various courses, as well as the extent to which they prepared learners for higher education, with regard to the extent to which the examinations tested the content specified in the syllabus.

The key concepts and procedures

Intended curriculum

Evaluators were asked to describe the key concepts and procedures that the subject entailed in terms of the intended curriculum.

The general guiding question which the evaluators were given was:

- Does the content specification refer to a situation related to everyday life (procedural)? Does it include questions of an abstract nature (principled)?

This question was broken down to the following guiding questions:

- Is there an abstract concept or principle or general rule that the learner needs to grasp (principled), or is it a list of steps that they are expected to understand (procedural)?
- Are the learners expected to be able to describe something they can see or do, or are they expected to master an underlying idea or approach?

Evaluators were asked to make judgments about the relative standard of the various courses, as well as the extent to which they prepared learners for higher education, with regard to the key concepts and procedures specified for each course.

Examined curriculum

The evaluators were then asked to describe the key concepts and procedures that each question in the exams/assessments (the examined curriculum) measured and the level at which they were measured.

The following guiding questions were given:

- What does this question require of the learner?
- Does it require understanding an abstract concept or a principle or a general rule?
- Does it require memorization or repetition? Is it something that requires them to repeat what they have learned in class? Is it something they have to remember which has been rehearsed?
- Are they asked to think on their feet and make a new argument? Is it an answer that they have to think out for themselves? How well do they have to articulate their argument? Do they have to reason?
- Where would they get the answer from (are they asked to draw on their own experience, solve a problem or draw on what they have been told)?
- Is it something that requires them to identify and/or apply a concept or rule ?

It was not necessary to respond to these guiding questions individually. The evaluators were asked to use these questions to evaluate the level of difficulty of the questions/tasks. It was suggested that the evaluators use a three-point scale, with one indicating the most basic questions, two indicating average difficulty and three involving fairly sophisticated application of knowledge. However, evaluators developed different scales according to their subjects.

Evaluators were asked to make judgments about the relative standard of the various courses, as well as the extent to which they prepared learners for higher education, with regard to the levels of cognitive challenge in the examinations for each course.

EVALUATION PROCESS

The research was conducted in two phases. Phase One involved the practitioner evaluators, and Phase Two involved the higher education evaluators.

In Phase One, an initial workshop was held in which evaluators were asked to work together with the criteria and guidelines suggested to ensure that among them there was a consistent approach and interpretation, and to enable them to further develop or elaborate the criteria based on their expertise in their subject, if necessary. Evaluators were asked to start by providing a description of each course. On the basis of their descriptions, the evaluators were asked to compare the standards of the different courses. In each group of evaluators, one person was appointed to produce a synthesised report in the subject area. Evaluators then worked individually on research reports. A second workshop was held after the individual reports were complete, to synthesise and refine a single report for each subject area.

Phase Two was designed to enable higher education experts to investigate the key research questions through an analysis of both the primary data and the findings of evaluators (Phase One). The expert evaluators were asked to start by using the categories and guiding questions (content, concepts, procedures, and outcomes) used by the practitioner evaluators where they felt it to be appropriate, but, based on their knowledge of their subject area, to develop a more specific matrix of categories and criteria within this if necessary. They were asked to assess whether or not there were specific ways of describing and comparing which were appropriate to the subject in the three categories provided, which had not been incorporated or used by the practitioner evaluators. [4]

It was suggested that the expert evaluators used the same or similar scales for categorizing questions into different levels of difficulty (cognitive demand or complexity) of content, conceptual constructs, and outcomes for both the intended and examined curriculum. However, it was expected that differences might come up in the way they applied such scales.

This phase of the research consisted of one workshop and individual work conducted by evaluators. The higher education experts felt that a follow-up workshop was not necessary, but groups did remain in communication with each other.

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[4] It should be noted that while in Phase One there were two subject groups analysing English, one for First Language and one for Second Language, in Phase Two the same group of evaluators looked at all the English courses.

During the workshop all teams of expert evaluators reported that they would use the reports of the evaluators as a basis from which to work, as all felt that these reports provided a useful starting point. They felt the practitioners' reports to be particularly useful in terms of laying out the content areas of the courses in question. Leaders were appointed for each subject group, to produce synthesized reports.

The final report is based on a synthesis and analysis of the two sets of evaluations conducted by practitioner and higher education expert evaluators in each of the four subject areas.

In creating this synthesis, differing views were considered, when there were any between the practitioner and higher education groups. For example, in the Science report, the practitioners argued that the N3 courses were accumulative—that N1, N2, and N3 should be seen as one course. The higher education experts, on the other hand, argued that the N3 course could stand on its own, and was examined as such, as opposed to the school syllabus where the Grades 11 and 12 syllabuses are examined together in the final examinations. However, they both agreed on the basic facts of the matter, that learners could take the N3 Engineering Science course if they had Senior Certificate Mathematics (not Science) and usually also Technical Drawing. We therefore agreed with the expert evaluators' judgement on this matter.

WHAT WAS EXCLUDED AND WHY

Although a new qualification has been designed to replace the Senior Certificate, and curriculum statements have been developed for the subjects which will make up this new certificate, no examinations have yet been written. As such, it was felt that no meaningful analysis could be made in terms of the standard of the subjects for the new National Senior Certificate. Similarly, learnerships are an important new type of programme which has been introduced in South Africa, but they were also excluded from this research. One reason for excluding learnerships and other new courses was the same as the reason for excluding the new National Senior Certificate—that many of these programmes are so new that there are not yet any assessment or examination tools, and as such it is difficult to judge the standard of the subjects. In addition, this research required subjects which were designed for different qualifications and different purposes, but which had enough in common with each other to make comparison fruitful. As such, for this initial, focused study, a decision was taken to restrict the analysis to subjects which are taught in both schools and colleges.

Chapter Three

3

Physical Science

Chapter Three describes the research findings for the Physical Science courses.

Three courses were examined by the group of practitioners:

- Senior Certificate Physical Science Higher Grade
- Senior Certificate Physical Science Standard Grade
- National Certificate (N3) Engineering Science

A group of higher education evaluators provided an analysis based both on the practitioners' report and the primary data; the findings below draw on both the practitioners' and the higher education experts' analyses.

EQUIVALENCE OF COURSES

TIME

Finding One
The N3 Engineering Science course is taught over a dramatically shorter period than the Senior Certificate Higher Grade and Standard Grade Physical Science courses, providing learners with insufficient time to master the content in question.

A significant factor indicating that the N3 course is far less substantial than the Senior Certificate courses is the time taken for the two types of courses. While time is not necessarily an issue in terms of the standard of the curriculum, it is significant in terms of the opportunity to master the knowledge areas of any course. The Senior Certificate Physical Science course is a cumulative one, as the Grade 12 examination is based on the Grade 11 and Grade 12 syllabuses, and even examines some work taught in Grade Ten. Each of these courses is taught over a year. In the Grade 12 year alone, learners have approximately 104 hours of teaching time (excluding

revision, trial and final examinations). By contrast, the National Certificate examination is only set on the basis of the N3 syllabus. [5] The N1, N2, and N3 courses each take place over one trimester of about ten weeks. The course is designed to be taught over 75 hours, although some evaluators argued that approximately only 60 hours of tuition actually take place per course, because of difficulties with registration and other problems at various institutions. In addition, although less time is available for teaching in the N3 course than in the Senior Certificate Grade 12 course, more time is probably required, because students are not necessarily building on prior knowledge. Thus, it is clear that the time allocated for the National Certificate Physical Science course is not adequate if the body of knowledge is to be learned at the required levels.

THE INTENDED CURRICULUM: CONTENT

Finding Two
An overview of content shows substantial differences between the Senior Certificate Physical Science course on the one hand and the N3 Engineering Science course on the other.

Table 3.1 shows the key content areas of the three Science courses under consideration as demarcated by the higher education group. [6]

Table 3.1: Overview of Science content

Physical Science (HG)	Physical Science (SG)	Engineering Science (N3)
Bodies in Motion: Newton's three Laws of Motion	Bodies in Motion: Newton's First and Second Laws of Motion	Bodies in Motion: Newton's Second Law of Motion
Newton's Law of Universal Gravitation, projectile motion (up and down)	Newton's Law of Universal Gravitation	

[5] As mentioned above, the practitioner evaluators argued that the National Certificate programmes were also accumulative, and that the knowledge obtained in N1 and N2 was necessary for the N3. However, the fact remains that it is not included the N3 examination. Furthermore, as both sets of evaluators pointed out, learners may in fact enrol for N3 without having completed N1 and N2, provided they have Grade 12 Mathematics and Technical Drawing or Trade Theory. The higher education evaluators are clearly correct when they argue that the N3 course content must, therefore, be considered on its own when addressing the question of equivalence.

[6] The practitioner designation was similar, but provided only a skeletal overview of the Chemistry syllabus because of the lack of Chemistry in the N3 syllabus, as discussed below.

Concept of friction	Concept of friction	Friction: static and kinetic friction, horizontal and inclined planes
(Covered in Grade 11, including graphs of motion)	(Covered in Grade 11, including graphs of motion)	Velocity and acceleration, equations of motion, no graphs of motion
(Vectors in general covered in Grade 11)	(Vectors in general covered in Grade 11)	Force as a vector, equilibrium of forces, resultant force, equilibrant, frameworks, roof trusses
		Belt drives and angle of contact
Momentum: as vector, conservation, change in momentum in collisions, force = rate of change of momentum	Momentum: as vector, conservation, change in momentum in collisions	Momentum: conservation
Work, energy and power: concepts and conservation of mechanical energy	Work, energy and power: concepts and conservation of mechanical energy	Work, energy and power: concepts and conservation of mechanical energy
		Moments: turning moment for constant motion, levers and lamina, beams
(Heat: specific heat capacity, transfer of heat covered in Grade 10)	(Heat: specific heat capacity, transfer of heat covered in Grade 10)	Heat: specific heat capacity, transfer of heat, heat value of a fuel, efficiency, expansion and steam
		Hydraulics: hydraulic presses, work done against a pressure
Electrostatics: electricity at rest, force between charges, electric fields, quantization of charge	Electrostatics: electricity at rest, force between charges, electric fields	
Electric current: current concept, force on current-bearing conductor in magnetic field, force between current-bearing conductors (quantitative), resistance, Ohm's Law, heating effect, power (quantitative), alternating current	Electric current: current concept, force on current-bearing conductor in magnetic field, force between current-bearing conductors (qualitative), resistance, Ohm's Law, heating effect, power (qualitative), alternating current	Cells, simple electrical circuits, electrolysis, Joule's Law, power and energy in DC circuits, alternating current, single-phase transformer
CHEMISTRY		
(Covered in Grade 10)	(Covered in Grade 10)	Elements: constituents of matter, periodic table, metals and non-metals, structure of the atom

Reaction rates and chemical equilibrium, energy of reactions, dynamic equilibrium, equilibrium constant, change of state of equilibrium, equilibrium in solutions, some industrial and other applications	Reaction rates and chemical equilibrium, energy of reactions, dynamic equilibrium, change of state of equilibrium, equilibrium in solutions, some industrial and other applications	
Acids and bases: dissociation of water, pH (quantitative), models for acid and base, acid-base titrations	Acids and bases: pH (qualitative), models for acid and base, acid-base titrations	
Redox reactions: definition in terms of gain or loss of electrons, identifying oxidising and reducing agents	Redox reactions: definition in terms of gain or loss of electrons, identifying oxidising and reducing agents	Redox reactions (brief introduction) and corrosion
Electrochemical cells: copper-zinc cell, electrolysis and electroplating	Electrochemical cells: copper-zinc cell, electrolysis and electroplating	Electron transfer: formation of ions, brief definition of electrolysis and electroplating
Half-cell potentials: table of redox half-reactions and applications, selection of reference electrode, calculations of potential difference	Half-cell potentials: table of redox half-reactions, use of table to balance redox half-reactions	
Organic chemistry: definition, structure, nomenclature, hydrocarbons, alkyl-halides, alcohols, carboxylic acids	Organic chemistry: definition, structure, nomenclature, hydrocarbons, alkyl-halides	

Finding Three

The most significant difference in terms of content is that the N3 Engineering Science course is essentially a Physics course, with the exception of one very small and superficial Chemistry section. The Senior Certificate Physical Science course, on the other hand, contains 50% Chemistry and 50% Physics. The N3 course does contain additional Physics topics and industrial applications not covered in the Senior Certificate courses, but the inclusion of Chemistry in the Senior Certificate courses make them substantially broader.

The practitioners argued that the absence of Chemistry is compensated for by additional Physics topics which are not covered in the Senior Certificate course. However, the higher education evaluators countered that the absence of Chemistry could not be compensated for in this way. Chemistry, they argued, is a different science to Physics, with distinct competencies, skills and content areas. Chemistry focuses on the micro and Physics on the macro, and the combination is necessary. The combination of Physics and Chemistry in a Physical Science course, in the way the Senior Certificate is designed, makes it a completely different course to one which has much less Chemistry. The additional Physics topics in the N3 course,

therefore, do not compensate for the absence of Chemistry; the Senior Certificate remains a course which is substantially broader than the N3 course, and therefore the two courses are significantly different. Furthermore, the additional Physics content covered in the N3 course is not equivalent in breadth or depth to the Chemistry content that is missing from this course.

It must be noted that there is in fact a separate Chemistry course at N1, N2, and N3 levels, called Industrial Chemistry. However, it is not widely offered, and the Engineering Science course is the one taken by most learners.

Finding Four
The Senior Certificate Physical Science Higher Grade course covers topics in the most depth, followed by the Standard Grade course; the N3 Engineering course covers topics in the least depth.

The comparative table above, as well that produced by the practitioners, and the detailed analysis conducted by the evaluators of what is specified to be covered in different areas, shows that the Senior Certificate Higher Grade syllabus goes into the most depth in all content topics. The Standard Grade course covers a similar set of topics, although somewhat reduced in depth and breadth. For example, under the category of electricity, electrolysis is studied by Grade 12 learners within the chemical section of the syllabus whilst N3 Engineering Science requires only a definition and understanding of this principle: both Standard Grade and Higher Grade study this concept in greater detail. In the N3 course, the higher education experts argue that 'there are clear and serious omissions', despite the fact that the syllabus covers a greater number of specific industrial applications.

THE EXAMINED CURRICULUM: CONTENT AND COGNITIVE CHALLENGE

Finding Five
The Senior Certificate is examined through two papers, which provides greater scope for creative testing of the entire syllabus as well as for marking learners' thought processes in partly correct answers. In addition, the rigidly prescribed format of the N3 examination makes it more likely that this paper is highly predictable.

Learners on the N3 course write one three-hour paper, while learners on the Senior Certificate write two two-hour papers. The N3 syllabus prescribes very tightly the proportions of the examination which can be used for each content area, through ten possible questions for a total of 100 marks. The Senior Certificate examinations are

worth 150 marks for Standard Grade and 200 marks for Higher Grade. There is more flexibility in terms of setting the paper, and also more possibility for awarding learners with marks for partly correct answers. The N3 examination thus provides less opportunity to examine all aspects of the syllabus, because there is only one paper and because the restricted nature of the format makes it likely that the papers are highly predictable. Predictability is a significant problem in terms of understanding the validity of learners' responses to test items, as it enables narrow teaching to tasks.

Finding Six
Both Senior Certificate Science courses were tested through examinations which were more challenging than the N3 Engineering Science examination.

The higher education evaluators developed a two-way framework for evaluation (shown in Table 3.2). Questions were allocated to specific types of cognitive activity, as well given a rating in terms of levels of cognitive challenge. The framework is an elaborated version of the scale that the practitioner evaluators used.

Table 3.2: Scale of cognitive challenge for evaluation of Science examinations

Category	Level	Descriptions	Examples
Factual recall or rote memory	Simple (1)	State a simple law or equation	State Newton's Laws
	Medium (2)	Recall complex content	Process for lab preparation of chemical compounds; testing for presence of various chemicals; inorganic chemical interactions
Understanding of concept or principle	Simple (1)	Simple relationships; simple explanations	Relationship between resultant and equilibrant; explain what is meant by ... ;
	Medium (2)	Counter-intuitive relationships; qualitative proportional reasoning; more complex relationships or explanations	Direction of acceleration for free-fall; effects of changes in circuits; identifying acid-base conjugates, redox pairs, etc; simple influences on dynamic equilibrium
	Challenging (3)	Identify principles which apply in a novel context	Identify all influences on realistic motion; identify isomers of organic compounds; complex influences on dynamic equilibrium

Problem solving	Simple (1)	Simple procedure; plug into formula with only one unknown; no extraneous information; known or practiced context	Given current and resistance, calculate voltage
	Medium (2)	Construction or interpretation of diagrams; problems with two or more steps; basic logic leaps; proportional reasoning; interpretation of table of data	Graphs of motion; force or vector diagrams; concentration or molar calculations; naming organic compounds; writing and balancing equations for reactions
	Challenging (3)	Complex abstract representation; combination of concepts across sub-fields; complex problems involving insight and logic leaps; formulating new equations (using all unknowns); problem solving in novel context	Interpret complex graphs; translate between various graphs of motion; combine equations for mechanical energy and motion; combine gravitational and electrostatic forces; complex circuit calculations; combination of various factors influencing equilibrium

This scale notes that within different categories of cognitive skills or activities (recall, understanding of concepts and principles, and solving problems) there are different levels of difficulty. This is very important, particularly in a policy context where the notion of memorization tends to be equated with easiness, and further, where memorization is often denigrated and seen as unimportant.

It is clear from the evaluation that the level of cognitive demand is higher in the Senior Certificate courses, at both Higher and Standard Grades, than in the N3 course. There are far more questions requiring understanding and knowledge of underlying knowledge principles (91% of questions for Higher Grade and 73% for Standard Grade, compared to 49% for N3). The Higher Grade examinations place very little emphasis on the simple level of cognition, and contain a substantial proportion of challenging questions. The vast majority of questions in the Standard Grade examinations test understanding and knowledge of underlying knowledge principles (medium level/level 2) but with virtually no questions at the challenging level. The N3 examination contains no questions which probe understanding of concepts or principles. All questions fall into either the factual recall or problem-solving categories; the examination mostly tests application of procedures (level 1).

HIGHER EDUCATION PREPARATION

Finding Seven
The desirable analytical, problem solving, and mathematical skills required for the study of Science at degree level in higher education are sufficiently well developed and examined in the Senior Certificate Higher Grade curriculum, less fully developed in the Standard Grade syllabus, and not well developed at all in the N3 curriculum. In particular, the lack of Chemistry in the N3 Engineering Science course is a problem.

To prepare learners for degree study at higher education level, the higher education evaluators summarized the Physics and Chemistry knowledge which is needed (Table 3.3).

Table 3.3: Essential Science content for higher education preparation

PHYSICS	Knowledge type
Newton's First Law	Procedural: manipulation of equations.
Newton's Second Law	
Newton's Third Law	
Gravitation and gravitational fields	Conceptual (a generalised understanding)
Momentum	Conceptual (a generalised understanding)
Work, energy and power	Content and conceptual
Heat	Content and conceptual
Electrostatics	Essential conceptual knowledge
Electric fields and gravitational fields	Conceptual (as introductory concepts)
Electric current	Essential content and conceptual knowledge including mathematical links
Resistance and Ohm's Law	Content and procedural. Including mathematical relationships and using equations.
CHEMISTRY	
Elements: the constituents of matter	Content and conceptual
Periodic tables	Content and conceptual
Interaction between elements: structure of an atom	Content and conceptual
Physical chemistry	Conceptual and procedural. Understanding calculations with chemical reactions and how to do calculations - the mathematical procedures specific to chemistry
Chemical equilibrium	Content
Acids and bases	Conceptual
Organic chemistry	Content
Inorganic chemistry	Content

However, the evaluators also argued that learners with well-developed generic competencies, motivation, and interest in scientific studies would be able to succeed in Chemistry and Physics courses at tertiary level without having studied Physical Science at senior secondary level, provided that the institution concerned offered a good bridging or introductory programme.

ADDITIONAL CONCERNS

The higher education evaluators argued strongly that insufficient emphasis was placed on practical laboratory skills development in all three courses.

Evaluators also raised concerns about marking, arguing that N3 Engineering Science markers tended to greater inconsistency in awarding part marks. If one strictly follows the marking memorandum, then there is less opportunity for awarding part marks for information that may have some relevance to the question.

DISCUSSION

Both research questions were clearly answered in the analysis above. Clearly there is no equivalence between the school and college subjects—the N3 course (the college course) is a far less substantive course. If indeed it is important that college courses lead to higher education, the N3 course needs to be redesigned. The brief amount of time in which the curriculum is delivered in the colleges (because of the trimester system) is clearly not conducive to learners' mastering a substantive body of knowledge of a subject like this one. Question papers need to be more challenging and less predictable.

In terms of Umalusi's role in monitoring standards, the scale developed by the Science evaluators is particularly useful and might form the basis for a scale which could be used across subjects.

Chapter Four 4

Mathematics

Chapter Four describes the findings for the Mathematics courses examined.

Two courses were compared by the group of practitioners:

- Senior Certificate Mathematics Standard Grade
- National Certificate (N3) Mathematics.

The evaluators were also asked to compare examinations of both N3 and N6 Mathematics with the Senior Certificate Higher Grade examinations. They argued, however, that the differences between these courses were so substantial as to render a comparison of examinations completely pointless; nevertheless, a very brief comparison of prescribed content was conducted. Evaluators argued that the difference between Mathematics Higher Grade and Mathematics Standard Grade is far greater than that between these two grades in most other subjects.

The original intention of the Higher Grade course was to prepare candidates who wished to study for qualifications at the 'old' universities that had compulsory courses in Mathematics. On the basis of their experience, evaluators argued that it was clear that candidates who were struggling to get 40% on the Higher Grade often got 80% and higher after changing to Standard Grade. The automatic method of converting Higher Grade marks to equivalent marks on the Standard Grade does not, therefore, appropriately compensate for the difference in the conceptual demands of the two grades in this subject.

Thus, only the N3 and Senior Certificate Standard Grade were compared. However, a brief description of the differences in content for the Higher Grade and N6 courses is included in this report.

The group of higher education evaluators provided an analysis based both on the practitioners' report and on the primary data. The findings below draw on the analyses of both the practitioners and the higher education experts.

Evaluators also conducted a cursory analysis of an NQF-contextualized Mathematical Literacy programme which had been designed against unit standards. As discussed in the introduction, the idea behind the development of the NQF was to find a way of ensuring equivalence between competences in specified areas. In theory, any course at NQF level four should enable learners to reach the same level of competency in designated areas. As such, some investigation of the NQF course was felt to be important. However, the NQF course aims to teach learners 'mathematical literacy' and not 'mathematics'. There is no Mathematical Literacy course currently in either schools or colleges[7], and as such this course could not be directly compared with anything; there is almost no overlap between the courses. Discussion on this course is therefore not included in the body of the discussion below. There is, however, a brief discussion of evaluators' views about the NQF Mathematical Literacy course at the end of this section, as the course exemplifies a particular type of approach which has implications for future choices about curriculum.

EQUIVALENCE OF COURSES

TIME

Finding One
The N3 Mathematics course is taught over a substantially shorter time period than the Senior Certificate Standard Grade course.

The time frame of the two courses is very different. The N3 course is taught over one full-time trimester—approximately 75 hours over ten weeks. Topics which are covered in N2 but tested in N3 are listed in the N3 syllabus; in other words, the N3 examination only covers the N3 syllabus. The Senior Certificate course, by contrast, is taught over two years (Grades 11 and 12), for between 200 and 230 hours. Topics in the Grade 11 syllabus are not restated in the Grade 12 syllabus, but are examined

[7] While this was true during the research and at the time of first drafting this report, the new curriculum in Grade 10, introduced in January 2006, does offer a Mathematical Literacy course at senior secondary level.

in the final examination. The practitioners argued that it could even be considered as a three-year programme, as some parts of the Grade 10 syllabus can be tested in the Senior Certificate examination. The two additional major sections in the Standard Grade syllabus are not enough to account for the additional time that Standard Grade students have to study (more than double over a much longer time period). [8] The relative shortness of the N3 course was considered to be a disadvantage in terms of learners mastering the prescribed content.

THE INTENDED CURRICULUM: CONTENT

Finding Two
An overview of content shows that the two courses are generally similar. There are two substantial sections in the Senior Certificate Standard Grade syllabus which are not in the N3 syllabus.

Table 4.1: Overview of Mathematics content

N3	Senior Certificate (SG)
Factors and fractions	
Exponents surds and logarithms Includes the following laws: 1. $\log_x ab = \log_x a + \log_x b$ 2. $\log_x \frac{a}{b} = \log_x a - \log_x b$ 3. $\log_x a^n = n \log_x a$	*Exponents, surds and logarithms* Includes the following laws: 1. $\log_x ab = \log_x a + \log_x b$ 2. $\log_x \frac{a}{b} = \log_x a - \log_x b$ 3. $\log_x a^n = n \log_x a$
Equations, word problems and manipulations. This includes equations involving the k-method, surds and the Remainder and Factor Theorems.	*Equations, word problems and manipulations.* This includes equations involving the k-method, surds and the Remainder and Factor Theorems.
Geometry of co-ordinates: Distance between two points; midpoint of a line segment; gradient of a line; equation of a line parallel or perpendicular to a given line through a given point; collinear points and intersecting lines; equation of circle with centre at the origin only and given radius; points of intersection of lines and circles.	*Analytical Geometry:* Distance between two points; midpoint of a line segment; gradient of a line; equation of a line parallel or perpendicular to a given line through a given point; collinear points and intersecting lines; equation of circle with centre at the origin only and given radius; points of intersection of lines and circles. Loci.

[8] The practitioners noted, however, that most N3 students are those who have previously attempted the Senior Certificate, and this might mean that less time is needed.

Algebraic Graphs: Straight line; circle and semi-circle; rectangular hyperbola; parabola; cubic function; Ellipse.	*Algebraic Graphs:* Straight line; circle and semi-circle; rectangular hyperbola; parabola; cubic function
Differential calculus: The average gradient of a curve between two points; limits and determining the derivative from the first principles where the function is restricted to the following types: k, ax, ax+b, ax^2 using the rule $D_x[ax^n] = n.ax^{n-1}$ to differentiate functions (learners are expected to be familiar with the different types of notation.); the gradient of a curve at any point on the curve; the derivation of the equation of the tangent to a graph at a given point; calculating the turning points and sketching polynomials of at most the third degree (points of inflection are not included).	Differential Calculus: The average gradient of a curve between two points; limits and determining the derivative from the first principles where the function is restricted to the following types: k, ax, ax+b, ax^2 using the rule $D_x[ax^n] = n.ax^{n-1}$ to differentiate functions (learners are expected to be familiar with the different types of notation); the gradient of a curve at any point on the curve; the derivation of the equation of the tangent to a graph at a given point; calculating the turning points and sketching polynomials of at most the third degree (points of inflection are not included). Simple practical problems to determine maxima and minima.
Trigonometry: The definitions of the six trigonometric functions of any angle over [0; 360]; function values of (900-θ), (1800+θ), (1800-θ), (3600-θ) expressed in function values of θ where θ is between 00 and 900; ratios of special angles $(0^0, 30^0, 45^0)$ and multiples thereof over the interval [00; 3600]; reciprocal, quotient identities and square identities are used to prove identities and simplify expressions; Sine Rule, Cosine Rule and the Area Rule are applied in the solution of triangles and in problems in two dimensions; graphs of the sine, cosine and tangent functions within the interval [00; 3600] include: the sketches and identification of the curves y =a cos x; y = a tan x; y =a sin x; y =sin ax; y =cos ax; y=a.cos(bx+c) and y=a.sin(bx+c) sinusoidal waveforms; combinations of two trigonometric waves; trigonometric equations	*Trigonometry:* The definitions of the six trigonometric functions of any angle over [00; 3600]; function values of (90$\tilde{0}$θ), (1800+θ), (180$\tilde{0}$θ), (360$\tilde{0}$θ) expressed in function values of θ where θ is between 00 and 900; Ratios of special angles (00, 300, 450) and multiples thereof over the interval [00; 3600]; reciprocal, quotient identities and square identities are used to prove identities and simplify expressions; Sine Rule, Cosine Rule and the Area Rule are applied in the solution of triangles and in problems in two dimensions; graphs of the sine, cosine and tangent functions within the interval [00; 3600] include: the sketches and identification of the curves y =a cos x; y = a tan x; y =a sin x; y =sin ax; y =cos ax; trigonometric equations
	Nature of roots of quadratic equations.
	Sequences and series. This topic includes: arithmetic and geometric sequences; the writing of a series in an expanded form from sigma notation (the converse is not examinable); calculations

	involving the sum of n terms. The formulae for these sequences are given on a formula sheet, but the learner has to identify which one to use.
	Euclidean Geometry. Similarity (Grade 12): In geometry definitions, axioms and theorems that were treated in Grade 9 and Grade 10 may be used as reasons for statements in solving riders. In the examinations two theorems are tested, one from the Grade 11 and one from the Grade 12 syllabus. The theorems tested from the Grade 11 syllabus are: the line joining the centre to the midpoint of a chord is perpendicular to the chord; the chord, which is subtended at the centre, is double the angle it subtends at any point on the circumference; the opposite angles of a cyclic quadrilateral are supplementary; the angles between a tangent to a circle and a chord drawn from the point of contact are equal to the angles in the alternate segments. Theorems tested from the Grade 12 syllabus are: the line drawn parallel to one side of a triangle divides the other two sides proportionally; if two triangles are equiangular, then the corresponding sides are in proportion and the triangles are similar.

There are minor differences within sections: loci in analytical geometry (present in Senior Certificate but not N3); the ellipse graph (N3 but not Senior Certificate); practical problems on maxima and minima in calculus (Senior Certificate but not N3); and sinusoidal wave-forms and combination of two waveforms in trigonometry (N3, not Senior Certificate).

The differences between Higher Grade and Standard Grade are substantial. Higher Grade candidates are required to cover all the topics prescribed for Standard Grade plus:

1. Absolute value.
2. Linear programming.
3. Quadratic and other inequalities (only linear inequalities are taught in the Standard Grade syllabus).
4. More complex types of exponential equations.
5. The exponential and logarithmic functions.
6. The logarithmic change of base law.
7. Angles in trigonometry not limited to the domain .

8. Trigonometric problems in three dimensions.
9. Trigonometric graphs involving a vertical or a horizontal shift.
10. Compound angle formulae in trigonometry.
11. More complex types of trigonometric equations.
12. Proofs of converses in Euclidean geometry.
13. The use of concurrency theorems in geometry riders.
14. Equations of circles with any centre (not just the origin).

While the above additional topics increase the volume of work for Higher Grade candidates, evaluators argued that it is the difference in the conceptual level of the questions asked in examinations that makes the difference between Higher Grade and Standard Grade so much greater than in most (if not all) other subjects.

The N6 Mathematics course was designed to meet the government requirements for the National Diploma in different fields of Engineering, and focuses on a relatively small section of Mathematics which is needed in various areas of engineering. There is virtually no common ground between the N6 and Senior Certificate Higher Grade syllabuses—at most, a 3% overlap. The rest of the N6 curriculum consists of:

- integration techniques;
- partial fractions;
- differential equations;
- applications of the definite integral; and
- applications where differentiation and integration techniques are combined.

While differentiation forms part of the Higher Grade syllabus, this is confined to simple algebraic functions.

The higher education evaluators examined the Standard Grade and N3 courses in relation to the key learning outcomes which have been defined for the FET curriculum: number and number relationships; functions and algebra; space, shape and measurement; and data handling and probability.

Finding Three
Sequences and series and linear programming are worrying omissions from the N3 syllabus.

The higher education evaluators argued that sequences and series are a fundamental topic in Mathematics and are important in calculus at higher levels. In addition, they

are a specific kind of pattern, and function and flexibility in working with them adds to students' mathematical knowledge and skills in these areas. Further, the evaluators felt that problems on maxima and minima should not be left out of N3, given their more practical orientation and the importance of similar problems at higher levels. However, sequences and series is included in the N4 syllabus, and a critical reader of this research argued that N3 and N4 together could be viewed as equivalent to the Senior Certificate course.

Linear programming also does not appear in the description of the Senior Certificate syllabus; this is because it is covered in Grade Eleven. Linear programming has a number of technological and industrial applications and can also help to further develop the concept of functions for the learner.

Finding Four
Number and number relationships are not dealt with in any great detail in either syllabus. While this could be because this is taught more explicitly at earlier levels and is assumed at this level, both syllabuses spend too much time on algebra, and do not pay enough explicit attention to this aspect of Mathematics. As such, they are unlikely to develop necessary numerical skills.

An exception is exponents and surds, which are dealt with in N3 (and also in Grade 11 Standard Grade), and which contribute partly to knowledge of number and number relationships.

Finding Five
Functions are treated inappropriately in both syllabuses, with little emphasis on the concept of functions, few links between different kinds of functions, and no indication of how they are used or why they are important.

The higher education evaluators argued that functions are one of the key (possibly the key) concepts in Mathematics, and that in higher education Mathematics, Science and Technology all require an understanding of what functions are and how they work, as well as the ability to work flexibly with a range of different kinds of functions. In both the Senior Certificate Standard Grade and the N3 courses, functions are treated in static and decontextualized [9] ways. The evaluators provided as an example the completely separate treatment of the laws of logarithms in both syllabuses, arguing,

[9] By decontextualized, the evaluators mean from the broader contexts of mathematics, science and technology, as opposed to from the concerns of everyday life.

> As they are presented, in and of themselves, these are abstracted from all contexts and relatively meaningless as mathematical objects. Yet logarithms and logarithmic functions (which are in neither syllabus) are crucial in understanding a range of both natural and technological phenomena. Similar points can be made about the treatment of Sequences and Series in Standard Grade.

As a second example, they argued that the completely separate treatment of trigonometry in both syllabuses is inappropriate, as ... 'trigonometric functions are important aspects of higher mathematics and a good grounding in them, from a functions perspective, is crucial. While some separate treatment can be useful, they need to be developed as an important subset of functions, subject to the same principles and analyses'.

Finding Six
The development of spatial concepts and skills is weak in both syllabuses.

The only geometry that is done is Euclidean geometry in the Senior Certificate, and analytical geometry in both syllabuses. The higher education evaluators argued that Euclidean geometry does not substantially develop spatial reasoning, but rather develops the notion of mathematical proof, and that,

> While this is important, it can be done with other areas of mathematics, or with Euclidean Geometry as long as this does not pose as developing spatial reasoning. Similarly, analytical geometry is also planar, and while it makes important links between plane geometry and algebraic techniques, it does not develop spatial reasoning.

There is no work in either syllabus on 3-dimensional objects, volumes or areas. Some work on 3-dimensional visualization is done in Higher Grade trigonometry, but even that would not be sufficient for the kind of spatial and visualizing skills that are required in some higher education technological fields.

Finding Seven
Data handling, an important mathematical area in terms of practical applications, is absent from both syllabuses.

Data handling will be new in FET Mathematics. Knowledge of data handling and statistics is crucial for all citizens, and particularly for those going into scientific and

technological fields. This is the area where the best practical applications can be found and it is likely to be the most useful to those not going on to technological careers. In the new school curriculum it has been introduced at lower levels, and so can be built on at this level.

The evaluators linked data handling to competences in number relationships and functions, arguing that dealing with data can increase flexibility with numbers and number relationships, and that developing and reading graphs can help with the graphical aspects of functions.

Finding Eight

Both syllabuses are inadequately structured, with no explicit mention of what are variously called mathematical skills, processes or practices, including estimation, generalization and justification as important parts of the syllabuses. As a result it is highly unlikely that these skills will be explicitly taught or examined.

From their experience in higher education, the evaluators argued that most students are unable to estimate quantities and answers to questions or to work out whether an answer obtained is sensible, and that this is the result of the way the syllabus is presented in separate packages of content.

THE EXAMINED CURRICULUM: CONTENT AND COGNITIVE CHALLENGE

The N3 course is examined in a single three-hour paper worth 100 marks. The Senior Certificate Standard Grade course is examined through two three-hour papers, each worth 150 marks. The pass mark for the N3 is 40%; the pass mark for Senior Certificate Standard Grade is 33⅓.

The year mark counts for 40% of the final examination in N3, and 25% for the Senior Certificate. In the opinion of the evaluators this mark for N3 tends to be compiled from class tests, while for the Senior Certificate there has been a prescription that parts of the mark should come from different kinds of assignments.

The Mathematics syllabuses stipulate how much of the examinations should cover what, as well as the amount of the examination that should be designated to different kinds of questions. For the N3 examination the syllabus prescribes a strict mark allocation per topic, while for the Senior Certificate Standard Grade this is looser.

Because the N3 is tested in a single examination, some topics may be left out—the solution of triangles using the sine and cosine were not tested in 2004, for example.

The only difference between the prescribed and examined curricula in the Senior Certificate Standard Grade course is that in the section Sequences and Series, in the writing of a series in an expanded form from sigma notation the converse is not examinable. Sinusoidal waveforms and combinations of two trigonometric waves are prescribed in the N3 syllabus but not tested; practitioners argued that this meant they were often not taught.

The Mathematics evaluators developed a five-point scale with which to evaluate the levels of cognitive challenge in the examinations (Table 4.2). This was based on the classification of question types in the Senior Certificate Standard Grade syllabus.

Table 4.2: Scale of cognitive challenge for evaluation of Mathematics examinations

Level number	Level descriptor
1	Knowledge: recall of content: facts, notation, conventions, formulae, definitions, standard proofs
2	Skills: simplification of expressions and solution of standard equations; substitution, drawing graphs
3	Understanding: translate from one symbolic form to another; interpret what is required; recognise a tendency; generalise; extrapolate
4	Application: as for level 3, but situation relatively unknown; method of solution not implicit in the question
5	Creative thought: requires the analysis of the material into constituent parts and then a synthesis of these parts to form a new whole.

Finding Nine

The two Senior Certificate Standard Grade Mathematics examinations test roughly the same content as the single N3 Mathematics course, but the former course has far more challenging questions. The rigid format of the N3 paper, as well as the restricted number of total marks, is likely to lead to greater predictability.

The trend is clear from the evaluators' analysis: 88% of the marks for N3 were for levels 1 and 2 questions; 66% of the marks for the Senior Certificate Standard Grade

were for level 1 and 2 questions. Only the Senior Certificate examinations had anything at level 4 (13%), with more at level 3 (21% as opposed to 12% for N3). The higher education evaluators felt that there were insufficient demanding questions even for the Senior Certificate learners; neither the N3 nor the Senior Certificate contained questions at level 5—creative thought.

Finding Ten
Standard Grade candidates are expected to work more quickly and are examined on more work than N3 candidates.

The evaluators compared both absolute numbers of marks and percentages across the papers, and showed that roughly the same marks are given for the same work. This means that much more is being asked of the Senior Certificate Standard Grade candidates. Given the ratio of marks to time, Senior Certificate candidates are expected to work more quickly (150 marks in 3 hours as opposed to 100). It is clear that the additional sections—sequences and series, Euclidean geometry and linear programming account for 81 marks—do not make up for the difference in marks between the two examinations.

Finding Eleven
The Standard Grade examinations contained more work on analysis of graphs, calculus, and trigonometry than the N3 examinations. These are sections which are crucial to higher education in scientific and technological fields.

Overall, Senior Certificate Standard Grade candidates are examined on more work, particularly in important sections. Since what is taught tends to follow what is assessed, this would suggest that there is more work in the taught curriculum in the Senior Certificate (wider range of examples, problems in each section). [10]

Learner performance

The practitioners conducted a detailed comparison of a small sample of scripts of learners in the two types of courses. They looked only at the areas of the question papers that had a clear correspondence in terms of topics and types of questions. They found that learners who had scored roughly the same mark on the question paper as a whole did have similar levels of competence with regard to these common

[10] This may account for the extra teaching time in the Standard Grade course. However N3 papers may in fact cover the same range as Standard Grade across a number of years. This would need to be ascertained by looking at papers from several years.

areas of the curriculum. Further analysis of this nature, utilising a much larger sample of scripts, would be needed before conclusions can be drawn.

N6

As stated above, the evaluators did not analyse the Senior Certificate Higher Grade or N6 examinations. However, one of the practitioner evaluators conducted a cursory examination of the N6 examination, and argued that the focus of the N6 course is on manipulative techniques used by engineers. The application problems seem to be confined to specific standard types, and they do not appear to require sophisticated problem-solving skills. While the syllabus looks like part of a first-year (and even second-year) university course, she argued that it is tackled at a very procedural level, and methods are taught for tackling standard types of questions.

HIGHER EDUCATION PREPARATION

Finding Twelve

Neither the N3 nor the Senior Certificate Standard Grade Mathematics course prepares learners adequately for degree study at higher education. Important sections which are necessary for learners going into technological and scientific careers are not covered. The syllabuses for both courses are inappropriately compartmentalized, and both lack higher-order questions which develop the kinds of mathematical skills needed in higher education. The Senior Certificate course was seen as better in this regard, but still inadequate.

The higher education evaluators worked with an additional framework for mathematical proficiency developed by Kilpatrick, Swafford and Findell (2001). This framework includes five strands: procedural fluency, conceptual understanding; strategic competence; adaptive reasoning and productive disposition. These levels do not necessarily specify levels of achievement, but the expert evaluators argued that it is useful to look at the levels above (see Table 4.2) in terms of the strands. Levels 1-3 account for procedural fluency and conceptual understanding while Levels 4 and 5 account for strategic competence (problem solving in novel situations). They argued that it is this strand that is key to success in higher education, and yet it constitutes a mere 13% of the Standard Grade paper and 0% of N3 paper. The strand of adaptive reasoning is about justification and explanation of mathematical ideas, which, they argued, is not key to progress in technological and scientific areas, which use mathematical tools to solve problems rather than work with them in their own right. However, adaptive reasoning is key to Mathematics, and they argued that students who enter higher education, particularly those who are going to use Mathematics, should have some idea of what it means to justify and prove

mathematical ideas. It is usually assumed that Euclidean geometry provides this competence, and it is likely that some of the marks in levels 3 and 4 for Euclidean geometry in the Standard Grade paper are allocated for this. However, this is usually justification in an already experienced context and in only one area of Mathematics. As discussed above, the evaluators also pointed to the lack of work in either syllabus on 3-dimensional objects, or on volumes and areas, and argued that even the work on 3-dimensional visualization done in Higher Grade trigonometry is insufficient for the kind of spatial and visualizing skills that are required in higher education technological fields.

The higher education evaluators for Mathematics also pointed out that it is necessary to consider student readiness for different kinds of higher education institutions (the 'old' universities, the universities of technology, and the comprehensive universities):

> Traditionally both N3 and Standard Grade mathematics gave access to science, technology and engineering courses at the technikons, which now form part of the latter two kinds of institutions. [11] Traditionally Standard Grade mathematics could also give access to non-science subjects in the "old" universities, depending on the students' other subjects, and in some universities Standard Grade could give access to scientific fields. However, N3 has never been considered in the "old" universities[12] and is unlikely to be considered in the future. Standard Grade is being phased out and so future equivalence will be between Mathematical Literacy and N3 .... It remains to be seen whether institutions allow access based on Mathematical Literacy in the same ways as Standard Grade.

Universities of technology might accept students to Engineering programmes with Mathematics on the Standard Grade or N3 Mathematics, whereas most universities insist on at least a 'C' for Higher Grade Mathematics. Some of the evaluators argued that the universities of technology generally give no credit for first-year courses for N6—it is not regarded as being higher than Senior Certificate Mathematics. Others contradicted this, arguing that N6 is much higher than the Senior Certificate course, and that some universities of technology give credits up to second-year level. A critical reader of the research argued that N3 and N4 combined were often accepted by universities of technology. It appears as if individual colleges have specific

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11 However, it was argued anecdotally by some evaluators that many of these institutions would prefer a learner with an N3 to a learner with a Standard Grade pass.

12 All of this is anecdotal, based on evaluators' experience. Research is needed to find out exactly how the different of higher education institutions allow entry based on prior qualifications.

arrangements with individual universities of technology. It was beyond the scope of this research to verify the exact policies of each institution.

NQF-CONTEXTUALIZED MATHEMATICAL LITERACY COURSE

Finding Thirteen
It was not possible to make rigorous judgements about the content and level of the Mathematical Literacy course merely on the basis of course packs, but the course seemed to be too embedded in the context, and as such could lose sight of the mathematical competencies being built.

The Mathematics evaluators examined two resource files for NQF Mathematical Literacy (for Early Childhood Development and for Hairdressing). They argued that there were some excellent activities in both files. However, on the basis of the files alone, they could not comment on whether or not learners would achieve the same level across these two programmes, as this would depend on how learners' skills and knowledge were assessed. They were concerned that the activities were very narrowly focused on relevant contexts within the vocational field and that the mathematical concepts might not be transferred to other contexts:

> Will the student who can get the ratios right in tinting hair be able to apply the same technique to baking or building?

The evaluators were also concerned that the material in the files was very reliant on the ability to interpret fairly complex text, and that the context tended to dominate, to the extent that the maths might get lost. They felt that educators needed to be alerted to the need for supplementary drill and practice exercises to make sure that students developed familiarity with the actual mathematical skills.

DISCUSSION

N3 Mathematics is clearly a less challenging course, but both courses have problems. It is to be hoped that the introduction of Mathematical Literacy will address these problems.

The fact that the evaluators refused to compare the Senior Certificate Higher Grade course with the N3 Mathematics course, arguing that it was totally incomparable and that only the Standard Grade course could be compared with the N3 course, raises concerns. As evaluators argued, it seems as if the difference between Standard Grade and Higher Grades is not a consistent difference across subjects—none of the other subject groups felt that the Higher Grade course was so different as to render a comparison pointless. This issue has been raised before (for example in Umalusi's 2004 Investigation into the the Senior Certificate Examination). The introduction of Mathematical Literacy and the phasing out of the Higher Grade/ Standard Grade distinction may provide a solution to this problem. Nonetheless, this does raise concern about whether or not future curricula will have sufficient levels of differentiation to capture needs and abilities of learners to master different amounts and levels of Mathematics.

Chapter Five

5

English

Chapter Five describes the findings for the various English courses at NQF level four which were examined as part of this research. Because Home Language and Additional Language courses were compared, this section contains an analysis of a much larger number of courses than the other subject chapters. Separate groups of practitioners examined Home Language and Additional Language courses, but the higher education practitioners were asked to look at both sets of courses in order to build an understanding of the bigger picture of English teaching across schools and colleges.

The group of Home Language practitioner evaluators examined the following courses:

- Senior Certificate Home Language English, Higher Grade and Standard Grade;
- National Senior Certificate Home Language English (Business English); and
- 'Situated' Communications NQF level four (including Language for Early Childcare Development and General Business Administration Practitioners).

A separate group of Additional Language practitioner evaluators examined the following courses:

- Senior Certificate Additional Language English, Higher Grade and Standard Grade;
- National Senior Certificate Additional Language English (Business English); and
- 'Situated' Communications NQF level four (including Language for Early Childcare Development and General Business Administration Practitioners).

Both groups examined the new courses that have been developed against unit standards registered on the NQF, as these courses are not specified in terms of Home Language or Additional language, but simply claim to be developing learners' language competence at level four. Evaluators referred to these courses in their

reports as 'NQF courses', and this practice is followed for ease of reference in the report.

A group of higher education evaluators considered the reports of both the Home Language and Additional Language groups, as well as analyzing the original data. The findings below are based on the analyses of both the practitioners and the higher education experts.

The findings are discussed in two sections: equivalence of courses and preparation for higher education. Following that, there is a discussion of a few important issues which emerged during the research but which were not related to the research questions. Finally, the chapter presents a summary of findings.

EQUIVALENCE OF COURSES

Finding One

It was not possible to make meaningful comparisons between the Senior Certificate and National Senior Certificate courses on the one hand, and the NQF courses on the other, due to the absence of summative assessment instruments in the NQF courses, as well as the fact that only unit standards are prescribed. On the basis of this finding, a decision was made not to pursue a detailed comparison. However, the finding is very significant because it implies that an approach to curriculum design in which only outcomes are specified will make quality assurance unsustainable.

There is no prescribed syllabus and no external summative examination or assessment for the NQF courses. Only the learning outcomes are prescribed. The idea seems to be that through the specification of learning outcomes, different institutions and teachers will design different courses, all of which will enable learners to achieve these same outcomes. This research sends a strong warning about serious problems with this approach. While evaluators found that the learning outcomes expressed laudable competencies, the absence of both a syllabus and an examination made it impossible for them to reach any conclusions about whether learners would in fact obtain these competencies. Correspondingly, there would be no way for a quality assurance body to understand what learners had in fact achieved, short of conducting a detailed analysis of the learning programme of each individual teacher and the assessment tasks of each learner.

Evaluators examined two 'course packs', which could be considered as possible instantiations of different course designers' understandings of the outcomes in question. The course packs themselves were different—one was a broader type of

workbook for learners, and the other was a very specific pack focused on learners in an Early Childcare Development programme. The evaluators felt that neither of these course packs were sufficient to ensure that learners could achieve the requirements of the unit standards. In addition, the course packs were not courses—they were optional resources that teachers might choose to use in their courses; teachers could in fact use completely different resources based on their understanding of the learning outcomes. In fact, the course packs emphasized that teachers should select aspects to use with their learners. It is clear that a widely divergent set of courses could be designed against the learning outcome 'Read, analyse and respond to a wide variety of texts', one of the outcomes in the courses in the evaluation. With no prescription on what should be read, or even what types of texts, and no external examination, it is hard to see how there could even be a semblance of equivalence across institutions.

It is impossible to know without looking at each individual course in detail what learners have actually learned—from an analysis of the course packs evaluators were unable to make a judgement about, for example, the extent to which the broad outlines specified in terms of writing practices would be enacted, and there were no assessment tasks from which to gauge what practices were actually valued.

The evaluators attempted to analyze the course packs, and where some data could be drawn from the two course packs available, information about the NQF courses is included in the discussion below. Where the NQF courses are discussed in the comparison below, it must be remembered that what is being discussed is not a course per se, but rather a workbook for learners which might or might not be used.

The research revealed, therefore, that using outcome statements alone as the basis for curriculum design, assessment, and quality assurance is inadequate.

TIME

Finding Two
In terms of teaching time, the English Senior Certificate and National Senior Certificate courses are comparable, for both Home Language and Additional Language courses.

The Senior Certificate and National Senior Certificate courses are one-sixth of a full-time year's study, or one subject out of a package of six that are pursued over a year. Although it is not possible to calculate the exact amount of time which is spent teaching and testing across different schools, the Home Language evaluators

calculated approximately 189 contact hours in school and 170 in college, while the Additional Language evaluators calculated more hours for the college courses: 155 to 100. Clearly there are differences from institution to institution, as well as differences in terms of time dedicated to assessment.

Although the evaluators estimated 30-35 hours for the NQF communications courses, these courses are designed against unit standards which are worth 20 credits on the NQF, and therefore are supposed to represent 200 notional learning hours.

THE INTENDED CURRICULUM: SPECIFIED CONTENT

Key content areas in English is a somewhat contested area. The English Home Language practitioners argued that

> ... English Home Language treats English as both a subject with its own content and also as a means of communication. NQF and Business English seem to regard English only as a means of communication. English as a communication tool is likely to be less cognitively challenging than English as a subject as can be seen in the data.

They went on to define the key content areas of English in terms of reading, writing, speaking, and language (see Table 5.1, below).

The Higher Education evaluators felt that this approach was inappropriate, as, in their view, it made value judgements and prioritized certain forms of literacy above others. They also argued that the practitioner evaluators for the Home Language courses used the Senior Certificate as the benchmark for what an English course should look like. However, they agreed that the framework provided by the practitioner evaluators provided a useful way of comparing the different courses.

Umalusi decided that the four key areas of content outlined by the Home Language English practitioners (reading, writing, speaking, and language) provide a useful set of categories within which to make meaningful judgements about the relative standard of English courses, and used these categories as a way of understanding the differences and similarities between the various courses under investigation. 'Listening' as a content area was included for the Additional Language courses, as this is clearly an area which is specifically identified.

There was some dispute among the evaluators about the role of literature in an English curriculum. The Home Language practitioners argued strongly that literature is an important part of a language course, not just because of sustained reading but because of what they called 'the development of the whole person'. They argued that there are a whole set of reflective activities involved in the study of literature, and also that literature plays a major role in broadening learners' general knowledge and experience of the world. However, they also acknowledged that the literature examination is the easiest to prepare learners for. In subsequent correspondence with the lead writer of the Home Language group, she argued that it is the language paper which is the real discriminator between weak, good, and excellent learners—if it is a good language paper.

The higher education practitioners, on the other hand, argued that both good reading ability and the 'development of the whole person' could be achieved through other means. They felt that the greatest value of the literature component was that it provides an opportunity for sustained reading, but argued that other texts could play the same role. The Home Language practitioners felt that fiction is important in developing an ability for sustained reading as it enables learners to read for enjoyment, which they felt was essential in developing learners' reading ability. The Additional Language practitioners, on the other hand, argued (from anecdotal experience, and not from the research data) that the literature component of the courses in fact has the opposite effect on learners, and makes them not enjoy reading; a fact they attributed to the type of texts selected.

Notwithstanding this dispute, there was clear agreement that sustained reading is a vital part of an English course, and that while none of the courses provided enough of it, the Senior Certificate courses are dramatically better than the National Senior Certificate courses in this respect, through the inclusion of a literature component.

Within the key content areas, it was clear that there are substantial differences between the four courses. What was striking was the far greater breadth of what is being taught and examined in the Senior Certificate courses.

Finding Three
An overview of English Home Language content shows that the Senior Certificate course contains more prescribed reading and a greater variety of types of writing.

Table 5.1: Overview of content of Home Language courses

Senior Certificate L1 Higher Grade	Senior Certificate L1 Standard Grade	Business English L1	NQF communication course
Reading **Literature:** Fiction, drama, poetry, film. Specific study of three set works.	**Reading** **Literature:** Fiction, drama, poetry, film. Specific study of three set works.	**Reading** **Literature:** One book of short stories, South African poetry.	**Reading** **No literature:** A few short newspaper and magazine articles.
Comprehension: Passages and short texts for various kinds of analysis.	**Comprehension:** Passages and short texts for various kinds of analysis.	**Comprehension:** Passages.	**Comprehension:** Passages related to core subjects and life skills.
Visual literacy: Advertisements,	**Visual literacy:** Advertisements,	**Visual literacy:** Advertisements.	**Visual literacy:** Advertisements.
six extra books prescribed for reading.	six extra books prescribed for reading.		
Writing Transactional writing: Correspondence, business writing, diary entry, reports, memoranda, very short pieces.	**Writing** Transactional writing: Correspondence, business writing, diary entry, reports, memoranda, very short pieces.	**Writing** Transactional writing: Correspondence, business writing, diary entry, reports, memoranda, very short pieces.	**Writing** Transactional writing: Correspondence, business writing.
Creative writing	Creative writing		
Academic writing	Academic writing		
Speaking Reading aloud	**Speaking** Reading aloud	**Speaking**	**Speaking**
Talking and listening	Talking and listening	Talking about life skills	
Prepared speech	Prepared speech	Prepared speech	Prepared speech
Set work discussion	Set work discussion	Optional	
Language Meta-language	**Language** Meta-language	**Language** (Very limited)	**Language** (Very indirectly introduced and very limited)

Finding Four
An overview of English Additional Language content similarly shows more reading and a wider variety of writing types in the Senior Certificate courses, although within transactional writing, the only writing type for Business English, there are more types of writing tasks.

Table 5.2: Overview of Additional Language course content (excluding NQF courses)

Senior Certificate L2 Higher Grade	Senior Certificate L2 Standard Grade	Business English L2
Reading Two set works from different genres; Short texts for various kinds of analysis and language work—e.g. dictionary work, bias, etc.	Reading Two set works from different genres; Short texts for various kinds of analysis and language work—e.g. dictionary work, bias, etc.	Reading Short texts (a long list of possible types is prescribed) for various kinds of analysis and language work—e.g. dictionary work, bias, etc.
Writing Transactional writing but no specific focus on employment-related correspondence. Descriptive and narrative writing (but no mention of argument).	Writing Transactional writing but no specific focus on employment-related correspondence. Descriptive and narrative writing (but no mention of argument).	Writing Only transactional writing, including: summary, client and company correspondence; employment-related correspondence; meeting procedures and documentation; proofreading and editing.
Speaking Comprehensive list of speaking situations included. Syllabus includes a comprehensive list of all aspects of speech which learners are expected to master.	Speaking Comprehensive list of speaking situations included. Syllabus includes a comprehensive list of all aspects of speech which learners are expected to master.	Speaking Speaking situations limited to business-related situations. Syllabus includes a comprehensive list of all aspects of speech which learners are expected to master.
Listening Syllabus includes a comprehensive list of listening situations and aspects which must be mastered.	Listening Syllabus includes a comprehensive list of listening situations and aspects which must be mastered.	Communications Cycle and Listening Skills Syllabus includes a comprehensive list of listening situations and aspects which must be mastered. Theory of communication

		(sender and receiver, message, feedback, barriers).
Language Long list of basic structures listed in syllabus, with an emphasis on teaching them in context.	Language Long list of basic structures listed in syllabus, with an emphasis on teaching them in context.	Language Long list of basic structures listed in syllabus, with an emphasis on teaching them in context.

Finding Five
There is dramatically more reading in the Senior Certificate courses, and by far the most reading in the Senior Certificate Home Language courses.

The most significant difference in content between the Senior Certificate courses on the one hand, and the N3 as well as NQF level four courses on the other, is the amount of reading done. The literature in the Senior Certificate courses is prescribed and examined; additional books are prescribed but not examined (as discussed below). Learners doing the Senior Certificate Home Language course spend up to half of the contact time studying prescribed literature, which means that there is a minimum amount of reading that learners must do, even if the additional reading prescribed in the syllabus is not done. Some literature study is suggested for the Business English course but not examined (as discussed below); the practitioners argued that in their experience literature is very seldom taught in these courses. There is no literature included in the NQF level four course packs, and no other sustained reading to compensate for this gap. All of the English evaluators commented strongly on this difference. The higher education evaluators argued that the inclusion of various literature set works in the Senior Certificate course means that this course should develop more advanced reading skills in learners, and possibly an interest in or familiarity with reading. Further, they argued that the reading of a range of texts prepares learners for higher education because the texts are complex, and of a reasonable length and linguistic complexity.

Finding Six
The Senior Certificate courses teach a greater variety of types of writing; argument and exposition are a worrying omission from writing in the Business English courses.

In writing, there are also significant differences between the courses. The Senior Certificate courses involve creative writing, academic writing, and transactional writing, while the Business English course only involves transactional writing. The higher education evaluators were concerned by the absence of argument and exposition in the writing requirements of the Business English syllabuses. It must be

noted that there is a significant difference between the intended and examined curriculum in the Senior Certificate courses, which is discussed below, as this compromises the amount of writing which is actually taught in the courses. The unit standard on which the NQF course is based suggests that creative writing should be done, but there are no exercises in the workbook. The types of transactional writing in the workbook are, according to the evaluators, similar to those prescribed in the other English courses.

There are a few other less significant differences, including the following:

- The orals prescribed in the Senior Certificate course are more diverse. However, there are also significant differences between the intended and examined curricula, which could mean that many of these skills are not actually being taught.
- Only the Business English courses teach the 'theory of communication'; neither of the Senior Certificate courses include this. Unfortunately the higher education evaluators did not, as we had hoped, comment on the merits of teaching 'theory of communication'; it appears to be a topic which is out of touch with modern approaches to language teaching, and unlikely to assist learners in any way.

Finding Seven
There is some difference in form between all syllabuses, and a dramatic difference between both the Senior Certificate and National Senior Certificate on the one hand and the NQF courses on the other.

Notwithstanding the debate alluded to above about the notion of content in English, the form of the syllabus is an important issue. Both the N3 and Senior Certificate English syllabuses stipulate in a fair amount of detail what is to be taught: for example, under written communication, for N3, one out of 13 items in the list of what should be taught is:

> Students must recognise and use the elements of style such as register, diction, tone, syntax, denotation and connotation and the use of literal and figurative language.

The detail of the syllabus provides a useful tool for teachers, and for ensuring some degree of standardization in terms of what is taught. On the other hand, the syllabus reads as a long list of items to be learned. The higher education evaluators commented that while the syllabus stresses teaching the different aspects of English in an integrated manner, they are not in fact presented as such in the syllabus, but rather as a long list of skills. The Senior Certificate syllabus, on the other hand,

provides more guidance and discussion in terms of how teachers should teach the required skills and abilities. An example, under writing, is the suggestion that

> Written work should always be followed up by editing, proof reading, evaluation, constructive guidance, and reply, in order to reinforce, develop, and extend a pupil's ability to write in English within the context of their present and envisaged future needs and interests.

A similar situation prevails in the Additional Language courses, although the Senior Certificate courses are more list-like than the Home Language course. The Senior Certificate course syllabus provides guidelines for how to teach English, and must be read in conjunction with requirements for the continuous assessment portfolio and prescribed set works. The Business English course seems to consist simply of a long list of items to be taught.

The unit-standards-based courses, on the other hand, stipulate nothing other than learning outcomes and assessment criteria. The NQF courses are based on practical application of language skills, and are largely limited to the content training programme—for example, one of them was aimed at learners on an Early Childcare Development programme, and as such most of the English course used and referred to texts related to early childcare.

It seems as if the form of the syllabus is something which needs more careful consideration in the South African education system.

Finding Eight

The English syllabuses are in some disarray. This is cause for serious concern as English is the medium of instruction for most learners. Considerable effort should be expended on designing courses which build sufficient ability in the language to master academic study in English, and not just communicative competence in the language.

For the Senior Certificate courses, Table 5.1 shows the key content areas for the English Home Language courses prescribed in the Transvaal Education Department (TED) 1986 syllabus and the Language Standardization policy. No new syllabus was obtainable for English Home language. There is a document entitled 'Language Standardization Policy', but it is very general and specifies the format of the examination. When the examiner was approached for the syllabus on the basis of which the examination was set in 2004, we were given the TED 1986 syllabus. The practitioners from high schools confirmed that this was the document that they used, as nothing had ever been given to them which replaced it. The Language

Standardization Policy document plays a different role: it was created specifically to ensure that all languages are examined in the same way. It is essentially an assessment guideline, which describes the structure of the different examinations and other forms of assessment, to ensure that they are the same across languages. This was necessary, as in the past African languages were taught totally differently to English and Afrikaans. The document is not, however, a syllabus.

The college syllabus is titled The Syllabus for Experimental Implementation for Post-School Vocational Education, and its date of implementation is 1992. The NQF course does not contain a syllabus, but simply a list of learning outcomes as per the 'fundamental' unit standards registered on the NQF.

This raises the important question of the form of curriculum prescription: how much detail should be prescribed, in what form, and so on. This matter is discussed in more detail below.

THE EXAMINED CURRICULUM: CONTENT AND COGNITIVE CHALLENGE

Finding Nine

The Senior Certificate courses are examined through a writing portfolio and three external examinations, two of which are two-hour written papers. The National Senior Certificate is examined through two external examinations but a year mark also contributes to learners' marks.

The Senior Certificate courses, both Home Language and Additional Language, are currently examined through three external examinations and a writing portfolio (CASS mark). There is a language paper, a literature paper, and an oral examination. The oral examination is internally marked but externally moderated. Fifty per cent of the CASS portfolio is supposed to be written pieces that are produced under examination conditions. Part-time learners do an additional written paper instead of the writing portfolio. (With the introduction of the new National Senior Certificate a writing examination will be reintroduced.) The National Senior Certificate (Business English) course is examined through three external examinations, consisting of two written papers and an oral examination.

For the Senior Certificate Home Language course learners do an oral examination worth 20% of their final mark; 30% of this mark should be composed of oral activities done throughout the year. The Additional Language syllabus does not

contain specific requirements for a CASS oral mark; thus the mark is compiled at the discretion of each institution and lecturer. It could be the case that no oral assessment is done at all. A similar problem was raised in relation to Business English. It was not possible to make a judgement about the standard of assessment of orals in the absence of concrete evidence.

Across all the courses, the written examinations are two-hour papers. For the Home Language Higher Grade course both papers are worth 100 marks; the Standard Grade papers are worth 75 marks. For the National Senior Certificate course the language paper is worth 100 marks. For Additional Language Paper One of the Senior Certificate course is worth 80 marks, and for the National Senior Certificate course it is worth 100 marks. The CASS portfolio is worth roughly a third of the final mark across the Senior Certificate courses.

The NQF course is not examined at all. The workbooks examined in this research project consist of a series of assignments through which learners are evaluated. Evaluators argued that while the NQF course, according to the outcomes prescribed, had the potential of demanding a higher standard in terms of 'competence', the lack of examinations means that there is no way of standardizing assessment or of ensuring that all outcomes are adequately covered by the provider.

The English Home Language practitioner group developed a scale with which to judge levels of cognitive challenge of the examinations.

Table 5.3: Scale of cognitive challenge for English Home Language examinations

Level scale	Descriptor/s of cognitive requirements
1	Straight recall, knowledge or literal comprehension
2	More thinking, application or analysis. Candidates might be required to give a reason for their answer, paraphrase a passage or even only comprehend literally, but in a more difficult context such as literal comprehension from Shakespeare as opposed to literal comprehension from a simple current magazine article.
3	More conceptual thinking. Synthesis, evaluation, and making inferences might be required.

The English Additional Language practitioners had a similar scale:

Table 5.4: Scale of cognitive challenge for

English Additional Language examinations

Level scale	Descriptor/s of cognitive requirements
1	Simple task/context knowledge, recall, literal comprehension, low demand, lower order thinking skills, e.g. 'List three ways in which children are protected by the anti-smoking legislation.' (Grade 12 HG, Paper 1, question 1.3)
2	Meaning translation, inference, context/task more advanced, analysis and application of knowledge, average skills, e.g. 'In paragraph nine there is a phrase "to live 'in sin' for 20 years". In the context of this article, what does this phrase mean?' (NSC, Paper 1, question 1(18).
3	Reorganization, synthesis, evaluation, appreciation, context/task complex, requires strategic and discriminative thinking skills, e.g. 'Rewrite the following sentences. The doctor told her to lean back and look at him. She recognized the doctor. Begin as indicated: Only after . . ' (Grade 12 HG, Paper 1, question 5.4).

The English evaluators used a three-point scale to evaluate the difficulty level of questions with which they rated the November 2004 examinations. The Additional Language evaluators used an additional scale which is designed to analyze how straightforward a text is to read.

Finding Ten

The Home Language Senior Certificate examinations were both considerably more challenging than the Business English course, with the exception of Business English writing, where a higher standard of understanding and application is required.

Finding Eleven

The Additional Language Standard Grade Senior Certificate examinations were less challenging than the Business English papers in some areas, but more challenging in others.

Finding Twelve

The inclusion of a literature examination in the Senior Certificate courses means that dramatically more reading is tested, particularly in the Home Language courses. In addition, for the Home Language courses the level of cognitive challenge of questions testing reading in the Senior Certificate courses are both higher than the Business English course.

Both Senior Certificate papers explicitly test reading: Paper One tests comprehension (reading) and language, and Paper Two tests literature. Paper One also tests the summary, which is testing reading, writing, and synthesising skills, and obviously also indirectly tests writing. The National Senior Certificate Paper One

includes a comprehension and a summary. Across the courses, evaluators commented on the lack of reading examined for the Business English courses. Besides the fact that much more reading is done by learners doing the Senior Certificate, the Home Language evaluators also argued that literature exposes learners to language in its varied forms, as well as imaginative insight into human experiences which they cannot encounter in their daily lives.

The evaluators argued that for the Home Language courses, the comprehension section of the examination is considerably more challenging in the Senior Certificate Higher Grade course than in the Business English courses, and that the Standard Grade course is also more challenging; all the comprehension questions for the Business English courses were rated to be on the lowest level of cognitive challenge (simple recall or literal comprehension), while the Standard Grade examination had 50% of questions on the second challenge level (some application or analysis), as well as a few (15%) at level 3 (conceptual thinking, synthesis, evaluation, and making inferences[13]). The higher education evaluators confirmed that the comprehension questions for the Home Language Business English papers did not require critical perspectives on any of the texts, although there were some questions that required a level of interpretive responses.

In the Additional Language papers, the Higher Grade paper had the most challenging questions; it was followed by the National Senior Certificate paper and then, with far fewer challenging questions, the Standard Grade paper. It should be noted, however, that while the questions and difficulty level of the passage for the National Senior Certificate were regarded as lower than those of the Higher Grade paper, the reading passage was considerably longer, thus requiring more reading during the examination. The evaluators also looked at the difficulty level of the passages for comprehension tests. They found that the Senior Certificate Higher Grade paper is the most difficult, followed by the National Senior Certificate paper, followed by the Senior Certificate Standard Grade paper. The passage in the Standard Grade paper was dramatically easier, with the difference between the other two papers being less marked.

As discussed above, a substantial component of reading in the Senior Certificate courses comprises literature, and a two-hour examination is written on literature, worth 100 marks for Higher Grade and 75 marks for Standard Grade. Two

[13] These percentages are approximate because, as discussed below, some variation was found across the different provincial education departments for the Senior Certificate examinations.

prescribed set works from different genres, as well as poetry, are examined. In addition, for Home Language one of the components of the CASS portfolio tests a task on a third set work which is from a different genre. By contrast, the second examination for Business English tests 'concise communication', proofreading, summary, and communication theory. The paper is worth 100 marks.

The syllabus for the Business English courses refers to reading both fiction and non-fiction and includes a list of suggested short-story collections, poetry anthologies and one-act plays, as discussed above. However, the examination does not assess prior knowledge of any particular literary texts but instead includes a single short story on which a series of short-answer comprehension questions is based. Familiarity with literary conventions would assist students to answer some questions. All of the other texts in the examination papers are taken from newspapers or magazines. In the NQF course packs, reading is limited to short texts focused on specific workplaces, a contents page, a single chapter or an edited version of an article.

In terms of the difficulty levels of the literature examination, the evaluators found the papers difficult to evaluate, arguing that a question could be very difficult for a learner who has not been taught the prescribed literature well but very easy for a learner who has been primed. In general they felt that about 60% of the Higher Grade paper consisted of questions at level 2, with about 35% at level 3, and almost no questions at level 1. They felt that the Standard Grade paper had many more level 1 questions, but did not quantify this. The Home Language papers encouraged reading and writing in a wider range of genres and 'at a somewhat more complex or sophisticated level' than the Additional Language papers, according to the analysis of the higher education evaluators. This higher level is most evident in relation to lexis and to register but also to the form of some of the examination questions: Questions in the literature paper require paragraph and essay-length answers and in some instances encourage students to develop an argument or to express and substantiate a particular position in relation to the question.

Many of the questions in the Business English course test recall of learned rules, instead of requiring meaningful involvement with language in a business setting. Critical awareness is understood only at the level of proofreading, editing for correctness or surface-level interpretation.

All evaluators agreed that the Senior Certificate course does not require sufficient reading, and that the Business English and NQF courses are entirely inadequate in this regard. They argued that in relation to 'lifelong learning' and workers' ability to

update themselves in theoretical aspects of their jobs, the Senior Certificate provides at least some basis for learners to master adequate reading skills. Further, while all of the courses under consideration do not significantly develop students' ability to read texts critically, this was seen to be a particular area of weakness in the Business English course.

Finding Thirteen
All Senior Certificate examinations—Home Language and Additional Language, and Higher and Standard Grade—tested more challenging language items than the corresponding Business English examinations.

For Home Language Paper One, in relation to language, the evaluators again found a clear hierarchy of challenge level in the papers, with the Higher Grade paper being the most challenging, followed by the Standard Grade paper, followed by the Business English paper. The Business English course had no questions at level 3 in terms of difficulty, and the vast majority (88%) of the questions were at level 1. By contrast, the Standard Grade paper, which is supposed to be equivalent to the Business English course, did contain approximately 50% of questions at level 2 and a few at level 1. The Senior Certificate Higher Grade language paper had 32% of its questions at level 3, 58% at level 2 and only 13% at level 1. The evaluators argued that it is clear that Business English expects a consistently lower standard from its learners. They felt that activities related to language in the workbooks for the NQF courses were mainly at difficulty level 2, although they found it hard to make judgements about these courses in the absence of any marking scheme and in the absence of any actual work by learners.

In the language section of the Additional Language papers, the evaluators argued that the questions in the Standard Grade paper were in general more difficult than those in the Business English paper. They found that not only were the questions in the Additional Language Business English course less challenging than the Additional Language Senior Certificate course, but a more limited range of items was tested. However, they felt this is partially compensated for by stricter marking of writing, whereby learners are penalized for language errors.

Finding Fourteen
While writing tasks in Business English is restricted to transactional writing, a far greater range of items is tested, because writing is tested through an examination. There are serious problems with the testing of writing through portfolios in the Senior Certificate courses.

The Senior Certificate courses prescribe and test the widest range of writing genres, although the lack of an examination dilutes this strength, as discussed below. The National Senior Certificate courses are more limited, and only include technical writing skills for specific purposes, although within this narrow range the Business English syllabus covers a comprehensive list of writing tasks and items, many of which are examined. However, this list includes mainly writing tasks that are simple, technicist, and short. While the Senior Certificate and National Senior Certificate courses are specific about the kinds of writing tasks they require, the NQF level four manuals offer a broad outline stressing complexity of themes, clear communication, and so on. The NQF level four modules focus on projects and report writing.

With regard to the testing of writing, the practitioner evaluators felt that this section of the Business English examination (Paper Two) asked questions mainly at level 2, a reasonably high level. They noted that Business English is the only course which tests writing in an examination, and they felt, therefore, that transactional writing is probably taught and tested to a higher standard than it is in the other English courses. The Additional Language evaluators argued that because of this the Business English course may even be a more appropriate course in terms of preparing learners for further study. The higher education evaluators agreed that the writings tasks for the Business English examination are well set, but disagreed that the Business English course prepares learners for further study, arguing that it fails to provide students with opportunities for sustained critical engagement with texts as either readers or writers. The Grade 12 Additional Language courses, they argued, also fall short of what they would consider a minimum, but do provide slightly more chances for the student to develop this than the Business English courses do.

One of the issues most strongly raised by both the Home Language and Additional Language evaluators was the fact that writing is tested through a portfolio in the Senior Certificate courses (except for part-time learners, who write a third paper). This made it difficult to compare the examined curricula of the Senior Certificate and the National Senior Certificate, as learners doing the latter course are assessed on writing in both final examination papers. Samples of portfolio work done by Senior Certificate learners were not available as data, and therefore it was difficult to understand properly the skills and abilities which are tested in this course.

Serious concerns were raised by both groups about the effect of this assessment approach on the teaching of writing. For the Additional Language portfolio, only two essays and two short pieces of writing are required. Drawing from their experience and not from research data, evaluators argued that, besides the problems of learners not writing their own work, this practice has led to teachers putting very

little emphasis onto the teaching of writing, with an under-emphasis on teaching of writing in general and also a narrowing of the kinds of writing being taught.

The Home Language evaluators argued that

> ... this may seem enlightened because it is common cause that examinations are artificial and not the best way to test writing ability, but in practice, the portfolio has led to less writing been taught and practised by Grade 12s. This is because portfolios need to be completed by August when preparatory examinations are written. The teaching year ends in the middle of the third term with the writing of preparatory examinations, and teachers who are under pressure, may easily teach only enough genres to satisfy portfolio requirements. If their learners were to write an examination in which any of a wide range of genres could be required, teachers would be required to ensure that learners were familiar with all these genres and would go on teaching and learners would go on practising the genres until the beginning of examinations.

Further, the kind of writing required by higher education is an optional rather than compulsory aspect of the portfolio. However, the Home Language literature examination (Paper Two) does require extended writing; the Additional Language Paper Two only requires short answers. It should be noted that the Department of Education has already made plans to change the policy on the assessment of writing to include writing in the examination again.

HIGHER EDUCATION PREPARATION

Finding Fifteen

The English Home Language courses are by far the most likely to prepare learners for degree study at higher education, although they also have shortcomings. The Business English courses as well as the Additional Language Standard Grade course are the least likely to prepare learners for higher education.

Writing in all but the Senior Certificate Home Language course, and to a lesser extent the Business English Home Language course, is limited to short, transactional pieces that do not prepare students for understanding a range of literacy practices or for the sustained writing tasks common to many disciplines of higher education.
In English, sustained engagement with a range of reading and writing practices is fundamental for preparation for higher education. In this area, it was clear that the Senior Certificate Home Language course prepares learners better than the other

courses, notwithstanding the problems with the assessment of writing. In particular, it is the only course in which the syllabus tries to develop capacity for sustained and complex arguments, and which focuses on cultivating independent thought and critique. Writing in the other courses is limited to short, transactional pieces that do not prepare students for understanding a range of literacy practices or for the sustained writing tasks common to many disciplines of higher education; the Business English Home Language course was seen as slightly broader than the Additional Language course. In Business English the genres of argument and exposition are absent from the writing requirements of the syllabus and examination, and there appears to be no requirement that a text longer than two or three pages be read for examination purposes. The NQF course packs contained a narrow theoretical component on communication and functional texts, which was unlikely to prepare learners for higher education.

However, even in Senior Certificate Home Language papers, evaluators found an oversimplification of text excerpts used as comprehension passages, and argued that there is still a need for increased and sustained activities across a range of reading and writing practices. In addition, the concerns raised about the writing portfolios, and the effect they have on the teaching of writing, are particularly important for higher education preparation, as, according to the higher education practitioners, sustained reading and writing tasks are at the heart of higher education preparedness.

The lack of sustained reading for the Business English courses and in the NQF course packs is another major factor preventing these courses from preparing learners for higher education, both in terms of the necessity for learners to be fluent and critical readers, and also because 'to learn the syntax of writing, learners need exposure to the syntax of writing, which they can only get from reading. A first step in promoting good writing is to promote reading' (English Home Language evaluators). The higher education evaluators argued that the inclusion of various literature set works in the Senior Certificate courses would develop in learners more advanced reading skills and possibly an interest in or familiarity with reading, and that the reading of a range of texts prepares learners for higher education because the texts are complex and of a reasonable length and linguistic complexity.

The Business English Additional Language syllabus excludes preparation for higher education as one of its aims, and indeed officially it and Standard Grade Additional Language do not give learners access to tertiary study. Evaluators confirmed that the content of the English Additional Language syllabus, together with assessment practices for this subject, are singularly inappropriate for preparing students for the study of other subjects, and that cognitive and proficiency demands in this subject

are low.

OTHER ISSUES RAISED BY THE EVALUATORS

The evaluators examined a small sample of learners' scripts. This did not lead them to revise their analysis of the relative standard of the papers discussed above, but did lead them to comment on a 'lack of ability to order thoughts and write logically, coherently, and clearly in answering comprehension questions' across the English courses. They argued that the poorest writing occurred in answers to the unseen poem in the literature paper for the Senior Certificate examinations and in the comprehension paper. This led them to think that the problem is primarily one of poor reading. Further, evaluators argued that markers 'bent over backwards' to find some 'correctness' in a learner's answer, and provided an example of a totally incoherent answer that had been marked correct.

A serious concern raised by the evaluators which made it difficult for them to answer the research question is that they found variations in the standard of papers for the Senior Certificate across provincial education departments, both in terms of the level of questions and the quality of the layout. While this is being addressed systemically through the move towards an increased number of papers being set nationally, it made it slightly more complicated for the evaluators to make judgements on the standard of the Senior Certificate relative to the National Senior Certificate courses.

The evaluators also felt that the marking of the Business English scripts was inaccurate. It must be emphasized that a small sample of scripts was examined and, as such, this finding is highly anecdotal. The evaluators argued that learners who did not use the same words as the marking memorandum, and indeed who did not itemize their answers in the way that the memorandum had itemized them, were penalized, even though their answer was in fact completely correct. Their conclusion, that being 'good' at English could disadvantage learners, raises alarm bells for Umalusi, and must be urgently addressed. A first priority should be to establish how widespread this problem is.

The higher education evaluators thought that the format of the examinations showed signs of efforts to construct 'marker-proof examinations', which meant a focus on format and surface-level correctness.

The Additional Language evaluators argued that the November Standard Grade Paper Two for KwaZulu/Natal was more difficult than the Higher Grade paper. While this was not the focus of the research, it is clearly a matter of concern. The Higher Grade/Standard Grade distinction is being done away with, but the ability of examiners and moderators to set questions which appropriately discriminate between different ability levels will be all-important.

DISCUSSION

Language is absolutely crucial for all other subjects; the findings are thus very disturbing. In a country in which most learners will learn in English as a second, third, or fourth language, effective teaching of English is vital. A focus on English is essential, not merely as a means of communication, but on sustained reading and writing, including argument and exposition. In the light of this, the contestation that emerged in the evaluators' reports with regard to understanding content in English is disturbing. In a country where the majority of learners need to learn English as a key tool for all their other subjects, English as a tool needs to be taken seriously in terms of curriculum design. Similarly, the disarray of syllabuses is cause for concern, and the outcomes-based approach contained in the new NQF courses is unlikely to assist. Focused attention must be paid to the development of appropriate English syllabuses, with considerable energy being directed to ensuring that the English Additional Language syllabus enables learners to learn their other subjects in English. Further, more thought needs to go into deciding what the appropriate differences between different English courses should be.

The findings in relation to reading are particularly worrying. It is urgent to find ways of ensuring that learners read in a sustained manner. Currently the only English courses which teach sustained reading to any degree are those with a literature component, and, as the English evaluators argued, reading for enjoyment is linked to mastery. Either literature needs to be included in all English syllabuses, or considerable energy will need to be expended to ensure that texts which are sufficiently lengthy to develop sustained reading are included in English courses and available in all institutions.

The findings with regard to the assessment of writing through portfolios are also worrying, but this is in fact already being addressed for the New NSC. However, it is important to note the unintended consequences of this particular innovation, as portfolios become a more prominent feature of our assessment system.

Finally, English was the one course in which course packs for NQF courses which are actually supposed to be equivalent were available. As such, the difficulties that evaluators had with these courses must be highlighted. The NQF was introduced as a mechanism to stabilize the education system and to bring standardization across different courses. However, it has in fact led to distortions. In courses where there is no syllabus, or where the syllabus is underspecified or a very broad outline, teachers will be over-dependent on textbooks. While in most subjects textbooks are crucial, and will always be used by teachers as a primary tool in their learning programme, a strong syllabus is necessary firstly to direct textbook writers, and secondly to enable teachers to use textbooks critically.

Chapter Six

6

Hospitality

Chapter Six describes the findings for the courses within the broad area of Hospitality at NQF level four which were examined as part of this research.

Two college courses were examined:

- National Senior Certificate: Catering Theory (N3 course)
- National Senior Certificate: Catering Practical (N3 course)

They were compared by a group of practitioners to one school subject:

- Senior Certificate: Hotel Keeping and Catering.

A group of higher education evaluators provided an analysis based both on the practitioners' report and the primary data. The findings below draw on both the practitioners' and the higher education experts' analyses.

EQUIVALENCE BETWEEN COURSES

Finding One
There are no formally equivalent courses in Hospitality across schools and colleges, although there is a great deal of common content in the courses.

The comparison between college and school subjects within the broad area of Hospitality was the least straightforward, as the subjects do not have a formal correspondence in the same way as the previous three subjects. The two subjects that have the most correspondence are Hotel Keeping and Catering (Senior Certificate) and Catering Theory and Catering Practical (National Senior Certificate). In schools, Hotel Keeping and Catering is taken by learners as one of their six subjects leading to a Senior Certificate. The other five subjects would be in totally different subject areas. In colleges, on the other hand, Catering Theory and Catering Practical form

two subjects out of a prescribed six-subject package leading to a National Senior Certificate. (The other courses are Life Orientation, Small Business Management and Entrepreneurship, Business English, and Sake Afrikaans.) The researchers focused on the Foods[14] content area as the one with significant similarities between schools and colleges.

TIME

Finding Two
The National Senior Certificate course is taught over a substantially longer period of time than the Senior Certificate courses.

The practitioner evaluators suggested that about 136 hours are spent on the theory course and 340 on the practical, for a total of 476 hours a year. This is the same for both N2 and N3. By contrast, the Senior Certificate course has approximately 108 hours of theory in Grades 10 and 11, and 60 in Grade 12, and should have approximately 40 hours of practical time in each of the three years; this makes a total of 148 hours of contact time in the first two years, and 100 in the last year. However, as discussed above, the practitioners felt that the time allocated to practical work in schools varies. Time is an issue only in terms of whether or not learners have sufficient opportunity to master the knowledge area in question. It is by no means clear that the longer time period in the college course is necessary, although clearly practical work is time-consuming.

THE INTENDED CURRICULUM: CONTENT

Finding Three
The syllabuses in both schools and colleges are in a state of disarray.

Analysis of courses within the broad Hospitality area was further complicated by what appears to be a high degree of disarray with regard to the syllabus. There are currently two Hospitality subjects which operate in schools, Home Economics and Hotel Keeping and Catering. The latter was initially introduced as a pilot into two targeted schools. For the purpose of the pilot a full syllabus was not developed, but merely an outline, to see whether or not such a subject was feasible in schools. The

[14] The syllabus refers to food types as commodities, a practice followed by the evaluators but not used in this report.

pilot was to last for three years, after which appropriate revisions were to be made. A full syllabus was never developed, in fact, although various other schools started to change from Home Economics to Hotel Keeping and Catering. The fact that this happened with no proper training for teachers in what was in various ways a new subject, and with no properly specified syllabus, is cause for grave concern. The incomplete syllabus has no directives about practical work, a major component of this subject. The practitioners argued, on the basis of their experience in the system, that this has lead to great confusion, the downgrading of practical work, and inconsistency in terms of how much time is spent on practical work. They also argued that there is no clear weighting of different areas within the syllabus.

Within this confusion, a new pilot programme was introduced into selected schools (three per province) in 2000-2001. This programme was, according to the practitioners, set on the basis of NQF outcomes or unit standards, and continuous assessment counted for 75% of the final mark. The theory examination at the end of Grade 12 was set at 100 marks, and the examination was supposed to be an overview only. All of these characteristics, together with the fact that, according to the practitioners, the outcomes were too vague, led to most schools pulling out of the programme. There are now six schools in the Western Cape and one in Gauteng on this programme.

There is thus considerable confusion about which subject should be offered and what should be taught. This is clearly a matter of serious concern and needs immediate attention, although the new National Senior Certificate will introduce three new subjects—Consumer Studies to replace Home Economics, and Hospitality Studies and Tourism to replace Hotel Keeping and Catering.

Finding Four

A broad overview of content shows that the single Senior Certificate subject is broader than the two National Senior Certificate subjects combined. The narrowness of the college courses may be appropriate given that the courses are Catering rather than Hospitality courses. However, there does not seem to be a corresponding balance in terms of depth in the syllabuses.

In terms of topics, the Senior Certificate course covers all the topics covered by the two National Senior Certificate courses, as well as having additional areas. The additional areas of the Senior Certificate course, which are entirely different from the National Senior Certificate course, are Front Office and Reception, Maintenance and Security, and Hotel Organization. In terms of breadth of content, the Senior Certificate course has approximately a third more content, and this additional content is of a different nature, as it focuses on the hotel industry as a whole as well

as some coverage of tourism. The focus of the National Senior Certificate is entirely on food services. However, this difference is appropriate, as the National Senior Certificate courses are catering courses, and not designed to be broad Hospitality courses.

Table 6.1: Broad overview of Hotel Keeping and Catering compared to Catering Theory and Catering Practical

Hotel Keeping and Catering		Catering Theory and Catering Practical	
Catering (60%)	Hospitality industry organization (10%)	Catering Theory	Terminology (10%)
			Foods (30%)
			South African wines (10%)
			Cultural eating patterns (10%)
			Large-scale catering (15%)
	Culinary studies (40%)		Functions, function planning, table service (15)
	Restaurant organization (10%)		Herbs and spices (5%)
	Beverages (10%)		Garnishing (5%)
		Catering Practical	Foods (50%)
			South African wines (7%)
			Large-scale catering (15%)
			Function, function planning, and table setting (16%)
			Flower or fruit arrangement (5%)
			Butter icing (7%)
Hotel-keeping (40%)	Front Office and Reception (10%)		
	Maintenance and Security (10%)		
	Hotel Organization (10%)		

Finding Five
The bulk of the content of both the National Senior Certificate courses and the Senior Certificate course consists of food preparation, and in this area the courses have similar content, although the National Senior Certificate course has more time for practical work.

For the purpose of this research, the comparison focused on the common areas of the syllabus, which is indeed the major component of the school syllabus—the area of catering. The evaluators felt that both the two-year N2 and N3 programme and the three-year Senior Certificate programme should be regarded as continuous courses. (Indeed, they even argued that the Senior Certificate programme should be

seen as a five-year programme, including Grades 8 and 9). However, the work covered in the N2 syllabus is not directly tested in the final N3 examination, but it is seen as necessary to prepare for it. Similarly, the Grades 10 and 11 syllabuses are not directly examined in the final Senior Certificate examination, although the knowledge and skills acquired in the earlier grades is regarded as essential for what is finally taught and tested in Grade 12. In all subjects the work done in earlier grades contributes essential building blocks to work done in later grades, but, for the purpose of this research, the two final-year courses are seen as comparable, and are the units of analysis given that they are the basis of the final examination. Table 6.2 thus shows the key content areas for the catering component of the Grade 12 Senior Certificate course with the N3 National Senior Certificate course.

Table 6.2: Comparison of Foods component of Hotel Keeping and Catering and Catering Theory and Catering Practical

Hotel Keeping and Catering	Catering Theory and Catering Practical
Theory	Theory
Hors d'oeuvres	Appetizers and entrees
Sauces	Stocks, soups, and sauces
Meat	Meat
Vegetables and salads	
Desserts—gelatine and cold desserts	Gelatine
Pastry, yeast products	Flour mixtures
Traditional cookery—dishes from various countries	Cultural eating habits
Practical	Practical
Wine and beer	South African wines
Cereals and pasta	Cereals and pasta
Beverages	Beverages
Meat	Meat
Fish	Fish
Poultry	Poultry
Fruit, salad, and vegetables	Fruit, salad, and vegetables
Eggs	Eggs
Milk	Milk
Cheese	Cheese
Seafood	Seafood
Desserts and baked products	Desserts and baked products
Restaurant organization	Large-scale catering
Flower or fruit arrangements	Flower or fruit arrangements
	Butter icing
(taught in Grade 11)	Herbs and spices
(taught in Grades 8 + 9)	Garnishing

It appears that considerably more practical work is done in the National Senior Certificate course, even though this is not tested in the final examination, as discussed below. The N3 Catering Practical course includes eight weeks of practical in-service training 'at identified and approved institutions under the guidance of professional people and according to a prescribed work schedule and evaluation form'.

Nonetheless, one of the evaluators, based in a school, was adamant that at the end of the Senior Certificate course learners know as much about how to prepare food items as learners on the National Senior Certificate courses. From the syllabus documents, it is not possible to make any judgements about the depth of knowledge required—items are simply listed.

There is some confusion about the terms 'theory' and 'practical' in this area, particularly in the college syllabus. The Catering Theory syllabus stipulates that learners must do theoretical and practical work. Practical is defined as the application of the theory learned. As per the syllabus, this means things like collecting and drawing up menus with French terms. Theory, in this instance, means explaining menus and naming common French terms. With regard to food preparation, the practical component is described as 'practical implementation of use of commodities' which means preparing and cooking different food types. With regard to South African wines, the practical component involves identifying, classifying, and serving wine. For Cultural Eating Patterns, practical is explained as 'Students must study and implement cultural eating habits'. For Large-scale Catering and Function Planning and Table Service, the practical component involves 'practical implementation of large-scale catering'. For Herbs and Spices, it is making a collection of herbs and spices, and for Garnishing, it is preparing and serving garnishes.

The main focus of the content in the National Senior Certificate course is the knowledge and skills needed to plan and execute functions for large numbers of people. The course focuses on preparing different foods and setting up function areas. Little attention is paid to serving. By contrast, where learners on the Senior Certificate course learn similar content with regard to preparation of food, there is considerable focus of the serving of food.

Finding Six
In terms of content specified in the syllabuses, none of the courses focus on conceptual development.

Both types of courses, the practitioners argue, aim to prepare learners to function competently in the workplace. The emphasis is on the mastery of specific knowledge and skills.

The practitioners argued that in both schools and colleges the respective courses are highly dependent on one specific textbook. It would appear that this is the mechanism which is currently filling the space of a syllabus, given the problems described above. However, it must be seriously questioned whether the national Department of Education wants textbook writers to be the key determiners of what is taught—an inevitable situation when teachers are uncertain of the boundaries and weighting of their subject, and when the syllabus is very underspecified.

THE EXAMINED CURRICULUM: CONTENT AND COGNITIVE CHALLENGE

The Senior Certificate subject, Hotel Keeping and Catering, is examined through a three-hour theory paper and an eight-hour practical examination. The National Senior Certificate subject is examined through a three-hour paper for Catering Theory worth 300 marks and a three-hour written paper for Catering Practical worth 300 marks. The syllabus for Catering Theory stipulates that the class mark must be composed of 80% theory and 20% practical. The Catering Practical has an internal evaluation component which consists of 40% weekly evaluation during practicals, 40% practical assignments and functions, and 30% in-service training assignments. The year mark counts for 60% and the examination for 40% of the final mark. The syllabus specifies that the examination is open book, and emphasizes elements of practical work assignments. It includes things like costing menus, setting out work schedules, explaining basic cooking techniques and definitions, and so on.

The Hospitality evaluators developed a three-point scale with which to evaluate levels of cognitive complexity. Level 1 was defined as requiring 'simple recall, often illustrated by the fact that the answer could be found in precisely the asked for form in the textbook', and the information required no transformation, nor was the learner asked to relate it to any other information. Level 2 was seen as more difficult, and was generally applied to questions which were more complex and involved more than one kind of task (such as identify and calculate, compare and contrast, and so on). Level 3 was defined as application of information, and was not found in any of the question papers. The evaluators provided the following examples:

Level 1:

(i) One of the following is NOT classified as a white wine:
A: Sauvignon Blanc
B: Chardonnay
C: Cabernet Sauvignon
D: Rhine Riesling

(ii) Name any FOUR types of appetizers

Level 2:

(i) Dry cuts of meat can be barded or larded to prevent it (sic) from becoming too dry. Explain the difference between these two terms.
(ii) Differentiate between a franchise and a chain group.

Level 3:

(i) South African cuisine is often described as a fusion of colours and flavours, representing all the different ethnic groups which contributed to our heritage. Compile an interesting THREE-course menu which represents this eating style. Write the menu in the answer book. (10 marks)

Careful comparisons developed by the practitioner evaluators demonstrate that there is a reasonable correspondence between weighting of areas of content in the syllabus and in the examination for each course. There is some variation, but not sufficient to cause a syllabus area not to be taught, or to be inappropriately emphasized or neglected.

Finding Seven
All the examination papers have few questions at a challenging level. The National Senior Certificate Catering Practical paper has the highest number of challenging questions. In general the Hospitality examinations depend on recall of lists of facts, and are very superficial.

In general, evaluators felt that there were few questions at level 3, with the exception of the Catering Practical paper. This paper was seen to be the most challenging. Approximately 70% of the paper was argued to be testing application, although the evaluators only rated 15 items at level 3, with 25 at level 1 and one at level 2.

Evaluators argued anecdotally that learners struggle with this paper, and dramatic upward adjustments are made. This is not the case, in fact, as scores have not been statistically adjusted at all by Umalusi over the past few years, as the cohorts of learners have been too small. It is possible that markers compensate for what they perceive to be difficult questions, but there was no way of confirming this in the current research.

Both the Catering Theory and the Hotel Keeping and Catering examinations contained predominantly items rated at level 1 (278 marks for the former and 65 items for the latter), with a minimal portion at level 2 (eight marks for the former and 15 items for the latter), and no items rated at level 3 for the Hotel Keeping and Catering examination, with 14 marks at this level for Catering Theory. In general, it was argued that these examinations depend on recall of lists of facts, and are very superficial.

HIGHER EDUCATION PREPARATION

Finding Eight
Neither the Senior Certificate nor the National Senior Certificate course prepare learners for degree study at higher education. They could, however, prepare learners for other programmes in higher education.

The analysis of the limited nature of the examination questions in both Hospitality subjects shows clearly that in important ways neither the school course nor the college course prepare learners for higher education study. While recall is important for many if not all subjects in higher education, the recall tested in these subjects tends to be simple and unchallenging. It seems, therefore, from the range of knowledge required and the type of questions set, that these courses do not prepare learners well for the range of practices that are generally required for higher education. This is particularly of concern because learners who take this as one subject among six at a school are also very unlikely to be prepared for the workplace at the end of this programme.

One subject in this broad area of study in the new National Senior Certificate, Consumer Studies, has been added to the list of designated subjects for entrance to degree study. Whether this subject is substantively more challenging than the courses analyzed in this research is a matter for further research. Curriculum design for that subject will be important, because if a subject is perceived to be easy, but is also on the list of subjects which lead to degree study, is will have appeal to a large number

of learners. The courses which will replace the courses in this study will not be on the designated list of subjects leading to degree study—learners who take these subjects and want to proceed to degree study in higher education will have to take four other subjects which are on the list. However, this does not mean that curriculum design in the subjects which are not on the degree study list is not important, as these subjects should be able to prepare learners for further study in other higher education programmes, which they do not do at present.

With regard to formal entrance requirements, there is some articulation with the college Hospitality course and higher education programmes in Hospitality. Students with the National Certificate in Food Services can currently obtain entrance to B. Tech degrees at universities of technology or comprehensive universities.

The higher education evaluators argued, however, that the University of Venda, together with the Education Institute for Service Subjects (EISS, a private provider) offer a B.Com. (Hospitality Management), for entrance to which Home Economics is regarded favourably.

The higher education evaluators also argued, on the basis of their own experience, that Hotel Keeping and Catering could prepare learners for a National Diploma in universities of technology or comprehensive universities. However, they also pointed out that all such courses assume no prior knowledge of the subject area, and that within approximately two months learners who have not done Hotel Keeping and Catering would catch up with those who have. This begs the question of what value this subject really provide for learners. Learners who have passed Catering Theory and Catering Practical at college would have a National Senior Certificate in Food Service, and, in the experience of the evaluators, are better prepared in terms of their knowledge of the industry and their practical experience. However, they argued that in general such students are not prepared adequately in terms of cognitive skills. They accounted for this by arguing that such courses are taken by learners who are not 'university material'.

DISCUSSION

It is clear that significant upward movement in complexity and challenge is required in both subjects. In addition, there needs to be greater co-ordination in curriculum design between colleges and schools—this subject highlights the problem because learners often go from school to college and spend a lot of time and money learning essentially the same content and skills. More thought needs to be given to the

relationship between courses if there is to be movement between institutions, to avoid unnecessary time wastage. Umalusi should also consider getting the same moderators to work across colleges and schools in this subject area.

The state of the Hospitality syllabuses highlights the danger of allowing syllabus neglect, whereby something which was meant to be an interim or pilot tool becomes entrenched.

The analysis of whether or not the current courses within the Hospitality area prepare learners for higher education and, particularly, for degree study highlights the need for other kinds of post-secondary education. While such courses may prepare learners for some types of certificates or diplomas in universities of technology or comprehensive universities, there also seems to be a need for post-secondary study which is not higher education. While the idea of the NQF and upward mobility for learners is important, it is also at times important for learners to be able to learn more at the same level.

Chapter Seven

7

Common findings and discussion

The research only examined a limited amount of data, as described above. However, as the English higher education evaluators argued,

> Naturally any curriculum encompasses far more than documents, but the teaching and learning practices underpinning these courses have to be assumed as they have not been directly observed. However, it is well documented that the washback effect of assessment is such that it strongly influences what selections of knowledge, skills, values and practices are taught and how they are taught. 'The assessment tail wags the curriculum dog', or to put it less colloquially, Rowntree (1987, p. 1) tells us 'if we want to discover the truth about an educational system, we must look into its assessment procedures...the spirit and style of student assessment defines the de facto curriculum.

The evaluators were able to develop some understanding of the enacted curriculum for those subjects for which they had summative examination papers—in other words, all except the NQF level four subjects. Certain clear trends emerged:

- The college subjects (National Senior Certificate subjects) in the study do not prepare learners for degree study in higher education.
- Syllabuses are in most cases inadequate in form and content—important areas are left out or dealt with in insufficient depth, and content areas are not integrated appropriately. This is the case in all National Senior Certificate courses in the study, as well as some Senior Certificate courses.
- Examinations are not sufficiently differentiated, and there are far too few questions which are challenging.

It is worth noting that part of what made this research difficult, and in some senses inevitably incomplete, is the fact that each course is part of a total package. The location of the course within this package affects the role that the course plays in the

development of the learner. The standard of the qualification obtained is a product of the combination of the different subjects taken; the subjects should not only be looked at in their own right. The vast majority of learners writing the Senior Certificate are studying six subjects at the same time. In general these subjects are part of a three-year programme—what is examined in the final examination is taught over the second and third years, with the first year in most cases laying the basis for the next ones. Learners writing N3 Engineering in colleges might study for only one year in total, taking four subjects done in a series of three trimesters each (for N1, N2, and N3 respectively). The final examination for N3 is based on the last trimester only. Learners studying for the National Senior Certificate usually do six subjects over two years; the final examination is often based on the Grade Eleven syllabus as well as the Grade Twelve syllabus, and sometimes even tests items taught in Grade Ten, although in some subjects only the Grade Twelve syllabus is explicitly tested. Obviously, for the National Senior Certificate, the National Certificate, and the Senior Certificate, the knowledge tested in the final year is accumulative, and builds on knowledge and abilities taught in earlier courses.

A number of other common trends emerged in the evaluation of the different subjects, and these are discussed below.

JUDGING STANDARDS AND EQUIVALENCE: LEVELS OF COGNITIVE CHALLENGE

In 2004 Umalusi conducted an Investigation into the Senior Certificate Examination, and noted that

> The question of assessing standards is not a simple one. Standards mean different things to different people. They can refer to benchmarked norms and standards of assessment, statistical standardisation procedures, or standards defined as part of a curriculum. More popularly, standards refer to a commonly accepted level of performance. Furthermore, what is commonly accepted may also vary across time and space. A high standard for one person may be a low standard for another, and what was at one time considered a high standard may in another be considered a low standard. Who defines standards for whom is another critical question. Standards are defined in the context of social and cultural norms that are considered appropriate by some and inappropriate by others. The influence of context in the definition and achievement of standards is also crucial (Umalusi, 2004:ix).

In the 2004 research, Umalusi undertook an investigation to come to grips with the changing nature and character of the matriculation examination as it has been set, assessed and moderated. The approach used in that research worked with a notion of standards in education that derives from the breadth of the curriculum, as well as the depth with which topics are learned and the levels of cognitive challenge that are expected from learners in examinations. Descriptions of areas of subject content are key in terms of understanding the breadth of the subject taught.

In this current research project, Umalusi drew on the approach developed in the 2004 research in terms of understanding the relative standard of an examination, to attempt to come to grips with the relative standard of subjects which were designed for different institutions and different learning pathways. As with the previous research, this current research project assumed that educational standards relate to levels of difficulty as well as breadth of content and concepts taught and assessed, and that levels of difficulty can best be described in subject-specific terms. As described above, the current research used a set of categories (content specification, key concepts and procedures, and outcomes) with which to make sense of subjects, and scales of levels of cognitive challenge within the categories. The latter were developed per subject by the subject evaluators, who drew on the syllabus and assessment specifications to develop these scales. This means that the same scale was not used across the subjects—some of the evaluators used a three, some a four, and some a five-point scale in terms of judging levels of difficulty. Because the focus of the research was on comparisons within subject areas and not between subjects, and because meaningful descriptions of levels of cognitive challenge need to relate to the content of the subject at hand, it was decided that it was appropriate for each group of evaluators to decide on a scale appropriate to their subject area. For one subject, memorization of large amounts of information may be important, and not for another. A problem with using different scales, however, proved to be that the evaluations operated at different levels of nuance and sophistication: The most sophisticated approach was developed by the higher education Science group. Another problem with this approach was that the scales were not comparable to each other—a level 3 in hospitality is clearly not the same as a level 3 in English. Thus, a detailed comparison of the numbers of questions at specific levels across subjects would be meaningless. However, general comparisons can be made, once the subjects have been described and analyzed in their own terms.

Judgements about the standard of examinations are not straightforward, but this and the 2004 research have developed useful tools, which need to be consolidated in our education system. While this type of process will always rely on subject experts, tools which make categories, criteria, and scales as explicit as possible will be useful

in ensuring some degree of standardization across individual judgements. Such tools can also be used to improve the cognitive demand of question papers, as well as to evaluate the usefulness of syllabuses.

Some of the evaluators in this research argued that judgements about difficulty levels could not always be made in a vacuum. For example, the English Home Language evaluators argued that a question could be very difficult for a learner who has not been taught the prescribed literature but easier for well-taught learners.

In their report, the Mathematics evaluators similarly argued that

> ... candidates do not always do best on questions classified as level 1. A case in point is that candidates are often unable to reproduce the proofs of theorems in the Euclidean Geometry section of the Senior Certificate curriculum (which is not included in the N3 curriculum). Some teachers put this down to lack of application by the pupils, whilst others believe that the cognitive demands of learning proofs which contain some fairly complex concepts and logical arguments, are beyond many/most Standard Grade candidates. It was also clear from this research that not a single Senior Certificate (Standard Grade) candidate (in the batch of scripts examined) was able to cope with the routine question (rated level 2) requiring candidates to determine the maximum area that can be enclosed with a specified length of fencing (question 9).

This analysis is problematic. Examinations must be developed against syllabuses, and the level of difficulty of an examination must be judged by whether the knowledge and skills specified in the syllabus are tested appropriately. Nonetheless, it is the case that judgements about the validity of learners' responses (whether learners have in fact mastered the desired knowledge and skills) are undermined by predictability. A question that is unexpected, and tests the application of a mathematical concept in a new context, could, the following year, only test ability to apply a procedure in a known context. Similarly, the Hospitality evaluators argued that while a level 3 question might seem to be challenging, since it appears as if learners are being asked to bring together different pieces of information, in fact the learner could have easily anticipated and prepared the entire answer beforehand, as it is explicitly dealt with in the textbook.

This research has highlighted two factors which have lead to increased predictability in the South African system: rigid and limited examination formats in some of the National Senior Certificate courses, and syllabus stagnation.

CONTENT SPECIFICATION, AIMS AND OUTCOMES

Notwithstanding the preoccupation with outcomes that has characterized educational reform in South Africa, this category did not prove to be a significant one for the purposes of the research. The syllabuses generally stated broad aims and objectives, while the NQF course packs were designed specifically against lists of outcome statements in unit standards. However, the evaluators were not able to make meaningful judgements on the basis of either of these.

Some of the evaluators felt, and argued in their reports, that the 'equivalence' in terms of content could not be meaningfully commented on if the subjects did not seek to achieve the same outcomes. On the other hand, their analysis reveals that in places, where subjects did have the same explicit outcomes, the subjects were not equivalent because of how those outcomes had been translated into syllabuses and examinations. Others argued for a focus on equivalence in terms of the complexity of the practices being developed, and in terms of the extent to which the courses prepared learners for higher education.

The relationship between courses and course aims or outcomes appears to be a complex one. The Senior Certificate course and the National Senior Certificate course have significantly different aims, the latter focusing on students taking 'their place in the community' and functioning 'productively in their working environment', while the aims of the Senior Certificate are broader and talk about such things as 'developing the learner as a whole person'. Because of this, the focus of the National Senior Certificate course is on specific skills thought to be required in a business environment and, as such, it is a much narrower course. For example, the learning objective in the National Senior Certificate course in relation to punctuation is to 'use punctuation that is appropriate to the meaning and correct', whereas in the Senior Certificate course the first objective in relation to punctuation is 'manipulating punctuation for different effects in their own writing.' Because the Senior Certificate course is broader, it is more likely to produce learners who can be lifelong learners, and who are able to learn in and for the workplace, despite this being the explicit aim of the other certificate. The absence of sustained reading due to the lack of prescribed literature in the Business English and NQF courses mean that these courses are unlikely to meet their aims of enabling learners to function productively in a working environment. The higher education evaluators questioned the extent to which preparation for higher education is different to preparation for a vocation or society at large, and argued that the ability to critically engage with a range of texts across genres and modes seems essential to all life paths in modern society. As such, developing the course with a very narrow aim in mind seems to

have had a counter-productive effect. The evaluators also argued that the Senior Certificate courses are more likely to develop entrepreneurial skills in learners, because the literature component as well as the creative writing encourage creativity and lateral thinking; they argue that there is no evidence in the Business English or NQF courses of anything that teaches learners to think laterally, creatively, or conceptually.

Further, the English evaluators who analyzed the NQF courses argued that the learning materials did not meet the requirements of the unit standards. Furthermore, these course materials were not prescribed, and in fact emphasized that teachers should select aspects to use with their learners. This creates even less of a basis of any notion of standardized courses, and therefore of any possibility to speak of the competences which learners have attained. What is clear from this research is that outcome statements need to be located within content in order to mean anything.

Further, it is clear that well-developed syllabuses are an essential tool in a national education system. Without clear syllabuses, teachers are wholly dependent on examinations and textbooks. Of course, both of these mechanisms will always be influential in any teaching programme, but teachers must have some guidance which is broader than these, and which allows critical engagement with textbooks where necessary. In addition, clear syllabuses are essential in order for textbook writers and examiners to do their work: The absence of a clear syllabus means that textbook writers will make choices that curriculum designers should in fact be making in terms of the content which will be mastered.

HIGHER EDUCATION PREPARATION

The research did not concentrate on official requirements for higher education entrance, but rather on whether or not the courses prepared learners for the kinds of practices, skills, and abilities that would be expected of them in higher education, both in the specific subjects and more generally. However, various members of the evaluation teams did comment on official higher education entrance requirements, and on specific agreements which had been entered into between specific colleges and universities of technology. Obviously, this area is very problematic as higher education is not monolithic. Clearly, for example, requirements for a degree programme in general may be different than those for a specific Mathematics degree, and a Mathematics course which does not prepare learners adequately for the latter might play a role in building some general abilities which are required for the former.

Precisely because of this complexity, higher education evaluators were chosen specifically on the basis of their having been involved in benchmarking and entrance tests, as we hoped that they would have a good understanding of the general types of skills and abilities which are required by higher education in general, and would be able to make judgements about whether or not the courses at hand were likely to build such skills and abilities in learners. In addition, each group of higher education evaluators included experts from both traditional universities and universities of technology or comprehensive universities. We did not start, however, either with the official requirements of institutions and programmes, or with an official list or evidence of what higher education does in fact require.

This research was specifically concerned with which courses could enable learners to proceed to universities (including traditional universities, universities of technology, and comprehensive universities). The subjects were not evaluated against their ability to prepare learners for 'further study' per se. Including this would have made the research unmanageably complicated, as there are various courses, including N4 courses, which are considered to be 'higher education' because they are at NQF level five. It is possible, however, that given the nature of the knowledge and skill domain of some vocational subjects, they may in fact never lead learners to a qualification above level five. As such, articulation with level five qualifications would be important, and equally important would be clear information for learners about the potential for further study. This is a matter which policy formulators need to consider further.

The broader package of the qualifications that learners are obtaining also needs to be considered. The vast majority of learners taking one of the four school subjects discussed in this study will be taking the subject as part of a package of six subjects. Learners taking Business English will be taking it as part of a package of six vocational subjects. Learners taking N3 Mathematics and Science may or may not be doing an English course; they may only be doing four engineering subjects. Learners taking Catering Theory and Catering Practical in a college do so as part of a six-subject Hospitality package. This point is important. It could be possible, for example, for a course which provides training in memorization and organization of knowledge in an area like Hospitality, without any conceptual or abstract thinking, to play some role in preparing learners for higher education, if the other courses that learners are taking develop the other skills and abilities required. The question for policy makers then becomes—could this course be a legitimate inclusion in a package of subjects, which together will prepare a learner for higher education?

In addition, the research highlighted that it is sometimes necessary for learners to be able to learn more after secondary school, without necessarily going on to higher education. The introduction of the NQF in South Africa may have obscured the need for post-secondary education which is not higher education.

Chapter Eight

8

Additional issues raised by the research

Various issues not directly related to the research questions came to the fore during the research process. As these issues are important for Umalusi and/or the Department of Education to note, they are listed here.

- The English Home Language practitioners argued anecdotally that less reading is currently being done in the Home Language courses, because of an increased assessment load that has been introduced with outcomes-based education. This is cause for concern.

- In general there appears to have been neglect of syllabuses within the South African education system. This is of particular concern given well-documented problems lack of subject proficiency in many of our teachers, as well as the fact that designing good curricula in vocational programmes is inherently complicated. The move towards outcomes-based qualifications seems to have aggravated this situation, as it has caused less energy to be put into syllabus design, when in fact what was needed was considerably more energy.

- This research also highlighted that attention needs to be paid not only to the content of the syllabus and the examination, but also to the form of the syllabus. All subject evaluators raised problems with form. In English, there is similarly no clear direction in English Home Language, as there has been no formal syllabus to replace the old ones. This creates an over-reliance on the examination, and also could seriously disadvantage weaker teachers, and hence their learners. In Mathematics, the evaluators felt that the syllabus is inappropriately packaged into content areas, without sufficient linkage between areas and without sufficient engagement of skills and abilities throughout all content areas. This seems to reduce the possibility that learners will understand the relationship between content areas and build a sense of how different content areas fit into the broader subject. In Hospitality, the school syllabus seems to be in disarray, but to the

extent that it does exist, it seems to simply consist of a long list of details to be learned. All of these problems have created increasing reliance on textbooks, which is of concern particularly where the textbooks themselves are weak. Finding the appropriate form, as well as appropriate balance between prescription and innovation, is a serious challenge for the South African education system.

- The problem described above is particularly a problem for courses based only on unit standards or specified outcomes. The NQF courses were found to be totally underspecified. It was impossible for evaluators to make any judgements on the standards of the courses based on the unit standards alone. The English Home Language practitioners argued that

> The NQF in terms of its outcomes has the potential to demand a higher standard in terms of "competence" than is presently held by National Certificate. The problem is that there is no way of standardizing assessment at the present time; nor of ensuring that all outcomes are in fact covered by the choices made by the provider in his/her learning material development.

- How much more difficult would it be, then, for educators to design courses on this basis? It is impossible to have standardized assessment if there is no prescribed syllabus, but it is very difficult to ensure some degree of standardization in what is learned without standardized assessment, in a country of great educational inequalities.

- Related to this is the importance in vocational education of the development of appropriate forms of external assessment of practical subjects or practical components of subjects. Currently there appears to be very little if any standardization of practical assessment, with the result that learners could be learning vastly different things in different colleges.

- Evaluators in the Mathematics, Science, and English groups felt that there was a degree of contradiction between their findings in the research and their everyday experience. Although their findings were that the Senior Certificate subjects on both Higher Grade and Standard Grade are generally of a higher standard than the college subjects, learners who enrol for these subjects at colleges have often already passed Matric (in other words, the more challenging subjects), but struggle in the college subjects. In general the learners concerned would be those at the very bottom of the achievement ranking within the cohort of learners who passed the Senior Certificate. This is worth noting in light of arguments by

Stumpf and Foxcroft (2005) that at lower levels of achievement the Senior Certificate does not seem to be a very reliable predictor of success in higher education. It points to a possibility that while the examinations as a whole may be of a higher standard for the Senior Certificate courses, learners may be passing these courses without having mastered sufficient key content and skills.

- Some papers and marking memoranda were found to be poorly proofread. This is something which Umalusi must address urgently. For example, the English Home Language practitioners found a question on a Wordsworth poem which asked the learners how Milton felt about the subject at hand.

- CASS moderation is another issue which Umalusi needs to address. There is insufficient specification in some syllabus documents on the composition of CASS marks. In addition, the experience of the English writing portfolio shows how a well-intentioned policy intervention can have unintended consequences. Umalusi may need to conduct further research to understand the effect that CASS is having on the system.

- The Mathematics evaluators pointed out that while the Senior Certificate examinations are set by panels of examiners, the N3 examinations tend to be set by a single examiner. This seems to be a reflection of ongoing neglect of vocational courses, and needs to be addressed.

- It is a concern that the English Home Language examinations seem to differ in standard from province to province, both in the level of questions and in the quality of layout. For example, the evaluators felt that the layout in the Limpopo examination was not reader-friendly, the essay question on the Shakespearean play was unfocused and poorly conceived, and the language questions focused on detailed grammar rather than on language in action as happens in the other provinces.

- It is a concern that from the small sample of Business English scripts examined the marking appeared to be very inadequate. Further research should be undertaken to determine the extent of this problem, and Umalusi should consider how it can improve the quality assurance of marking.

Chapter Nine

9

Recommendations

STANDARDIZATION

Recommendation One
Umalusi must urgently consolidate common tools for evaluating the levels of cognitive challenge of examinations and syllabuses. These could be based on the four levels of challenge contained in the new National Senior Certificate curricula, but would need to be further developed for each subject.

Both the Investigation into the Senior Certificate Examination (Umalusi, 2004) and this current research have developed useful scales for judgement. In this project, a strong argument was made for the necessity of subject-specific scales. Nonetheless, Umalusi does need to ensure some consistency across subjects. Umalusi should, therefore, develop clearer categories and criteria for judging syllabuses, as well as a generic scale of cognitive challenge for judging examinations, which subject experts can customize appropriately for their respective subjects.

It seems that there should be greater standardization in terms of what a syllabus should look like across subjects, what should be specified, in how much detail, and so on. Related to this, Umalusi needs to develop tools and processes for evaluating syllabuses. This will be essential if Umalusi is to fulfil its legal obligation to monitor the suitability and adequacy of qualifications and standards.

The old syllabuses varied in quality, both in form and content. To some extent in the old system some of the syllabuses showed how to teach and integrate the various knowledge and skill areas being taught, and included the key content and conceptual areas of the subject, while others did not include sufficient content, did not expect it to be mastered at an appropriate level of depth, or itemized content in an inappropriate manner. However, the tool which was introduced to improve this situation—directing learning through the specification of learning outcomes—does not appear to be workable. Teachers on the new National Senior Certificate will be

confronted with a dramatically larger amount of documentation than in the previous syllabuses. There are three substantive documents for each subject:

- a subject curriculum statement, which contains learning outcomes and a brief overview of content;
- a learning programme guideline some 60 pages long which contains advice to teachers on developing learning programmes, with analysis of the role of the subject, as well as suggestions and advice about planning, formats for lesson plans and other documents; and
- assessment guidelines, a 20-40 page document, much of which is generic across subjects, and which tells educators the number of assessments which must be conducted in Grades 10, 11, and 12, as well as the form of these assessments, and advice and guidance to teachers on various aspects of assessing in this subject.

The form and content of new subjects in colleges is still not clear. Umalusi will, however, urgently have to engage with this matter.

Recommendation Two
Umalusi's decision to issue certificates only to courses with external examinations is vindicated by this research.

It is important to note that the standards across the different courses are very different, even when the moderation is done within the same organization and there are external examinations. Evaluators were unable to make any judgements about courses written in terms of outcome statements alone. This sends a strong signal in terms of what kinds of assessment systems and quality assurance mechanisms are necessary if standardization or equivalence are felt to be desirable.

Recommendation Three
The predictability of examinations needs to be dealt with urgently.

FUTURE CURRICULUM DEVELOPMENT

Recommendation Four
Considerable effort needs to be expended in curriculum design: specifically, in designing stronger, user-friendly syllabuses and examinations with an appropriate mix of levels of cognitive challenge.

Recommendation Five

More thought should be expended in deciding on what the appropriate differences between school and college subjects should be. There should be more co-ordination in curriculum design and moderation across these institutions.

Recommendation Six

The subject reports contain useful suggestions and insights for future curriculum development in these subject areas, and should be utilized.

Recommendation Seven

English is a particular concern. Focused attention must be paid to the development of appropriate English syllabuses, with considerable energy being directed to ensuring that the English Additional Language syllabus enables learners to learn their other subjects in English. More thought needs to go into deciding what the appropriate differences between different English courses are. Either literature needs to be included in all English syllabuses, or considerable energy will need to be expended in ensuring that texts which are sufficiently lengthy to develop sustained reading skills are included in English courses and available in all institutions.

Probably the strongest message coming from this research is that South Africa must pay urgent attention to curriculum development, particularly in vocational programmes. Various recommendations were made for the curriculum development in the new National Senior Certificate as well as future programmes for colleges.

In terms of Hospitality subjects, the current reliance on lists of facts and superficial recall of these in an atomized manner is of urgent concern. The general level of cognitive challenge needs to be raised, and the new subject must include more authentic and comprehensive knowledge of the hospitality industry. In addition, there should be a greater spread of difficulty levels in questions. Possibly the inclusion of more social studies, such as history and geography, could be used to raise the standard of this subject. The standard of assessment will need to be raised. Essential will be the upgrading of educators' knowledge and skills. In terms of timetabling in schools, effort should be made to enable learners to do Hospitality subjects as well as subjects such as Science and Mathematics. Evaluators also argued that learners needed better numeracy and language skills. Future Hospitality courses should place more emphasis on principles and less on procedures. They also argued that the college courses should be more standardized—there is too much variation across institutions.

With regard to English, the higher education evaluators suggested that a curriculum which makes the literacy practices expected of students more explicit will help students to understand what it is that they have to master in English courses. There is clearly a crisis around reading in the English syllabuses—the evaluation pointed to the very small amount of reading done and to incoherent answers on questions testing reading.

With regard to Physical Science, evaluators suggested that future curricula should include more applications of knowledge in everyday life contexts and problem solving in novel contexts in order for learners to appreciate the relevance of the material being learned, and hence enable them to engage with it at a deeper level. They felt that the syllabus which does this the least well currently is the Senior Certificate Standard Grade. However, while the N3 syllabus is more applied, this application is very limited (generally to industrial contexts). A wider range of contexts would be beneficial. In addition, context-specific industrial applications without the development of principled, deep conceptual knowledge are unlikely to develop skills that are transferable across contexts. The evaluators recommended a more conceptual approach to learning, which they felt was not possible in the current Senior Certificate syllabuses because of the breadth of content knowledge required. They therefore suggested that fewer content topics be covered but in greater conceptual depth, with explicit emphasis placed on the development of sound understanding and competencies. For National Senior Certificate and National Certificate courses, however, this will require that more time is allocated to the course. Greater emphasis in all Science programmes should be placed on developing practical laboratory skills.

QUALITY ASSURANCE

Recommendation Eight
Umalusi needs to continue to improve its moderation systems and approaches.

Recommendation Nine
If standardization and equivalence across college and school subjects is believed to be important, Umalusi should consider employing the same moderators to look at subjects across institutions. However, care should be taken to ensure that school subjects are not seen as the benchmark in such a process, as there are necessary differences between school and college subjects.

Recommendation Ten
The standard of marking needs to be improved and monitored.

EDUCATOR TRAINING

Recommendation Eleven
Improved training of educators is essential to raise the levels of cognitive challenge in all subjects.

Most evaluators commented that ultimately much will depend on the way the intended curriculum is implemented. The Science evaluators argued that 'the extent to which students are engaged with underlying knowledge principles depends to a large extent on the educator's subject expertise and specialized knowledge as well as access to other resources'. Thus, for improvement in all subjects, capacity development of educators is essential.

The new Grade 12 Hospitality syllabus is presented with a list of 'integrated competencies':

- Be competent and creative in the basic production and presentation of food.
- Develop basic entrepreneurial and problem-solving skills in relation to food and beverage production.
- Use technology creatively and critically, showing responsibility towards the environment and the health, safety and security of other people within the hospitality industry.
- Develop and apply the important principles of teamwork in the hospitality industry.
- Develop independence and self-discipline.

This all sounds encouraging. However, clearly, without substantial teacher training and a well-developed syllabus which shows teachers how to achieve these competencies through the content taught, it will be difficult for real change to happen in this subject.

FURTHER RESEARCH

Recommendation Twelve

This research process investigated the extent to which courses provide access to higher education in a general way. While trends emerged, it does seem as if there are some pathways to higher education from most of the subjects concerned. Future research focused more narrowly on the extent to which college subjects give access to higher education would be useful.

Recommendation Thirteen

Further research and thought needs to be invested in developing the most appropriate approach to the development and presentation of syllabuses.

Recommendation Fourteen

This research pointed to possible problems with the standard of marking, and this should be followed up in future research.

Already planned is research to understand the extent to which these courses are sufficient to supply the theoretical knowledge needed for practical application in industry at the intended levels.

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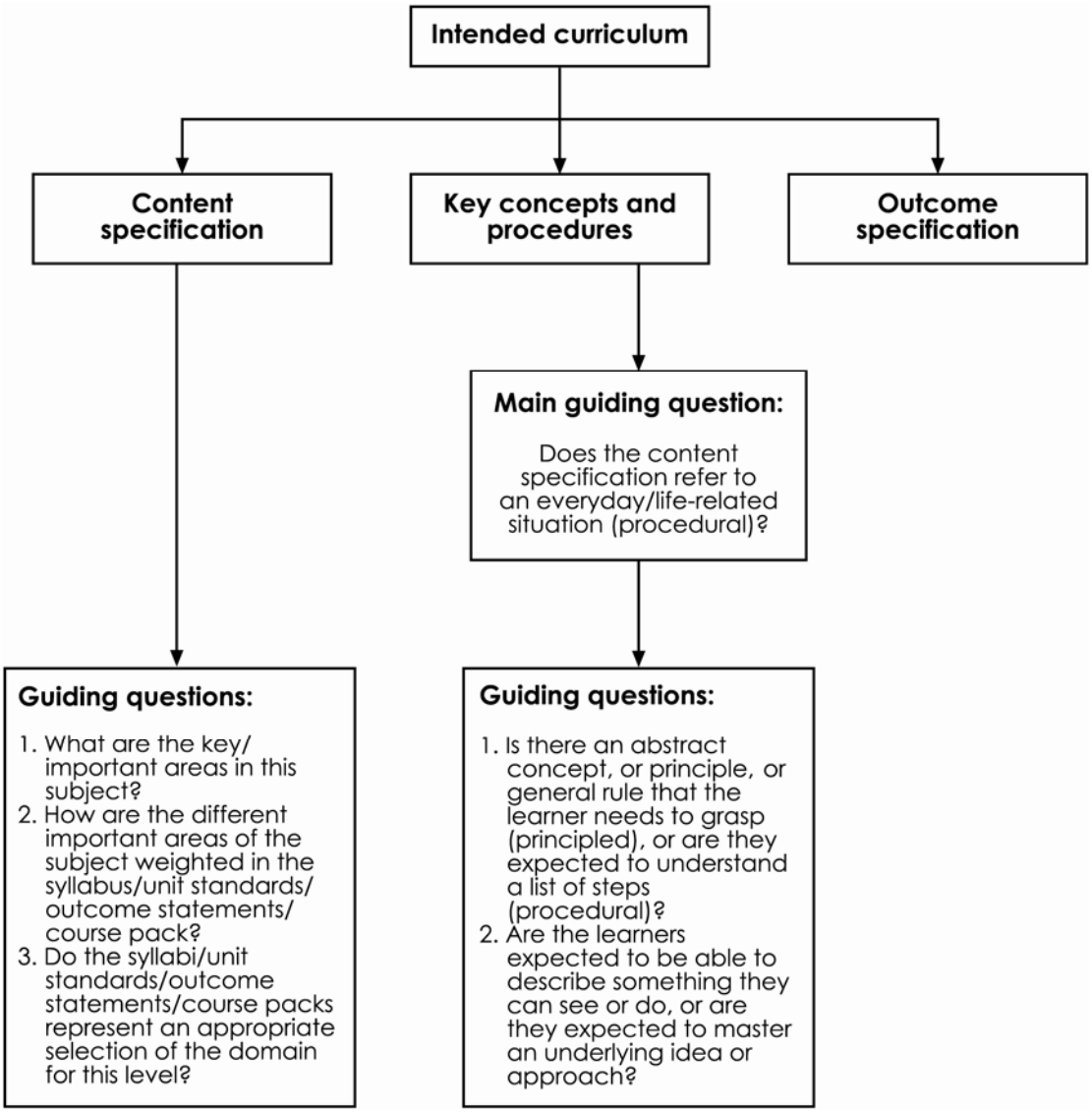
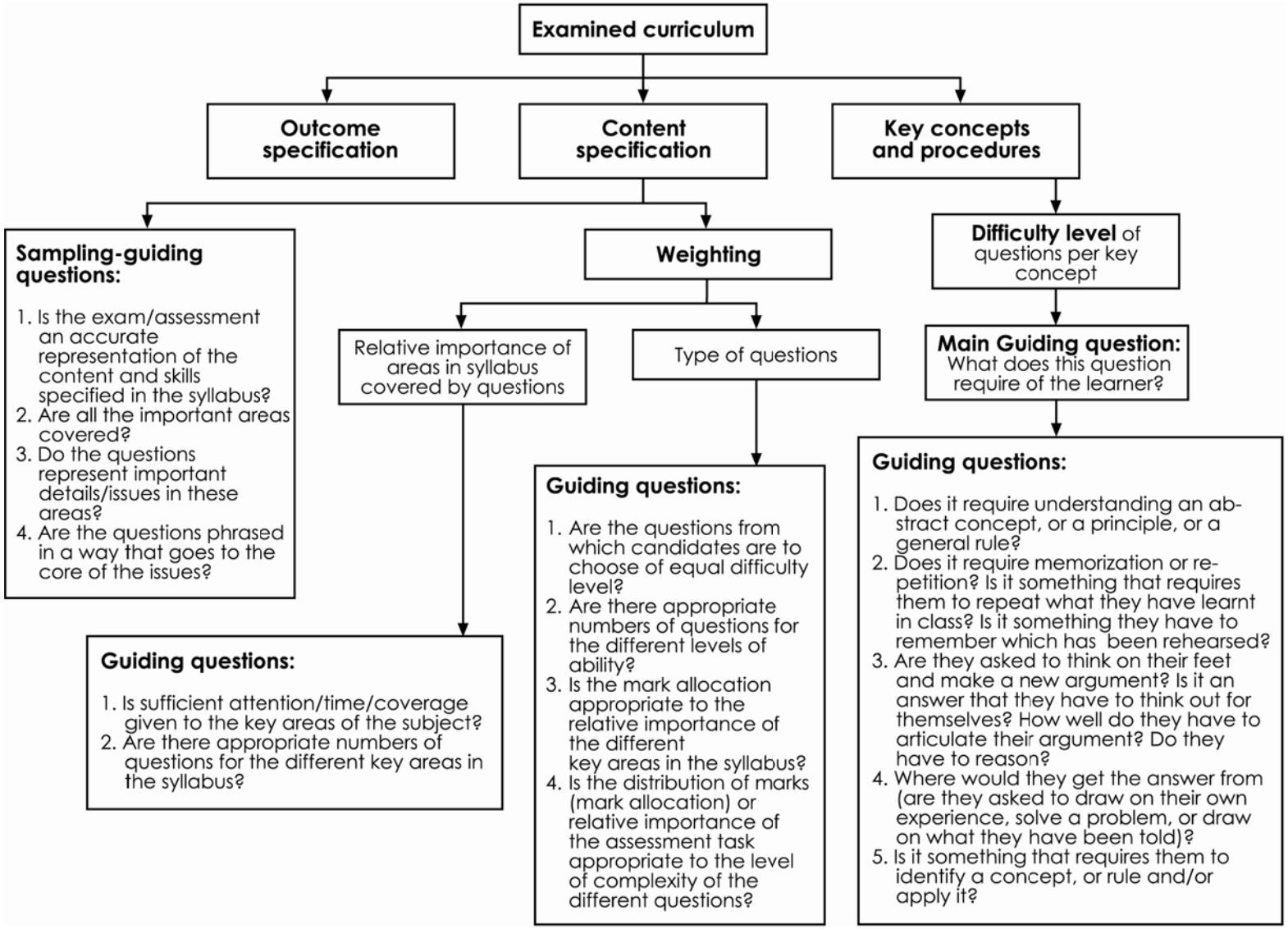
Annexure A

Diagrammatic representation of criteria used for the evaluation




Examined curriculum
Outcome specification
Content specification
Key concepts and procedures
Sampling-guiding questions:
1. Is the exam/assessment an accurate representation of the content and skills specified in the syllabus?
2. Are all the important areas covered?
3. Do the questions represent important details/issues in these areas?
4. Are the questions phrased in a way that goes to the core of the issues?
Weighting
Relative importance of areas in syllabus covered by questions
Type of questions
Guiding questions:
1. Is sufficient attention/time/coverage given to the key areas of the subject?
2. Are there appropriate numbers of questions for the different key areas in the syllabus?
Guiding questions:
1. Are the questions from which candidates are to choose of equal difficulty level?
2. Are there appropriate numbers of questions for the different levels of ability?
3. Is the mark allocation appropriate to the relative importance of the different key areas in the syllabus?
4. Is the distribution of marks (mark allocation) or relative importance of the assessment task appropriate to the level of complexity of the different questions?
Difficulty level of questions per key concept
Main Guiding question: What does this question require of the learner?
Guiding questions:
1. Does it require understanding an abstract concept, or a principle, or a general rule?
2. Does it require memorization or repetition? Is it something that requires them to repeat what they have learnt in class? Is it something they have to remember which has been rehearsed?
3. Are they asked to think on their feet and make a new argument? Is it an answer that they have to think out for themselves? How well do they have to articulate their argument? Do they have to reason?
4. Where would they get the answer from (are they asked to draw on their own experience, solve a problem, or draw on what they have been told)?
5. Is it something that requires them to identify a concept, or rule and/or apply it?