

# **International Comparisons in Senior Secondary Assessment**

Summary Report



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## **Executive summary**

This report presents a high-level description of the background to and the key themes identified through our International Comparisons in Senior Secondary Assessment project. It complements an extensive full report and accompanying table supplement, which detail findings for each of the education systems and subject areas covered by the study.

The aim of the project was to gain a detailed understanding and to judge the comparative demand of a range of subjects offered at senior secondary level in different parts of the world. This would enable us to reflect on how the system in England might develop. The project reviewed mathematics, chemistry, English and history that formed a part of the main qualification undertaken by students to gain entry to higher education in a range of education systems from Europe, North America, East Asia and Australasia, as well as some qualifications offered internationally. These were reviewed alongside one of the A levels offered in each subject in England.

Because we have concentrated on individual subjects and not the whole curriculum on offer at senior secondary level, subjects within A levels start with an advantage when judging comparative demand. The small number of subjects typically taken at A level allows each to be the main focus of a student's study. Elsewhere, courses normally comprise much broader offerings, a core of compulsory subjects supplemented with a number of subject specialisms. This emphasis on the study of a broader range of disciplines may naturally limit the breadth and depth of study achievable in each individual subject.

A series of themes emerged through the research. These have been framed as issues that could form the basis for discussion around what should be prioritised in England as part of any future development of our senior secondary qualifications. These issues are addressed in detail in section 4 of this report but in summary are:

- Issue 1: Breadth versus depth – Many systems have a baccalaureate- or diploma-style assessment system including the study of a number of subject areas that are not required as part of A levels. Would this additional breadth outweigh the strengths of additional depth of the current A level system?
- Issue 2: Independent study – Would the inclusion of independent research, projects and extended essays bring additional depth to subject expertise?
- Issue 3: Different levels of demand within mathematics – The number of different mathematics assessments at a variety of levels available to students in many education systems was also in contrast to A level Mathematics. Is

there a need for A level Mathematics to have further lower-level options in addition to AS?

- Issue 4: Breadth versus depth within mathematics – Within the more challenging mathematics courses considered, A level Mathematics is unusual in covering both pure mathematics and the application of mathematics in the same course. While this means that more fields within mathematics are available to study, other education systems include more demanding mathematics which an A level student can only access through additional A level courses. Would a more focused A level mathematics course better serve the needs of more capable mathematicians?
- Issue 5: Specialism within mathematics - A level Mathematics includes optional routes. This means students with the same grade in the qualification may not be equally well prepared for a specific further course of study. Would distinct qualifications, building on a mathematical core but emphasising the different specialisms, better serve students and those seeking to match them to appropriate further opportunities?
- Issue 6: Mathematical content in chemistry – A strength of A level Chemistry was seen to be its high mathematical content in comparison with other systems. Is this balance correct? Would students and higher educationalists find it preferable to have further or deeper chemistry content within chemistry and move the bulk of mathematics currently covered in chemistry to mathematics subjects?
- Issue 7: Focus of the study of English – A levels were found to be distinctly different from the study of English in other education systems as they have an exclusive focus on reading and interpreting traditional forms of text. In other systems there is a broad range of views on what could be considered a text (from a photograph, to film, to Chaucer). Would a broader approach prepare students better for studying in a higher education setting?
- Issue 8: Purpose behind studying history – Other systems often had a clear rationale for the study of history at senior secondary level, for example to promote good citizenship. Do we need to address a purpose for the study of A level History beyond preparing students for higher-level historical study?
- Issue 9: School-based assessment – Should there be more teacher- and school-based assessment with the potential to stretch students, especially where oral examinations are part of the system?

Issue 10: Multiple choice – Multiple-choice questions are common in other education systems at senior secondary level. They are not common in A levels. Multiple-choice questions can be used to test large amounts of content and assess skills such as the ability to use the English language. These can be difficult to test by other means. Should we revisit the use of multiple-choice questions in A level assessments?

## **Introduction**

As the regulator of qualifications, examinations and assessments in England, and of vocational qualifications in Northern Ireland, we have a responsibility to ensure the qualifications we regulate are fit for their purpose: they are of a high quality, they command confidence, they equip students for the next step in their education or working lives and they are value for money.

In an age when students cross international boundaries to study it is also increasingly important the qualifications we regulate are comparable with those studied by students in other high-performing education systems<sup>1</sup>. Students in England will often be competing with international students for higher education and employment opportunities.

The current UK government asked us to monitor the standards of regulated qualifications in England against those available internationally. In response, we began a long-term rolling research programme to investigate the comparability of assessments taken by students internationally against those taken by students in England.

The first of these studies is the International Comparison of Senior Secondary Assessment study which focuses on assessment at pre-university level. We compared the demand of the main assessment available to senior secondary students in England with the main assessments offered in other education systems. In doing so we aimed to identify what can be learned from other systems to strengthen the assessment system in England at senior secondary or pre-university level. Advanced Level General Certificates of Education (A levels) are the main qualifications used to gain entry to higher education in England. A levels are available in over 45 subjects and around 860,000 entries were made in 2011. A levels were therefore the qualifications which we attempted to benchmark with comparable qualifications<sup>2</sup> internationally.

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<sup>1</sup> The term “education system” relates to countries, provinces or states that control public education within their borders, and is sometimes referred to as a jurisdiction.

<sup>2</sup> When we refer to qualifications in this document, we are either referring to the programme of study or an examination or series of examinations that gives rise to a result that students use to gain entry to higher education.



## **Participating education systems and qualifications**

All of the qualifications included as part of this study are the main mechanism used by students to gain entry to higher education in their respective system. However, they still differ in purpose. Some are assessments (provided either by the state or by another organisation) with the *specific purpose* of selecting students for higher education (for example, a matriculation examination). Others are assessments of educational achievement that *in addition* are used to identify students for higher education. There is a further distinction within this second type of assessment between those that include the subject area as part of a diploma or baccalaureate-style qualification with one or more compulsory components and those that stand alone. The qualifications we analysed were:

Australia: New South Wales Higher School Certificate, or HSC

Canada: Alberta Diploma

Denmark: *Studentereksamen*, or STX (Upper Secondary School Examination)

England: Advanced Level General Certificate of Education, or A level<sup>3</sup>

Finland: *Ylioppilaskirjoitukset / Studentexamen* (Matriculation Examination)

France: *baccalauréat général*

Hong Kong: the outgoing Hong Kong Advanced Level Examination, or HKALE; and the incoming Hong Kong Diploma of Secondary Education, or HKDSE

International Baccalaureate Diploma, or IB Diploma (concentrating on Higher Level subjects)

Netherlands: *hoger algemeen voortgezet onderwijs*, or havo (Higher General Continued Education) and *voorbereidend wetenschappelijk onderwijs*, or vwo (Preparatory Scientific Education)

New Zealand: National Certificate of Educational Achievement, or NCEA Level 3

Norway: *Vitnemål fra den Videregående Skole*, or *Vitnemål* (Certificate of Upper Secondary Education)

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<sup>3</sup> Specifications used: OCR Chemistry A; AQA English Literature B; Edexcel History, Mathematics and Further Mathematics.

People's Republic of China: *Gāokǎo* (National Higher Education Entrance Examination)

Republic of Ireland: Leaving Certificate (Established)

Republic of Korea: *Su-neung* (College Scholastic Ability Test, or CSAT)

USA: the ACT

USA: New York State Regents Diploma

University of Cambridge International Examinations A levels, or Cambridge International A levels

University of Cambridge International Examinations Pre-U Diploma, or Cambridge Pre-U.

## **Education systems**

The structures and other key features of the education systems included in this study vary greatly. They differ in what proportion of young people progress into upper secondary education, how this education is regulated and the assessments administered. There are also very different models for how access to higher education is controlled. A table outlining these and some other key features of the education systems in this study is included in Table 1 in the Full Report Table Supplement, and is detailed country by country in the Full Report.

In England over 90 per cent of young people complete senior secondary education with almost half of these gaining A level qualifications at the end of their studies. There are similarly high levels of completion or graduation in Denmark, Finland, France, the Netherlands, New Zealand, Norway, the Republic of Ireland and the Republic of Korea (OECD, 2011a).

This is in contrast to Hong Kong where just over half of young people complete senior secondary education. Partly because of this relatively low completion rate, a new education system is now being introduced with a new qualification replacing the Hong Kong HKALE. The first cohort of students will complete the new HKDSE in 2012. The HKDSE has been designed to include and recognise both academic and vocational courses for a broader range of students. As a result the current HKDSE final year has over twice as many students as the previous HKALE annual cohort (Government of the Hong Kong Special Administrative Region Education Bureau, 2012).

Hong Kong, with a population of 7.1 million, is typical of the size of population that a single education system caters for, as reviewed in this study. The regulation and administration of qualifications and examinations is most often held at national level,

for example Denmark, New Zealand and the Republic of Ireland, who also each have a population of around 4–7 million people. Some examples of this are presented in Table A. Two out of the three systems included in the study that are administered at a provincial or state level, Alberta and New South Wales, are also a similar size (the exception being New York State with a population approaching 20 million).

Countries such as England and France (with populations of around 52 and 63 million people respectively) are unusual in having single education systems that cater for such large populations. In other large systems in this study (the Republic of Korea and the People’s Republic of China) there is a combination of local and national control. While it is the case that the examinations included in this study are national, much control of the education system itself lies at a more local level. In the Republic of Korea, many decisions are made by the seven municipal and nine provincial district offices of education rather than by the central government (International Review of Curriculum and Assessment Frameworks Internet Archive, 2010). In the People’s Republic of China responsibility for aspects of the education system, including text books, school examinations, finance and teaching are devolved to a local level (OECD, 2011b). The city of Shanghai is an example of one of these local level units, and with a population of just over 20 million, the education system caters for a similar size population as the New York State Education Department.

Education system	Control of education system	Population	Number of students taking the qualification included in this study
Alberta	Provincial level	3.7 million	45,286
Denmark	National level	5.5 million	51,178
New South Wales	State level	7.1 million	68,409
New York State	State level	19.5 million	224,744
England	National level	52 million	250,000
France	National level	63.1 million	328,467

*Table A: Examples of population and qualification figures for education systems included in this study*

In most of the education systems there is a central organisation which administers the senior secondary assessments considered by this report, although this may not be under governmental control. In Denmark, for example, assessments are managed directly for all students by the Ministry of Children and Education. In contrast the Finnish universities provide the assessment materials offered by the independent Matriculation Examination Board to all general studies students, whereas in Norway the Ministry of Education and Research administers the assessments but students are selected to sit a maximum of five external examinations (including Norwegian)

from the nine or more subjects studied. The Republic of Ireland has the State Examination Commission, while in England the requirements or criteria for A levels and other qualifications are specified by Ofqual.

As regulator, we also monitor the A level providers to ensure standards are maintained and the assessments are administered appropriately, but the course content is designed and the assessments are administered by one of the five A level providers.

Where the responsibility for education is at state, province or territorial level there are often initiatives at national level as governments attempt to tackle recognised differences in the achievement of students across the country. For example the United States has high-profile federal campaigns such as the continuing “No Child Left Behind” policy based on the 2001 Act, together with close cooperation between all 50 states leading to the adoption of the “Common Core Standards” for mathematics and English language arts. There is also the National Assessment of Educational Progress (NAEP) programme which collates data on educational achievement across the country. However there is currently no national programme to assess student achievement and the administration of education is still largely devolved to the school districts with schools encouraged to develop their own courses which meet and expand upon the state requirements.

In 2008 the Australian national, state and territorial governments jointly introduced the National Assessment Program – Literacy and Numeracy (NAPLAN) to all Australian schools. The data from these assessments has been used to identify successful schools as a potential source of good teaching practices which will be shared nationally. Additional funding has also been provided by the national government to support teacher development and additional resources in disadvantaged schools (Garrett, 2012).

Almost all of the education systems in this study assess students in their final two years of study which means most have completed 11 or more years of study before taking their final assessments. New York State is the exception as the Regents Diploma examinations can be taken from Grade 9 onwards. Each subject in the Regents Diploma is designed to be taken in a particular grade (school year), therefore both course content and assessment take into account the student’s age and the years of study. This approach spreads the assessment load across the student’s senior high school career, although very capable students may choose to complete their Regents Diploma examinations early in order to concentrate on college preparations in the later years of high school.

The way in which education systems incorporate both academic and applied or vocational subjects and the nature and content of the assessments offered is covered in detail in the Full Report.

In England students study primarily academic subjects to the end of compulsory schooling at age 16, although there are increasingly options for more practical studies. Post-16 the A level courses provide the academic route taken by about 45 per cent of students. The remainder start work and / or training leading to a vocational qualification. Choosing an equivalently demanding course of vocational study does not exclude a student from university, and may be an advantage for particular university degree courses.

By contrast, in the Netherlands a student's choice of study route at the beginning of secondary education determines their access to higher educational opportunities. Some secondary schools allow flexibility in course choices up to the end of the first year of study. There are two study programmes designed to prepare students for degree-level studies, but a student in the technical programme (havo) who wishes to apply for an academic university must complete a conversion course before they can apply. Denmark has a similarly structured secondary education system.

What Denmark, England and the Netherlands do have in common with Finland, France and Norway is that at some point in secondary education there is a clear separation of academic and vocational study programmes and outcomes.

In New South Wales, New Zealand and the Republic of Ireland the programme of study can include both academic and vocational courses leading to the same overall qualification. However, a student in New York State can only graduate from high school by obtaining the New York State Regents Diploma which requires them to demonstrate sufficient academic achievement. This does not prevent students from including vocational courses in their individual programme of study, but there is a compulsory academic core. The approach in Alberta is similar although the education system is less rigid about the time within which a student is expected to complete their diploma examinations.

Very academically capable students in both Alberta and New York State are actively encouraged to move through the school grades more quickly, enabling them to achieve their diploma earlier than usually expected. Both Alberta and New York State fund comprehensive college preparation programmes including use of commercially provided study and assessment programmes.

In all the education systems included in this study success in the senior secondary assessments increases, but may not guarantee, opportunities for continued studies. In New Zealand a student must complete their senior secondary education with a minimum level of achievement in order to be considered for university. Students in Canada and the USA aiming for top universities expect to complete high school and then further college preparation before applying.

In Finland, passing the Matriculation Examination entitles a student to continue their studies at a Finnish university. However, it is not so straightforward for students in the People's Republic of China and the Republic of Korea. In the *Gāokǎo* (People's Republic of China) and CSAT (Republic of Korea) university entrance examinations students are allocated a rank or score which can only be used in support of the current year's applications for university places. Students wishing to defer university entrance must retake the series of assessments in the year they wish to enter university.

## **Descriptions of qualifications and assessments**

Within the education systems outlined above this study focuses upon senior secondary assessments, in particular those in which a satisfactory result is accepted in support of an application for a place on a degree course at a university-level institution.

The qualifications and assessments in this study are either specifically university entrance examinations or have a more general purpose in recognising the completion of a course of upper secondary study. Those with the more general purpose can be divided further between specific stand-alone qualifications and those which form part of a composite certificate of achievement (such as a diploma). Table 2 in the Full Report Table Supplement summarises some key features from the qualifications and assessments included in this study.

There are differences in the number of subjects studied as part of each qualification or assessment at senior secondary level. A level students typically study the fewest subjects at around three to four. In contrast, students in Denmark, Finland and New York State study at least 10 subjects. Whilst the guided learning hours for each qualification are not available in a comparable format, it is evident that as the number of subjects studied increases, the time spent on each is necessarily reduced.

Of the qualifications included in this study, A levels in England, the New Zealand NCEA and the two CIE qualifications are the only assessments for which there are no compulsory subjects. The number of compulsory subjects varies widely from one in New South Wales and the Republic of Ireland (English and Irish respectively) to 13 in Denmark. An indication of this range is demonstrated in Table B.

Typical number of subjects studied	Qualifications and examinations	Number of compulsory subjects	Compulsory mathematics element?
3 or 4	England: A levels	0	x
3 or 4	Cambridge International A levels	0	x
4	USA: the ACT*	4	✓
5	Australia: New South Wales HSC	1	x
5	Hong Kong: HKALE (outgoing qualification)	2	x
5	Republic of Korea: CSAT	5	✓
5	Cambridge International Pre-U Diploma <sup>##</sup>	2	x
5 plus	Republic of Ireland: Leaving Certificate (Established)	1	x
5 or 6	New Zealand NCEA Level 3	0	x
6	People's Republic of China: <i>Gāokǎo</i> *	3	✓
7	Canada: Alberta Diploma	6	✓
7	IB Diploma <sup>#</sup>	6 <sup>^</sup>	✓
8	Hong Kong: HKDSE (incoming qualification)	4	✓
8 or 9	Netherlands: havo	7	x
9 or 10	Netherlands: vwo	9	✓
9 or 10	Norway: <i>Vitnemål</i>	9	✓
9 to 12	France: <i>baccalauréat général</i> <sup>#</sup>	9	✓
10	Finland: Matriculation Examination	4	✓
10	USA: New York State Regents Diploma	10	✓
13 plus	Denmark: STX	13	✓

# number of compulsory subjects include an independent research project or portfolio submission which may cross over traditional 'subject' boundaries.

\* assessment is independent of the school syllabus

+ students can gain Cambridge International Pre-U qualifications on a subject by subject basis, however, to gain the Cambridge International Pre-U Diploma they must take three subjects along with a mandatory independent research report and global perspectives portfolio.

<sup>^</sup> This total excludes the theory of knowledge and extended essay.

*Table B: Examples of the balance of compulsory subjects and total subject areas covered by qualifications included in this study*

There are differences in the level to which the compulsory language must be studied and there is a wide range of approaches from the functional use of English in Hong Kong through to the more comprehensive language acquisition in the IB Diploma which includes the study of literature and culture.

In several education systems both teaching and assessment are offered in more than one language, recognising the cultural heritage of the country's population. The curriculum in New Zealand has been developed jointly in English and *te reo Māori* (the Maori language) to meet the needs of all students. Similarly in Finland education is provided in the official languages of Finnish and Swedish, and the significant minority language of the Sami peoples. Finland also recognises mother tongue languages including Roma and Finnish sign language.

In all systems with more than two compulsory subjects, for example, Alberta, Finland and France, mathematics is compulsory. Where it does not feature in the senior secondary assessments, students are expected to have studied mathematics in lower secondary school.

The way that students gain their qualification, or are graded as part of their studies, varies widely. For example, in New York State and New Zealand there is a threshold of a certain number of "credits" that have to be achieved before students become eligible to gain the qualification.

Beyond the distinction of gaining or not gaining the qualification, there are different ways that student performance is described, or graded. These take essentially three forms: those based on performance descriptors (for example A levels and both the HKALE and HKDSE in Hong Kong), those based on a percentage of marks achieved in the qualification (for example the Republic of Ireland Leaving Certificate), and those based on norm referencing (for example the Finland Matriculation Examination and Republic of Korea CSAT). Grades are usually described in a numerical scale, and there is a wide range of bands of performance, from six in A levels and the HSC in New South Wales, to 13 in the Republic of Ireland, as Table C below demonstrates.

Education system: qualification	Number of grades (excluding any for no grade given)	How they are described
Australia: New South Wales HSC	6	Performance bands: 1–6 with 6 being the highest Band 2 is the minimum standard expected.
England: A levels	6	Grades: A*–E with A* being the highest Below E grade is a fail.



Norway: <i>Vitnemål</i>	6	Grades: 1–6 with 6 being the highest A grade of 2 is considered a pass.
Republic of Korea: CSAT	9	Stanine scores: 1–9 with 1 being the highest
Republic of Ireland: Leaving Certificate (Established)	13	Grades: A1–F with A1 being the highest

Table C: Examples of grading structures of some of the qualifications analysed in this study

In the Alberta Diploma, grades are not used. Instead, results are displayed as a percentage, and 50 per cent is considered a pass. A student gaining a percentage lower than this would not receive credit towards their diploma.

None of the qualifications we looked at included a ranking of a student against all others. However, the scores provided by examinations such as the People’s Republic of China *Gāokǎo*, the Republic of Korea CSAT and the USA ACT play a similar role. The specific purpose of the *Gāokǎo*, the CSAT and the ACT is to provide a score for students to inform their selection for degree-level courses. The *Gāokǎo* and the CSAT are compulsory for any students applying to universities in the People’s Republic of China and the Republic of Korea respectively. However many higher education institutions do consider each student’s high school achievement record in addition to their test score. These two assessments are unlike all others considered by this study in that the results are only valid for university applications in the current year. Students who defer their applications or wish to delay taking up a place on a degree course have to retake the assessments.

The ACT is one of a number of commercially provided tests accepted by universities in support of student applications. The ACT specifically assesses college readiness in terms of the student’s ability to process information and solve problems rather than testing subject knowledge. The remainder of the assessments in this study all include tests of subject knowledge.

The *Gāokǎo* and the ACT operate separately from the programmes of study provided by schools. The ACT organisation carries out considerable research to ensure that the subject content of its assessments will reflect the taught syllabus across all the United States. In contrast, the National Education Examinations Authority (NEEA) produces syllabus documents for the *Gāokǎo*, defining the specific subject content that the tests will cover.

The other university entrance qualification included in the study is the Finland Matriculation Examination. However this assessment has evolved from its origins as an entrance examination for Helsinki University to providing the final assessment of all Finnish senior secondary school students in the academic or general studies

programme. Therefore, although the Finnish Matriculation Examination Board is independent from the Ministry of Education and Culture the examination is designed to assess the school syllabus content.

In addition to Finland, senior secondary education in Denmark, England, France, the Netherlands, Norway and the Republic of Ireland provides distinct programmes of study for academic or general studies and for vocational studies. The assessments or qualifications included in this study from these countries are those which are recognised for university admission, generally those with academic content. This includes the Netherlands havo, described as a vocational study programme, but actually designed to prepare students for degree-level studies in technical and applied subjects.

Other distinctly academic qualifications included in this study are the HKALE, the IB Diploma, Cambridge International A levels and the Cambridge Pre-U Diploma. The systems which offer these assessments do not provide equivalent vocational programmes of study and although these are not exclusively university entrance examinations they do set out to prepare students for further study at degree level.

In other education systems, the completion of senior secondary school is recognised by a certificate or diploma which records student achievement across a range of possible subjects including both academic and applied or vocational courses. For example in New South Wales a student achieves their HSC by passing HSC courses in five subjects including English, but this can include applied or vocational courses.

The new HKDSE qualification, which will be completed by the first cohort of students in 2012, includes a considerable range of applied learning subjects, while in New Zealand students can complete courses at different levels within their NCEA although they do need sufficient credits at NCEA Level 3 to apply for degree-level studies.

To obtain their diploma in Alberta and New York State students must pass examinations in a specific selection of academic subjects but both education systems do include vocational courses, and these contribute to the school-assessed element of high school graduation.

Alberta and New York State are also distinct in their provision of additional study resources for students intending to apply for degree-level studies. Both education systems actively encourage those who are academically capable to complete their diploma ahead of the expected age and offer college preparation courses leading to qualifications which provide additional support to applications for degree-level studies.

In all cases except for the Netherlands, senior secondary education is not compulsory. Almost all assessments are usually taken after 12 years of schooling, although in England and Norway it is 13 years and in Alberta up to 14 years.

Additionally in the People’s Republic of China and the Republic of Korea students may complete senior school and then follow extra study courses before taking the assessments. Most students tackle their senior secondary assessments at about 18 years old. Havo students are the youngest at about 17 and those in Finland and Norway are the oldest, at about 19.

Although students complete their studies at similar ages there are some differences in the length of the programmes they follow, as illustrated in Table D.

Expected years of study	Education system: qualification
2	Australia: New South Wales HSC England: A levels France: <i>baccalauréat général</i> Hong Kong: HKALE (outgoing qualification) IB Diploma Republic of Ireland: Leaving Certificate (Established) Cambridge International A levels Cambridge Pre-U
3	Denmark: STX Finland: Matriculation Examination Hong Kong: HKDSE (incoming qualification) New Zealand: NCEA Levels 1, 2 and 3 Norway: <i>Vitnemål</i>
3–5	Canada: Alberta Diploma
4	USA: New York State Regents Diploma
5	Netherlands: havo
6	Netherlands: vwo

*Table D: Usual time taken to complete qualifications included in this study*

Students in the Netherlands make a commitment to their programme of study at the beginning of their secondary education (12 years of age) while under other systems this choice is taken later.

There is also a variety of assessment models in use amongst the qualifications and assessments included in this study. These relate to both the style and nature of the examination, and the timing of the assessments. In New York State, for example, the Regent Examinations are designed to be taken as students progress through their four-year senior high school study programme. The current A level programme in England is designed so that the assessments can take place at intervals through the two-year course, or all at the end.

The *Gāokǎo* and the ACT operate separately from the programmes of study provided by schools. The ACT organisation carries out research to ensure that the subject

content of its assessments will reflect the taught syllabus across all the United States. In contrast, the National Education Examinations Authority produces syllabus documents for the *Gāokǎo*, defining the specific subject content which the tests will cover and students expect to take additional courses to prepare for the examination.

## **The analysis**

As outlined above, we are reviewing qualifications which differ greatly in their purpose, content, intended cohort and structure, amongst other things. But in this study we have concentrated on the “demand” of the qualification.

Elliot (2011, p.11) defines “demand” succinctly as “the level of knowledge, skills and competence required by the typical learner”. It is defined alternatively by Pollitt et al. (2007, p.169) as the “requests that examiners make of candidates to perform certain tasks within a question”. Within a qualification or assessment it is often related to<sup>4</sup>:

- the amount and type of subject knowledge required to be assimilated
- the complexity or number of cognitive processes required of the student, the extent to which the student has to generate responses to questions from their own knowledge, or the extent to which the resources are provided
- the level of abstract thinking involved
- the extent to which the student must devise a strategy for responding to the questions.

“Demand” can be a challenging concept when we consider that it is different from the “difficulty” of a qualification. “Difficulty” can be measured by how students performed on a question – essentially their success rate. In contrast, “demand” relies on the judgement of experienced professionals as to the challenge that a question should pose, based on the various cognitive processes and knowledge that it requires.

The approach we used was based on judgemental methods and has been developed from our well-established *Standards Over Time* programme (see QCA, 2006; Ofqual, 2011). The underpinning analytical tools and forms were reworked to reflect the

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<sup>4</sup> These factors had been identified in a study into question structure by University of Cambridge Local Examinations Syndicate (UCLES) commissioned by QCA. Each factor has the capacity to make examination questions more or less difficult, irrespective of the subject content. The exact interpretation of the four factors is often, to a degree, subject-dependent. Explaining any subject-specific aspects was one of the tasks carried out by the lead reviewers.

greater diversity of qualifications under review. A full description of the methods we used is outlined in the Full Report.

To ensure that the findings of this study were not just constrained to one area of the curriculum, four subjects were selected for inclusion: mathematics, English, chemistry and history. There were three priorities for the analysis:

- a consideration of the purpose of each qualification, including target students, an indication of what is considered “success” in the qualification, pass rates, and intended progression following successful completion of the qualification
- a review of subject-specific materials for each qualification to establish and make judgements around the nature of the subject matter, including the topics covered, breadth versus depth of subject coverage, optional routes within the subject and accessibility for the range of students targeted by the qualification
- an investigation of the subject-specific assessment instruments to make judgements around issues such as level of demand, the quality of the question papers and mark schemes and the match between the assessment instrument/s and subject specification (syllabus).

## **Findings**

In bringing together the four sets of subject findings a number of themes emerged which encompass the differences between the main senior secondary qualifications used by students to support progression to university in England and in other high-performing countries. By presenting these emerging themes as issues we can suggest a framework for discussing how A levels available in England compare with the qualifications offered at a similar level elsewhere in the world.

None of these issues are new to the ongoing discourse about English A levels. Each issue has been considered and debated during the development of the English national qualification. However the current round of discussions can now be informed with key evidence from a wide range of individual countries’ approaches and experience.

The rest of the Summary Report looks at each issue in turn, bringing together the findings from the Full Report to consider how A levels available in England compare with the qualifications offered at a similar level elsewhere in the world.

The detailed findings can be found in the Full Report, International Comparisons in Senior Secondary Assessment and the Full Report Table Supplement.

## Issue 1: Breadth versus depth

**Many systems have a baccalaureate- or diploma-style assessment system including the study of a number of subject areas that are not required as part of A levels. Would this additional breadth outweigh the strengths of additional depth of the current A level system?**

Evidence from this study shows the structure of A levels to be very unusual when compared with the qualifications available to students at senior secondary level worldwide. Almost all of the education systems studied favour a baccalaureate- or diploma-style qualification, with a core of compulsory subjects supplemented by a range of optional specialisms. Even some university entrance examinations are delivered in a diploma style. In the People's Republic of China the *Gāokǎo* has three core areas, whilst the ACT is made up of four content areas.

The number of subjects studied at senior secondary level elsewhere in the world is considerably higher than in England – a minimum of 13 in the Denmark STX at the top end of this. In many education systems, students are generally required to study a social science, science, mathematics, a foreign language and a home language subject at the very least until age 18.

On top of these core subjects, most qualifications and assessments either allow, or more usually, insist upon some elective content allowing a student to specialise in a certain discipline or path. In the HKDSE, for example, students are expected to take four core subjects (Chinese language, English language, mathematics and liberal studies), as well as two or three elective subjects selected from a bank of some 30 options, including vocational study.

In some education systems, the elective subjects available are determined by the strand of the qualification that students have selected. In France, a *baccalauréat général* student can follow either the *série scientifique* (S), *série économique et sociale* (ES) or *série littéraire* (L) – sciences, economics and social sciences, or literature respectively. Within each, students study between nine subjects (if they select a compulsory subject as their speciality) and 12 subjects leading to national external examinations.

Qualifications which are offered on a subject-by-subject basis are far fewer in number. These include A levels, Cambridge International A levels, Cambridge Pre-U certificates and the HKALE.

Given that an A level student typically studies far fewer subjects than their international counterparts, it is perhaps not unexpected that the depth and breadth of content in A levels is amongst the most demanding seen in this study. Each A level subject is likely to account for between a quarter and a third of the total senior secondary course time, far higher than the time allocated to equivalent subjects in

some of the baccalaureate qualifications. As such, A levels contain a considerable breadth of content compared to most of the other qualifications in the study, and are able to explore much of this in some depth due to the space in total curriculum time devoted to the subjects.

If we take chemistry as an example, we find that stand-alone qualifications such as the OCR A level, the HKALE and CIE qualifications come out very strongly in this review. The content of OCR A level is broader and deeper than the majority of other specifications.

In other education systems depth is also achieved through the study of optional material. In Denmark teachers and students are expected to supplement the compulsory content by choosing topics to study more deeply or in different contexts. Most of the other courses offer a choice from a number of optional topics.

## Issue 2: Independent study

### Would the inclusion of independent research, projects and extended essays bring additional depth to subject expertise?

This study found that some of the most demanding elements of qualifications worldwide included independent projects and sustained study tasks.

A number of the qualifications in the study include an independent study project, often in the form of a piece of research or an extended essay. These elements can help to build the skills of deep thought, synthesis, research and self-directed learning which are so highly prized by universities. They can also introduce additional depth into subject study or help to build links across separate subjects. The format of these independent research tasks in different education systems often depends on the structure of the qualification. In diploma- or baccalaureate-style qualifications, these projects sometimes form a separate study area designed to stand alone from, or cut across, the subjects being studied (France *baccalauréat général*, IB Diploma). In other education systems, projects may be contained within the syllabus for specific subjects (New Zealand NCEA Level 3).

In France, students studying for any stream of the *baccalauréat général* are required to produce their *travaux personnels encadrés* (TPE), an independent project which crosses over two or more subjects (Eduscol, 2011). This is undertaken in small groups. Students also carry out independent study as part of the IB Diploma, completing an extended essay enabling them to engage in their own research through an in-depth study of a question relating to one of the subjects they are studying. In both qualifications, these projects are distinct elements of the assessment, standing apart from the study of subject areas.

Independent study projects are also used within subject syllabuses to provide depth of study in an area, and to build and assess subject-specific skills. In chemistry in particular, all qualifications emphasise the importance of practical work as an essential ingredient of chemistry at senior secondary level. The extent to which this is reflected in extended practical investigation varies, however.

An alternative approach is the IB Diploma which emphasises the importance of practical chemistry as an investigation. In the IB Diploma practical work is assessed by conducting a series of investigations together with a project using generic criteria. This requires higher-order skills to design, conclude and evaluate findings. Candidates are expected to complete 60 hours of practical activities and project work which contributes 24 per cent of the final score. A similar approach is taken within the New Zealand NCEA Level 3 chemistry course. Students studying the internally-assessed units undertake an open-ended investigation. Within this they design and carry out their own experiments in support of a research project, capturing the results



in a report. This was seen as being a demanding aspect of the course and one which would develop valuable skills for future study.

Independent study also adds demand in other subject areas. In history the inclusion of independent study supports the development of historical interpretation and enquiry; core components of the majority of history courses included in this study. In the assessment of historical enquiry, some qualifications or assessments contain a compulsory component of historical enquiry personal research. These include the A level, the Cambridge Pre-U, the Hong Kong HKDSE, the IB Diploma, the New Zealand NCEA Level 3, the Republic of Ireland Leaving Certificate (Established) and in the preliminary school-devised part of the New South Wales HSC. In all of these qualifications, independent study is a valuable way of increasing depth of knowledge, alongside developing subject-specific and more general study skills.

There is a similarity between the New Zealand NCEA Level 3 historical research internal assessment task, the IB Diploma historical investigation and the Edexcel A level historical enquiry. However it is interesting to note that the New Zealand NCEA Level 3 course has a much more flexible approach to the format in which the task can be presented; for example, designing a museum display for a battle or campaign in the Second World War, or a historical walking tour. The New Zealand NCEA Level 3 course is also unusual in its emphasis on the pre-teaching of research techniques in order to prepare students to undertake the internally-assessed task.

Where education systems incorporate independent research and study projects in subject syllabuses, this tends to be a feature of all disciplines, rather than being limited to particular subjects. In the Hong Kong HKDSE, for example, school-based assessment (SBA) is a component of every subject from mathematics to English. This requires students to complete a self-directed independent research project, sometimes over a number of school terms.

Even in those education systems where there is not an assessed research project, independent study skills are emphasised in other ways. At the start of the three-year STX in Denmark, students follow a six-month foundation programme during which they learn general study skills. Throughout the rest of the course, they are expected to study independently for 25 per cent of the course time, allowing them to pursue their own studies to greater depth. It is also usual practice in Danish schools for students to have access to reference materials during their examinations, including access to the internet. In addition to testing subject knowledge the assessments are also intended to test research abilities, data handling and analytical skills (Ministry of Children and Education 2012g).

### **Issue 3: Different levels of demand within mathematics**

**The number of different mathematics assessments at a variety of levels available to students in many education systems was also in contrast to A level Mathematics. Is there a need for A level Mathematics to have further lower-level options in addition to AS?**

In England there is a huge range of A level subjects which students can study including A level Mathematics and Further Mathematics. However mathematics is not compulsory post-16. Lower-level mathematics qualifications are available in England, but they do not generally make up part of what a student does alongside their A level qualifications. Students who complete GCSE Mathematics have no clear course of study to expand their knowledge and understanding of mathematics, other than the AS and A level Mathematics courses.

A level Mathematics is unusual in that it offers six different routes of study. By choosing a different combination of applied units a student can tailor their course towards their chosen career path or higher education course. However, all of these routes through the qualification are designed to be comparable and therefore no one route would be more suitable for lower-ability candidates. Additionally, all routes require completion of the pure mathematics core units rather than allowing students to pursue an application-based course of study. There is, however, a separate A level in Pure Mathematics.

Many of the education systems in this study offer qualifications at a range of levels. This is particularly important where qualifications are intended to be taken by the full range of students at senior secondary level. Mathematics is one of the subjects with the greatest choice of levels of study available, with three or four programmes of learning often available to students. In the qualifications and assessments in which mathematics is compulsory post-16, often it is the ability of the student that determines which of the routes they will follow.

The highest number of options for mathematical study is available in the IB Diploma. Within this qualification students must complete one subject within the mathematics and computer science group. Within the mathematics group there are four individual subject choices. Two of these are at standard level, Mathematics and Mathematical Studies, and two at higher level, Higher Level Mathematics and Further Mathematics. The higher-level qualifications were deemed to be amongst the most demanding in this study. The standard level is pitched at those students who will need a sound mathematical background as they prepare for future studies in subjects such as chemistry, economics, psychology and business studies. The demand was judged to be below A level.

More common is an offer of three different mathematics courses, pitched at three different levels. In the Republic of Ireland, there are also three levels of study

available for mathematics: Foundation, Ordinary and Higher. This is in contrast to the majority of other subjects in the Established Leaving Certificate which are only available at two levels. Foundation mathematics is geared towards vocational and functional mathematics. Ordinary mathematics is essentially a service subject, providing knowledge and techniques that will be needed in the future for the study of scientific, economic, business and technology subjects. Higher mathematics is the closest equivalent to A level and is the study of predominantly pure mathematics as a discipline.

Likewise, the Denmark STX is designed to be studied by students intending to continue their academic studies at university. Mathematics is a compulsory part of the STX programme and may be taken at three different levels: A, B and C. For preparation for higher education in a STEM (science, technology, engineering, mathematics) related subject or a subject that requires any form of statistical analysis it is necessary to study the STX level A in mathematics. This programme requires 325 guided learning hours which is roughly equivalent to A level.

In some other education systems, mathematics is offered at two levels: a basic compulsory level and a more demanding optional level. The incoming HKDSE, for example, is designed to be taken by all students. Mathematics is part of the HKDSE and comprises of a compulsory part and an extended part. All candidates must follow the compulsory part of the syllabus.

In other education systems, the nature and level of the mathematics qualification studied is dependent on the stream of learning in which a student is enrolled. In France the baccalauréat général is made up of three streams. At one end of the scale is the literature stream of which mathematics is a minor part. The syllabus for mathematics in this stream is heavily focused on basic algebra, statistics, arithmetic and geometry, and was judged to be significantly below the standard of A level.

## **Issue 4: Breadth versus depth within mathematics**

**Within the more challenging mathematics courses considered, A level Mathematics is unusual in covering both pure mathematics and the application of mathematics in the same course. While this means that more fields within mathematics are available to study, other education systems include more demanding mathematics which an A level student can only access through additional A level courses. Would a more focused A level mathematics course better serve the needs of more capable mathematicians?**

The majority of the qualifications and assessments in mathematics included in this study emphasise either pure or applied mathematics. The in-depth study of both aspects of mathematics within the same course is unusual, and rarely seen outside the A level. The balance between breadth of application and pursuit of complex and deep study is a tension inherent in the study of a discipline and was a major consideration when comparing the demands of different mathematics qualifications included in this study. Many qualifications and assessments in the study emphasise one over the other, and it is apparent that either emphasis may result in a demanding qualification.

The depth to which a topic is studied is particularly significant in the judgement of demand. Depth of study more than numbers of topics was judged to be more important in raising the demand of the specification. For example the ACT tests complex numbers but only superficially and this in itself is not enough to raise demand, whereas the in-depth knowledge required by A level Further Mathematics and the IB Diploma significantly raises the demand of those specifications.

Within the A level system there is the option for students to study in depth by taking Further Mathematics and 15 per cent of students who study A level Mathematics take this up. Similarly the Hong Kong HKALE, IB Diploma and New South Wales HSC also have options within which students can increase their level of study.

A number of qualifications in the study are structured to focus on a narrow range of topics, often to much greater depth than is possible at A level. These qualifications and assessments include the Hong Kong HKALE, the Netherlands vwo, the People's Republic of China *Gāokǎo* and the Republic of Korea CSAT. These four systems all required the study of abstract and technically difficult mathematics which raised qualification demand. In all cases, their assessments included some questions that were more demanding than those found in A levels. This was also true of selected questions contained within the assessments for NSW HSC (Mathematics with Extension 1 or 2), the science series of the France *baccalauréat général*, IB Diploma (Higher level), New Zealand NCEA, China *Gāokǎo* and the Cambridge Pre-U.

Other qualifications and assessments provided a much broader approach to the discipline of mathematics. A level Further Mathematics was the broadest and the deepest qualification reviewed. It is unusual in that the study of three application disciplines, statistics, decision mathematics and mechanics, is offered. The next broadest qualification was A level Mathematics, with two applications, statistics and mechanics, being most commonly studied. While some other qualifications come close, such as the Higher Level IB Diploma by requiring a significant amount of statistics and probability, only the Cambridge International A level, the Cambridge Pre-U and to some extent the New South Wales HSC require the study of a significant amount of applied mathematics.

Whilst demand was strongly associated with depth, there was also a link to breadth. Where the study of certain topics (such as calculus and trigonometry) was not included in a qualification or assessment to some significant level, this was deemed to lessen demand. In addition, the ability to adapt one's approach and mind-set to different applications of mathematics across a broad qualification may have the potential to raise the demand of the qualification, and allows students more flexibility in the pathways they can follow in higher education.

## **Issue 5: Specialism within mathematics**

**A level Mathematics includes optional routes. This means students with the same grade in the qualification may not be equally well prepared for a specific further course of study. Would distinct qualifications, building on a mathematical core but emphasising the different specialisms, better serve students and those seeking to match them to appropriate further opportunities?**

As noted in Issue 4 there is an emphasis in most qualifications on the study of either pure or applied mathematics. The study of both aspects of mathematics within the same course is unusual, and rarely seen outside the A level.

In some education systems the emphasis on pure or applied mathematics is dictated by the level of the course studied. As part of the Finland Matriculation Examination, the basic level mathematics syllabus covers a range of topics in mathematics and its applications. The advanced level covers a similar range of topics to the core modules C1–C4 (Pure Mathematics) of the A level and there are no significant application topics.

The Edexcel A level qualification is made up of the four pure mathematics core units C1–C4 plus two applied units. There is a choice of two applied units from the six available: Decision Mathematics D1 and D2, Mechanics M1 and M2, and Statistics S1 and S2. D2, M2 and S2 may only be studied in the second year as a follow-on to their partner unit. The most popular combination is C1–C4 plus M1 and S1.

The Further Mathematics qualification is designed to be taken alongside A level Mathematics. About fifteen per cent of A level mathematics students study this combination. In order to achieve A level Further Mathematics students need to complete a further six modules of study beyond those studied for A level Mathematics. The core is Further Pure 1 and either Further Pure 2 or 3 with another four modules being selected from ten potential pure and applied options. The most common option pattern is Further Pure 1, 2 and 3 and Mechanics 2, Statistics 2 and Decision 1. The choice of options for A level mathematics and further mathematics students will usually be restricted to the course combinations available at their school or college.

In other qualifications and assessments, separate pure and applied mathematics courses are available for students to choose between. In the Alberta Diploma, two different mathematics courses are available at each level of study. At the 30 level, students may study Pure Mathematics 30 and Applied Mathematics 30. The New Zealand NCEA also allows the study of mathematics in three different areas: Calculus, Calculus CAS and Statistics and Modelling.

Both Alberta and New Zealand actively encourage the use of new technologies as a feature of their assessments of mathematics. In the Alberta Diploma, graphical calculators play a key role in the learning of mathematics. In the New Zealand NCEA Calculus CAS course, there is a reliance on the use of algebraic calculators as a part of the course, ensuring that students gain experience in using technology they would use in higher education. Interestingly, in the Republic of Korea CSAT, there is also a heavy emphasis on the use of calculators and computers in the teaching of mathematics; however these are not allowed in the examination, thus restricting the topics that can be tested thoroughly.

The mathematics included in the A level and further mathematics combination above is amongst the most demanding in this study, similar to HKALE and the IB Diploma Higher. This study found that the mechanics papers allowed students to show they were able to apply pure mathematics to practical situations. In particular the Mechanics 2 module requires extensive problem-solving at this level. This would be very helpful for students whose choice of higher education takes them into science or engineering and technology degrees.

## **Issue 6: Mathematical content within chemistry**

**A strength of A level chemistry was seen to be its high mathematical content in comparison with other systems. Is this balance correct? Would students and higher educationalists find it preferable to have further or deeper chemistry content within chemistry and move the bulk of mathematics currently covered in chemistry to mathematics subjects?**

The range and variety of chemistry that a student can study successfully is closely related to their mathematical competence. This can range from plotting experimental results on a graph to the formulation of algebraic equations used in rate calculations and chemical modelling. In all the qualifications or assessments included in this study, syllabuses appear to expect students to be able to carry out routine arithmetical calculations, such as those in stoichiometry and empirical formulae. However, the actual mathematical requirements are sometimes not defined within the course content.

One of the strengths identified of OCR A level Chemistry was the high mathematical content of the course. Qualifications with similarly high levels of mathematical content include the IB Diploma, Republic of Ireland Leaving Certificate (Established), the Cambridge International A levels and the Cambridge Pre-U. These all have a clearly stated mathematical component representing an integral part of the course. For the OCR A level and both the CIE syllabuses these are identical and the most demanding seen.

Of course, as previously noted, the A level is relatively unique in its structure compared with many of the international qualifications, comprised as it is of stand-alone subjects rather than an overall certificate. As it is possible that A level Chemistry students will not be studying mathematics alongside their chemistry course, there is perhaps more of a need to ensure that the required mathematical content is explicit within the chemistry syllabus.

This is in contrast to comparator education systems where mathematics is a mandatory subject for all students in most of the composite qualifications. However, this has a limited match with the demand for mathematics within chemistry assessments and mathematical requirements must be inferred from the topics covered and questions asked in written assessments. For example, the Denmark STX Chemistry A course specifically requires students to complete the STX Mathematics B course in support of their studies. It does not specify which mathematical knowledge and skills from that course students are expected to apply to chemistry; however, success in the assessments requires good mathematical skills.

An exception to this is the Alberta Diploma which clearly cross-refers the mathematical requirements of the chemistry course to the core mathematics syllabus.



In the Alberta Diploma, the Chemistry 30 syllabus cross-refers directly to specific objectives within their qualification's Applied and Pure Mathematics 10 and 20 syllabuses.

The impact of mathematics upon the demand of the assessment can be measured in terms of the proportion of the assessment which relies upon correct application of mathematical techniques and skills in support of chemical knowledge, understanding, application and skills in order to complete a task or questions. This is highest in the Denmark STX assessment at nearly half of the available marks, but unsurprising given the intensely investigative nature of the assessment. Lowest is the USA ACT which has no mathematical requirements in the science test, but does also test mathematics separately. The Regents Diploma is dependent on mathematics for less than 10 per cent of the assessment, but the remainder are grouped between 15 per cent and 30 per cent. This suggests a clear focus on chemistry, although it may also reflect the prevalence of short-answer questions rather than unstructured tasks.

Perhaps the lowest level of mathematical demand can be found in the New Zealand NCEA Level 3 qualification. This does not exceed the level of competence required for English GCSE Mathematics. The demand to be able to use, for example, logarithms in pH calculations is the same for the NCEA as for the Alberta Diploma and OCR A level, but there is a limited depth of use of mathematics in NCEA assessments. The remaining syllabuses rely much more on students learning the relevant material and being able to apply it in relatively simple cases. The difficulty of calculations tends to follow the same pattern as the range and depth of topics in the syllabus. Most composite qualifications present mathematically undemanding assessments. The exception is the IB Diploma with the wider range of content requiring more mathematics.

A variety of question types is used by the chemistry qualifications and assessments studied. These include multiple-choice and numerical response; short-answer questions; interpretation of data; calculations; evaluation and analysis; interpretation of data and use of graphs; and practical procedures, amongst others.

## **Issue 7: Focus of the study of English**

**A levels were found to be distinctly different from the study of English in other education systems as they have an exclusive focus on reading and interpreting traditional forms of text. In other systems there is a broad range of views on what could be considered a text (from a photograph, to film, to Chaucer). Would a broader approach prepare students better for studying in a higher education setting?**

This study demonstrates clearly that there is no single, unified definition of English as an academic subject. Even within England there are three distinct A level qualifications: English Language, English Language and Literature, and English Literature. The A level chosen for inclusion in this study is the AQA English Literature B syllabus. However, not all of the countries included within the study which use English as the language of tuition have distinct English literature courses. The English courses available in comparator education systems may also include the study of language, and this may be one of the factors which promote the broader range of views on what might be considered a text in these qualifications.

It is clear that the qualifications included in this study have quite diverse aims. The AQA A level, the Cambridge Pre-U, the Cambridge International A levels and the IB Diploma concentrate on literature, the latter offering a more global perspective on the subject. These four qualifications are the most similar in terms of content as they focus on the more traditional forms of text. Others, such as the New South Wales HSC and New Zealand NCEA Level 3, and to a lesser extent the Alberta Diploma, New York Regents Diploma and the Republic of Ireland Leaving Certificate (Established), make the boundaries of English and English literature more porous, placing emphasis on the study of English to enable students to become good communicators, readers, thinkers and citizens.

Within these courses the definition of text and notions of canonicity vary considerably. Those qualifications which place some emphasis on the study of English for communication allow for the study of a wide range of text types (photographs, films, journalism, screenplays) not seen in the syllabuses that concentrate more exclusively on literature.

The portfolio requirement for both HKALE and HKDSE offers plenty of student choice and the opportunity to explore a range of writing styles, including film study. The New South Wales HSC features an inter-textual approach. The interdisciplinary nature of the specification (mixing traditional literary topics with media-based topics, for example), the emphasis on oral competency, and the opportunities offered for imaginative writing are distinct from other courses included in this study. Where more traditional literary texts are studied, these come from a wide range of periods and genres, and are expected to include classics, successful teaching texts and innovative recent works.

The New Zealand NCEA Level 3 syllabus offers a very good range of topics which are interesting and engaging for students; they are well balanced, with plenty of sub-topics available in the externally assessed standards. The study of English is opened up by the lack of division between language and literature together with the inclusion of the literary text and other forms of written and visual production. The oral component is an educationally beneficial part of the programme on offer.

In the Alberta Diploma, students may consider very diverse texts as part of their study. These may include modern drama (theatre, television, film, radio or screenplays), poetry and song, non-fiction and response to non-fiction.

Although A levels do prepare students well for continuing their studies at a UK university, this study found that the English Literature A level qualification may not provide specific preparation for all of the English-related degree courses available in England. This is because many English universities have developed broader English courses which look beyond the analysis and critique of literary texts to encompass the wider development and use of the English language. This is similar to some of the international qualifications in the study which manage to successfully blend the study of language and literature. The study of a more diverse base of texts is one feature of these qualifications.

## **Issue 8: Purpose behind studying history**

**Other systems often had a clear rationale for the study of history at senior secondary level, for example to promote good citizenship. Do we need to address a purpose for the study of A level History beyond preparing students for higher-level historical study?**

This study found that in the majority of education systems included in this project, there was a clear vision for the study of history at senior secondary level. Qualifications place differing degrees of emphasis on: preparing students for higher study at university; developing students' critical thinking skills; developing citizenship; and developing students' interest in history. This rationale for the study of history impacts on the design of the qualification, particularly on historical content and the types of historical skills that are assessed.

Most of the qualifications or assessments view the study of history as a discipline as an important part of their rationale, but to varying degrees. The strongest statements are to be found in the Edexcel A level, the Cambridge International A levels and Cambridge Pre-U and the IB Diploma. The exceptions to this are the New York Regents Diploma and the Republic of Korea CSAT where history is placed within the context of a prescribed social studies programme. In two instances, the *baccalauréat général* in France and the *Vitnemål* in Norway, the discipline of history is seen as integrated with another discipline; geography and philosophy respectively.

For some of these qualifications or assessments the study of history is explicitly a preparation for study at university, namely the Edexcel A level, the Cambridge Pre-U, the Finland Matriculation Examination, the *baccalauréat général* in France, the IB Diploma, the Netherlands havo and vwo and the *Gāokǎo* in the People's Republic of China.

For others the skills and understanding derived from studying history are seen as a preparation for life and citizenship (whether national or global). In New York State the predominant emphasis is on "developing a disposition to democratic values and learning to function effectively in American society" (New York State Education Department curriculum materials).

Additionally, some place a special emphasis on students learning about the culture of their country, such as the *baccalauréat général* in France, the Matriculation Examination in Finland and the havo and vwo in the Netherlands.

This emphasis on national citizenship and understanding is clearly a factor in determining the extent to which students are required to study their own national history at one end of the spectrum and are expected to develop a wider continental or world view at the other. Related to this is the extent to which the qualifications or assessments offer choice to teachers on what content to teach. In some, such as the

*baccalauréat général* in France or the New York Regents Diploma, there is no choice of course content, but in others, most notably the A level, there is very wide choice.

Of the countries which do require students to study their own national history the weightings vary. In the Edexcel A level, students spend a minimum of 25 per cent on their national history as do students in the Matriculation Examination in Finland. The New York Regents Diploma is entirely focused on US history whilst that for the *Gāokǎo* places Chinese history firmly at the centre of its content. Of the rest, the Republic of Ireland Leaving Certificate course requires 50 per cent on Irish history, the *baccalauréat général* requires at least 50 per cent on French history, the Netherlands havo and vwo courses include one component dedicated to Dutch history, and the course from the NCEA in New Zealand can be studied entirely on topics from New Zealand history (although this depends on the optional topics chosen).

Only one qualification, the Edexcel A level, mentions the provisionality of history, although others describe historical interpretation as being open to debate. The New South Wales HSC specification describes history as a “contested dialogue between past and present” (Higher School Certificate assessment materials). Perhaps only in the New York Regents Diploma, the People’s Republic of China *Gāokǎo* and the CSAT in the Republic of Korea does there appear to be a view of history as uncontested with a definitive narrative version.

Whilst these diverse senior secondary qualifications have very different purposes, these differences by themselves do not indicate different levels of demand. In some the content is more high profile, notably Finland’s aims to teach students the principal “trends of Finnish and world history” (Finnish curriculum materials). In others, historical skills are also strongly emphasised. It is not possible to make a direct link between the relative status of content and skills in specifications and their level of demand due to the many other variables.

## **Issue 9: School-based assessment**

### **Should there be more teacher- and school-based assessment with the potential to stretch students, especially where oral examinations are part of the system?**

Within the assessment of senior secondary qualifications internationally, there is a strong emphasis on the use of internal assessment. In A levels there is a degree of school-based assessment for the subjects included in this study (with the exception of mathematics); however this is often less pronounced than in the other education systems in this study.

The emphasis on internal assessment varies considerably by education system or qualification. In the Alberta Diploma, Netherlands havo and vwo and New South Wales HSC, for example, the school-based assessment mark makes up 50 per cent of the final mark for the qualification. In the New York State Regents Diploma and the Republic of Ireland Leaving Certificate (Established), the qualification is fully externally assessed. However, most qualifications contain some elements of internal assessment, which combine with the results of external examinations to give an overall grade.

A minority of education systems promote the use of internal assessment over external examinations. In Norway's *Vitnemål*, a student's progress is assessed by teachers to provide the information for the overall achievement marks on the student's school leaving certificate. External examinations are required in up to five subjects, one of which must be home language. In all other subjects, a student is still assessed, but this is managed within the school and the results are reported centrally.

The design of the school-based assessment varies by system and the nature of the subject or skills being assessed. Across the qualifications studied, the internally-assessed tasks include a range of different approaches, with the potential to test numerous relevant skills in a demanding way. In New South Wales, for example, school-based assessments may include "tests, written or oral assignments, practical activities, fieldwork and projects" (Board of Studies New South Wales, 2012).

It is of particular note that many systems use oral tests (both externally and internally) to assess subject knowledge and skills across all of the four subjects studied in this report (Denmark STX, Finland Matriculation Examination, IB Diploma, New Zealand NCEA, Norway *Vitnemål*). These oral examinations appear to be extremely demanding forms of assessment and an educationally beneficial part of the programme on offer.

In the Denmark STX history assessment, the 30-minute oral examination is based on 10–15 pages of very challenging pre-released material. These materials relate to one of the 15 stages of the curriculum covered and come in a variety of formats, including

tables of data, pictures and extracts of text. In the examination, the student must set out, analyse and discuss one or more of the issues connected with the topic that they are allocated. In the first ten minutes the student presents the historical problem(s) and their relationships with the completed curriculum stages. The examination then continues in the form of a 20-minute dialogue between the examiner and examinee. The flexibility and complexity of questioning that such an approach allows was considered very demanding. Having to demonstrate these skills would be valuable to a student looking to progress to higher education.

Another common style of internal assessment is a self-directed research project. In the New Zealand NCEA, practical research projects are built into a range of courses. In chemistry, students carry out open-ended investigation which allows students to design and carry out their own experiments in support of a research project. In history, internal assessment requires students first to plan and carry out independent historical research and then to communicate and present that research in context. These offer innovative ways of assessing students' understanding of the issues. Both of these examples were felt to be particularly demanding.

In the study of English, most education systems use internal assessment tasks as part of their overall assessment process. These include conventional essay-writing, creative and recreative<sup>5</sup> writing, and oral presentations. Where coursework is not included in a qualification (Republic of Ireland Established Leaving Certificate), this was felt to hamper students' opportunities for independent research. Coursework helps to develop independent thinking and decision-making and allows students to experiment with their own writing and responses to texts; it also caters well for all levels of the ability range.

In England, most of the A levels included in this study allocate around 20 per cent of available marks to internally-assessed tasks; this is with the exception of the Edexcel A level in Mathematics, which contains no internally-assessed content. In other education systems, however, the study of mathematics is no less likely to be internally-assessed than any other subject. Several mathematics qualifications involve school-based assessment where up to 50 per cent of the final grade is made up of such assessment tasks. Such tasks can broaden a qualification and allow students to be tested on the application of IT, extended problem-solving and the use of mathematics as a tool for modelling, all of which cannot be tested in an examination environment.

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<sup>5</sup> Recreative: literally, "create anew". A re-creative task is based upon source materials and requires the student to consider the content from an alternative viewpoint and produce a new text, often in a different genre from that of the original, which is supported by textual evidence from the original material.

## **Issue 10: Multiple choice**

**Multiple-choice questions are common in other education systems at senior secondary level. They are not common in A levels. Multiple-choice questions can be used to test large amounts of content and assess skills such as the ability to use the English language. These can be difficult to test by other means. Should we revisit the use of multiple-choice questions in A level assessments?**

The A levels in the this study do not use multiple-choice questions in any of the external examinations studied. This absence of multiple-choice testing is in contrast to many of the international assessments and qualifications at senior secondary levels. Various education systems incorporate multiple-choice questions into their examinations and in some cases, these questions are demanding and enhance the assessment as a whole.

A limited number of qualifications or assessments rely on the use of multiple-choice questions throughout. One example of this is the Republic of Korea CSAT. The CSAT is entirely externally assessed through multiple-choice papers with five possible answers for each item. All subjects in the CSAT are assessed over the course of one day. The People's Republic of China *Gāokǎo* has a similar format, with all subjects tested over the course of three full days.

The heavy use of multiple-choice questioning in the CSAT and *Gāokǎo* is particularly relevant given their context. The examination duration for both of these is relatively short. With this time restriction a question style which tests a student's ability to recall the large amount of information they have acquired as part of the course, in a time-efficient manner, is an effective way to ensure testing of a large part of a curriculum in a short period of time. In the case of the Chinese system in particular, the volume of students taking the examination is also significant. Multiple-choice testing provides one of the most efficient and reliable options for marking. In these cases the use of multiple-choice questions is vital for the manageability of the test.

Other education systems draw on multiple-choice questioning to a far lesser degree. In these cases, multiple-choice items are most likely to be part of the assessment of mathematics and chemistry. In chemistry, the nature of the questions very much reflects the rationale of the course. Where a course emphasises the acquisition of knowledge, the questions require recall. Often such questions are in the form of multiple-choice items (see for example, the Alberta Diploma and the New South Wales HSC). The demand of these questions is variable. The multiple-choice questions in the Alberta Diploma chemistry examinations require simple recall from the syllabus, logic and analysis or recognition, with very little opportunity to test higher-order thinking skills.



In the mathematics element of the Alberta Diploma, 82 per cent of the total marks available for the final examination are awarded for multiple-choice questions. The demand of the questions was judged to be significantly lower than that of A level Mathematics. Similar findings were made about the use of multiple-choice items in the HKDSE and the ACT test.

However, there are examples of assessments where multiple-choice questioning has been used to build greater demand. The People's Republic of China *Gāokǎo* and the Republic of Korea CSAT employ extremely stretching multiple-choice questions. These questions are often worth a significant number of marks but there is no facility for part-marks and students lose just as many marks for one arithmetical slip as for a non-attempt of the question or a wild guess.

Whilst A level Mathematics and Chemistry do not currently include multiple-choice questions, they do incorporate a number of short-answer questions. In contrast, the assessment of A level English and History include none of these short-answer questions; assessment is instead based on extended essay and source questions. This is therefore a significant difference in approach when we consider that in many of the international qualifications or assessments studied, multiple-choice questions are also used to assess these disciplines.

In both English and history, the most demanding style of question tends to be the extended, unstructured questions requiring substantial argument and synthesis. Despite this, this study found that multiple-choice items can also be demanding, depending on the content and skills that they are designed to test. They are also useful in varying the pace of an examination and catering for the lower-achieving students. However, if over-used they may also hamper the more able, especially when used to test unseen material. Multiple-choice questions are not suitable for some of the key skills involved in the study of certain subjects. In English, for example, it is impossible for students to undertake critical responses to texts (apart from those offered in the answer options) through multiple-choice questions. This prevents students from demonstrating skills considered very important for entry to a UK university to study English-related subjects.

The ACT English Test uses multiple-choice questions to test students' understanding of the conventions of writing and rhetorical skills as demonstrated by texts. Similarly the ACT Reading Test uses multiple-choice questions to test students' understanding of prose passages. The texts are selected to represent materials commonly encountered in the first year of higher education. In this first test, the higher-attaining students are hampered by the rigid constraints of the multiple-choice format, and are prevented from demonstrating any flair, originality, opinion or nuanced understanding of writers' methods. However reading the unseen texts and successfully answering the volume of questions within the time allowed requires a high level of specific literacy and comprehension skills.

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