



International Comparisons in Senior Secondary Assessment

Progress Report



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Executive summary

This report describes the context and parameters of Ofqual's research into the assessments taken by learners at senior secondary level in a number of key comparator jurisdictions and outlines the progress made up to February 2011.

The purpose of the research is to make comparative judgements concerning the demand of qualifications available to learners in England, Wales and Northern Ireland, against a range of qualifications available to similar learners in other jurisdictions. The focus is on their appropriateness in preparing learners for entry to an honours degree level course in the UK.

The study comprises:

- a consideration of the purpose of the qualification, including target learners and take-up rates, pass rates, an indication of what is considered as "success" in the qualification and intended progression following successful completion of the qualification
- a review of the subject specification (syllabus) to make judgements about the nature of the subject matter to be covered in the qualification, including breadth and depth of subject coverage, accessibility to the range of learners taking the qualification and suitability for progress to further study and/or employment
- an investigation of the assessment instrument/s (for example, question papers) to make judgements about issues such as level of demand, the quality of the question paper/s and mark scheme/s, and the match between the assessment instrument/s and the subject specification (syllabus), any subject criteria, and the purpose of the qualification.

As part of an initial desk research exercise, the scope of the research to be undertaken was determined. Criticisms of research previously conducted in this field often focused on the range of countries included, the limited number of subject areas considered and the number of different reviews taken into account in formulating the findings. The approach taken in this study seeks to address these criticisms through its scope and methods.

We invited 22 countries, states and provinces (jurisdictions), Cambridge International Examinations, the International Baccalaureate Organization and awarding organisations offering A levels in England, Wales and Northern Ireland to cooperate with the study. They were asked to contribute materials in four subjects representing a range of academic disciplines: chemistry, English (where this is the national language or the main language of tuition), history and mathematics.

By the end of February 2011, we had collected, or were in the process of collecting, assessment materials from:

- Eleven jurisdictions: Alberta, Denmark, Finland, Hong Kong Special Administrative Region of the People's Republic of China, Ireland, Massachusetts, Netherlands, New South Wales, New York State, New Zealand, South Korea
- Three qualifications or assessments offered in a number of jurisdictions: The ACT (formerly the American College Test), Cambridge International A levels and International Baccalaureate (IB)
- Two qualification types available to learners in England, Wales and Northern Ireland: A levels and the Cambridge International Pre-U

We are also working with colleagues in France and Shanghai to access materials from their assessments.

To date, we have undertaken desk research to provide context for the study, determined subjects to be reviewed, invited international jurisdictions to cooperate and appointed teams of reviewers to analyse the materials provided by partners. We aim to publish a final report in late 2011.

Introduction

In communications between the new Secretary of State for Education, Michael Gove, and Ofqual's Chair, Kathleen Tattersall, it was agreed that Ofqual would undertake a 'focused piece of work targeted on assessment tasks set in a selected range of subjects and countries' at pre-university level (Tattersall, 2010).

This report outlines the progress made to date in developing the parameters for the study, identifying and recruiting countries and jurisdictions to contribute assessment materials and developing the methodology to be followed when analysing these assessment materials.

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

In an age when learners cross international boundaries to study it is important that the qualifications we regulate are comparable with those studied by learners in other high-performing countries, since UK learners will often be competing with international learners for higher education and employment opportunities.

The focus of the study is on their appropriateness in preparing learners for entry to an honours degree level course in the UK. The aim of the study is to make a judgement about the demand of qualifications available to learners in England, Wales and Northern Ireland, compared with the demand of qualifications available to similar learners in other parts of the world.

This study will contribute to our understanding of how these qualifications compare with those offered to learners in other parts of the world. In addition to this study, we have agreed to take on a rolling programme of work to look at assessments across a wide range of age groups. The 2010 Schools White Paper and the Education Bill currently before Parliament reflect this. The 2010 Schools White Paper says:

Ofqual will measure our qualifications against the best in the world

4.39 The independent regulator of exam standards, Ofqual, plays a vital role, but until now has been asked to focus too narrowly on simply maintaining the standards of qualifications over time. This does not help us when other countries are improving faster and making their education systems more rigorous. So we have asked Ofqual to widen its view to reflect the importance of keeping pace with – and learning from – the rest of the world.

4.40 We will legislate in the forthcoming Education Bill so that Ofqual's objectives include securing international comparability of qualification standards...

4.41 We will invite Ofqual to review and report on the quality and standards of tests and exams at ages 11 and 16, comparing England with high-performing nations and building on work already started for 18-year-olds. Subsequently, Ofqual will make international comparisons an ongoing part of regular reviews of standards.

(Department for Education, 2010b)

The Education Bill presently before Parliament includes a revised qualifications standards objective for Ofqual:

The qualifications standards objective is to secure that –

(a) regulated qualifications give a reliable indication of knowledge, skills and understanding, and

(b) regulated qualifications indicate –

(i) a consistent level of attainment (including over time) between comparable regulated qualifications, and

(ii) a consistent level of attainment (but not over time) between regulated qualifications and comparable qualifications (including those awarded outside the United Kingdom) which are not qualifications to which this Part applies.

(Clause 22, Education Bill 2011)

Context

Making comparisons

Making comparisons, or benchmarking, between any features of international educational systems is not straightforward. As Professor John Gray has pointed out:

The major problem with many of the early forays into this territory was that the methods of investigation adopted were often partial and fairly unsystematic. Too much weight was probably placed on single country comparisons and too little attention was paid to how the parts made up the whole... 'under-performance' in one area... [may have been because]... a topic was not emphasised to the same extent in that country. In the absence of systematic and detailed comparisons it was often difficult to know.

(Foreword to Ruddock and Sainsbury, 2008, p.8; parentheses added)

A number of other reports support this view (see, for example, Black, 1992; National Governors Association et al.; 2008; Oates, 2010). The study to which Professor Gray refers was concerned with looking at the primary curriculum, and did not consider assessment in detail. It looked at six countries across the three core subjects at primary level: mathematics, science and literacy, 'rather than just isolated components' (Foreword to Ruddock and Sainsbury, 2008, p.8) and to consider the inter-connectedness of the curriculum with other parts of an educational system.

And that is the broad model for this study: to be inclusive of a number of qualifications offered across a range of educational contexts; to consider a selection of subject areas; and to undertake the analysis of evidence in a systematic way.

As Black pointed out in the report on the UNESCO-sponsored study on physics examinations used for university entrance:

It was of course clear that there would be difficulties [in undertaking the comparisons]. An examination in physics, like any other instrument that acquires any operational significance, cannot be understood except as a product of the social and intellectual context in which it functions and for which it is produced. Our study could clearly recognise this, but its capacity to explore the context in depth would clearly be limited.

At the same time, there would be an objective feature: one set of physics examination questions can be judged as more insightful and effective than another...

(Black, 1992, p.2; parentheses added)

This study follows in this tradition in accepting that qualifications, and the assessments that support them, cannot be judged in isolation (and we will consider the contextual details of each assessment in the final report) but will focus on the demand of each assessment and/or qualification against the others in the context of their appropriateness in preparing learners for entry to an honours degree level course in the UK.

What do we mean by 'demand'?

The 'demand' of an assessment or qualification can be defined in a wide variety of ways, and is linked to the purpose of the qualification. The demand of a qualification or assessment is related to:

- the amount and type of subject knowledge required to be assimilated
- the complexity or number of processes required of the learner, the extent to which the learner 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 learner must devise a strategy for responding to the questions.

Pollitt et al. (2007) describe different conceptions of demand and how it can be measured, and this will be further explored in the final report. In this study demand will be judged against what might be expected in preparation for entry to honours level degree study in the UK and includes:

- qualification level factors such as assessment objectives, qualification content and structure (such as breadth versus depth of study)
- assessment level factors such as what and how the content is assessed, the weighting of each component and how the assessments are marked.

What can influence demand outside these considerations?

There are a number of factors affecting the outcomes of learners that are not directly related to the learning that takes place or the examinations that assess the learning. These have been explored in other reports (see, for example, Black, 1992; Black, 1998; Le Métais, 2002; Newton, 2007; Oates, 2010; Ruddock and Sainsbury, 2008) and will be further investigated to give context to the findings in our final report. These include: cultural attitudes to education and perceptions of success; government policy; participation rates; whether or not there are alternative qualifications available; and how the outcomes of the qualifications are used and by whom.

This study will attempt, where possible, to identify some of these factors in order to set in context any judgements made about the comparability of particular qualifications.

Some factors are internal to the educational system, for example how important it is to do well, as Black points out:

The nature of an examination system, the ways in which examiners operate it, and the standards that it sets, are all strongly influenced by the use to be made of the results... Where the admission hurdles are very high... the examiners can set very difficult problems, reflecting the belief that the ability to tackle these under examination pressure is the best evidence of potential... Where there is such a shortage of qualified candidates that the admission hurdle is almost non-existent... the questions have to be oriented towards minimum competence.

(Black, 1992, p.198)

The proportion of learners who get the top grades is also a consideration. UK NARIC undertake statistical analyses of proportional distribution of grades across a number of jurisdictions where they judge them to be of equivalent standing (UK NARIC, 2010) and these will be taken into consideration.

Other factors in the control of a jurisdiction's educationalists include: curriculum (specifications, text books and other support material); time spent studying a subject (including numbers of hours in class and the number of target self-study hours); pedagogy used and the quality of teaching; assessment types; system accountability measures; and available routes to learners through the education system.

There are other factors external to the educational system that also have a bearing on demands such as the role of education in society (including parental expectations), and policy issues such as funding, institutions and policies on participation in education.

The role of international testing

One way in which policy makers have attempted to make comparisons more straightforward is with the use of tests that have been undertaken by learners in a number of countries. International studies such as those done by the Programme for International Student Assessment (PISA), the Progress in International Reading Literacy Study (PIRLS) and the Trends in International Mathematics and Science Study (TIMSS) use a common testing method to ascertain standing of different educational regimes.

A good general description of the process of setting up such international studies is seen in Whetton et al. (2007, pp.3–7) and it is clear that much care is taken in constructing them and reporting their findings. As Askew et al. noted:

England regularly gets positioned towards the top of the group of second ranking countries and its performance is fairly stable over time. It also needs to be noted that the differences between countries' performance are not that large and are usually statistically insignificant. The 'horse race' approach to the rankings produced by international studies – looking to see which position England is placed in and whether or not it has moved up or down the league tables is not that meaningful partly because the absolute differences in scores between countries are not that great and partly because the constituent group of comparators changes from study to study and from year to year. Overall, and over time, England's performance is not that worrisome.

(Askew et al., 2010, p.9)

However findings of such studies remain a great concern in England (see, for example, Department for Education, 2010a; Eccles, 2010; Paton, 2010; Shepherd, 2010). But as outlined above, there are good reasons to view the findings of such international tests critically (Oates, 2010). A number of factors may influence the outcomes of the studies and it cannot be assumed that the findings provide a definitive answer about which learners are the highest performing overall.

First, there is an assumption that the items tested for are somehow an objective measure of what is best; secondly, that the learners undertaking the study are a

balanced representation of all learners at that stage of education (Askew et al., 2010, p.7); and also that learners sampled in each country are equally motivated to perform well in the tests (Askew et al., 2010, p.11).

Further, all international comparisons, this one included, are subject to the fact that they can only offer a snapshot of one moment in time, which may have been affected by factors in the past that no longer apply. For example, learner performance in an examination may be the result of curriculum developments undertaken and subsequently abandoned, investment in education infrastructure some time in the past, or other factors that are no longer in operation in the system being analysed.

Undertaking the study

Ofqual and its predecessor organisation, QCA, has many years experience in undertaking comparative studies of qualifications. Making comparative judgements between qualifications is a difficult task. The process for undertaking these reviews is not static and evolves for every review based on the individual characteristics of the qualifications and subjects being compared, evidence from previous reviews, learning from the research of others and discussions with awarding organisations. In 2007 QCA discussed the current thinking on making valid comparisons (Newton et al., 2007) and processes have continued to develop since that time.

The starting-point for developing the research methodology for this study reflects practice in Ofqual's established *Standards Over Time* programme (see Ofqual, 2010) and other recent investigations. It is grounded in recent thinking and experience from projects in the area of comparability across subjects (as described in Pollitt et al., 2007) and takes into account the methods used by comparative studies outside England (such as Allais et al., 2008a; Allais et al., 2008b; Askew et al., 2010; Black, 1992; Le Métails, 2002; Whetton et al., 2007).

Comparing examination demands is a complex task, heavily dependent on the evidence available and the ability of reviewers to make judgements on it. This is particularly true when the judgements are being made between different examination systems at a given point in time. Several limitations need to be kept in mind when considering any findings of this review:

- the nature of the materials reviewed
- the review process
- the inferences that can be made from the findings.

Progress to date

As part of an initial desk research exercise, the scope of the research to be undertaken was determined. Criticisms of research previously conducted in this field often focused on the range of countries included, the limited number of subject areas considered and the number of different reviews taken into account in formulating the findings.

To provide a context for the study we carried out a review of the educational system and main qualifications accessed by senior secondary learners intending to progress to higher education across a number of countries as well as examining research previously carried out on international educational comparisons.

We invited 22 countries, states and provinces (jurisdictions), Cambridge International Examinations, the International Baccalaureate Organization and awarding organisations offering A levels in England, Wales and Northern Ireland to cooperate with the study. They were asked to contribute materials in four subjects representing a range of academic disciplines: chemistry, English (where this is the national language or the main language of tuition), history and mathematics.

The selection of jurisdictions invited to cooperate was based on a number of criteria:

- to include EU, Commonwealth and other jurisdictions representing a breadth of education traditions and economic structures
- to include jurisdictions where the primary language of tuition is not English
- to include jurisdictions with universities ranked highly in international comparisons, based on the *World University Rankings 2010* (Times Higher Education, 2010) and *Academic Ranking of World Universities 2010* (Shanghai Ranking Consultancy, 2010)
- to take into account the findings of the 2009 PISA survey (OECD, 2010)
- to take into account jurisdictions which have the highest rates of learners coming to the UK to study (Higher Education Statistics Agency, 2010)

Due to the diversity of education systems across these jurisdictions, criteria were established for selecting the qualifications to be reviewed. Where there are multiple qualifications or specifications within a country (for example, when there are different examination boards or different qualifications available in different parts of a country), the qualification selected would usually be the qualification or specification taken by the highest number of learners, and/or the qualification usually used as a prerequisite for university level education.

While many of the materials we required to make the comparisons are freely available via the internet, we did not want to use them without the agreement of those administering them.

By the end of February 2011, we had collected, or were in the process of collecting, assessment materials from:

- Eleven jurisdictions: Alberta, Denmark, Finland, Hong Kong Special Administrative Region of the People's Republic of China, Ireland, Massachusetts, Netherlands, New South Wales, New York State, New Zealand, South Korea
- Three qualifications or assessments offered in a number of jurisdictions: The ACT (formerly the American College Test), Cambridge International A levels and International Baccalaureate (IB)
- Two qualification types available to learners in England, Wales and Northern Ireland: A levels and the Cambridge International Pre-U

We are also working with colleagues in France and Shanghai to access materials from their assessments.

In England, Wales and Northern Ireland these subjects form part of more than one qualification available to learners at senior secondary level: A levels, the International Baccalaureate (IB) and the Cambridge Pre-U. While these vary in assessment style and format, they have a number of common characteristics, including that they are widely accepted as prerequisites for entry into honours degree programmes in the UK, and will therefore all be included in the study.

Within A levels, five awarding organisations offer specifications in the subjects being considered: Assessment and Qualifications Alliance (AQA), Council for the Curriculum, Examinations and Assessment (CCEA) (awarding organisation), Edexcel, Oxford Cambridge and RSA Examinations (OCR) and WJEC (previously the Welsh Joint Education Committee). We considered it impractical to include specifications from all awarding organisations, so the specification with the largest entry in 2009 was selected to represent all A levels in each subject: OCR – Chemistry A, AQA – English Literature B and Edexcel – History and Mathematics.

The materials requested included the specification, the question papers, related mark schemes and examiners' reports. This also included any subject-specific materials routinely issued to learners and centres such as vocabulary lists and formulae sheets. It must be acknowledged that not all of these materials are produced by every jurisdiction and some gaps are expected.

For the purpose of this study the demand of each qualification will be compared with English A levels. This comparison will include the following:

- a consideration of the purpose of the qualification, including target learners and take-up rates, pass rates, an indication of what is considered as 'success' in the qualification and intended progression following successful completion of the qualification
- a review of the subject specification to make judgements about the nature of the subject matter to be covered in the qualification, including breadth and depth of subject coverage, accessibility to the range of learners taking the qualification and suitability for progress to further study and/or employment
- an investigation of the assessment instrument/s (for example, question papers) to make judgements about issues such as level of demand, the quality of the question paper/s and mark scheme/s, and the match between the assessment instrument/s and the subject specification (syllabus), any subject criteria, and the purpose of the qualification.

The first of the above points will be addressed by the desk research carried out as part of the initial selection of countries and qualifications.

The latter two points will be addressed in the qualification analysis stage. For this stage reviewers are organised into four subject panels, each led by an independent subject/assessment expert¹ who is familiar with Ofqual's scrutiny and comparability studies. The panel memberships are designed to represent a broad spectrum of stakeholders and to bring together a range of different views – all of which will be considered as part of the study – with the subject panel leader responsible for making the final decision on the evidence available concerning any significant differences in views. All members of the panel are under contract to and paid by Ofqual. They are required to put their professional judgements above any allegiance to the organisations that nominated them.

Each subject panel has been set up ideally to comprise:

- one independent subject/assessment expert nominated by Ofqual to fulfil the role of subject panel leader
- two additional independent subject/assessment experts nominated by Ofqual

¹ Ofqual annually runs (in November) a campaign to recruit individuals with subject and/or assessment expertise. Recruits are often teachers, lecturers or assessors, or are self-employed, having formerly been involved in education and assessment.

- one nomination from each of the regulators in Wales (DCELLS) and Northern Ireland (CCEA)
- two nominations from the English-based awarding organisation whose A level qualifications are included
- two nominations from Universities UK, an organisation that represents the interests of universities in the UK
- two nominations from organisations that represent subject-specific interests in the subjects selected
- one nomination for each of the other qualifications included in the study, i.e. the International Baccalaureate Organization (IBO), Cambridge International Examinations (CIE) and the jurisdictions involved in the study.

The lead reviewers attended a briefing session in November 2010 where the project and methodology were explained and there was an opportunity to shape the review process. Following the briefing, lead reviewers had the opportunity to customise the reporting forms that all reviewers will complete as part of their in-depth jurisdiction reviews and prepare for the subject panel briefing days.

For each of the four subjects the panel members met for an initial briefing at the end of November 2010 before conducting the analysis as a home-working exercise led by the subject panel leader. At this briefing Ofqual staff provided further information about the study and the reviewers were given the opportunity to familiarise themselves with the study methodology, the jurisdictions being reviewed and the processes that will follow.

Subject panel members will collectively undertake analyses of each set of subject materials. Each panel member will be allocated a cross-section of four sets of subject materials as well as A level material. A description of the process for these analyses appears in the Appendix of this report.

Next steps

Once the panel members have carried out their individual analyses of the qualification specifications and assessment instruments they have been assigned (the question paper/s, mark scheme/s and any other guidance), the subject panel leaders will collate these analyses to produce a subject-level report on the collective findings of the panel. These reports should reflect both where there is consensus and where there is significant difference of opinion around any of the issues covered in the analysis forms.

The subject-level reports will then be shared and discussed with the relevant subject panels before the subject panel leaders work with Ofqual staff to collate the overall findings.

A draft of the final report for comment, clarification and factual check will be shared with participating jurisdictions and organisations whose qualifications were included. Ofqual will publish a final report in late 2011.

Appendix: Overview of methodology for the qualification analysis stage

In this stage of the study, subject panel members will collectively undertake analyses of each set of subject materials. Each panel member will be allocated a cross-section of four sets of subject materials as well as A level material.

Subject level

Each panel member will be asked to undertake a detailed analysis of the A level being reviewed and four other subjects from partners with reference to what is covered in the subject (often referred to as the syllabus, specification or curriculum) and how it is assessed. This includes the range of skills, the subject content and other factors that contribute to the level of demand (cognitive processes required) that a qualification/subject makes on the learner.

Panel members will complete three forms to facilitate this process:

- A form (facts) Panel members complete one A form for the set of subject materials assigned to them, including the A level qualification. This form is a factual analysis of the qualification/subject and its associated assessments, and provides a foundation for the analysis undertaken in the B form.
- B form
(comparisons) Panel members complete one B form which brings together their findings for each set of subject materials and compares them with their findings for the A level qualification. To make these comparisons, it is necessary to select a measure of achievement within the A level. The subject panel leaders have recommended that the level should be that of a grade B in the A level, as this grade is generally considered a good result to have for a second A level for university entry. The B form requires panel members to analyse the relative demand of each set of subject materials against A levels by applying a rating to each of the criteria identified. These criteria are aligned to the factual analysis undertaken in the A forms. Panel members are also required to provide comments, evidence and examples regarding the ratings given.
- C form
(findings) Panel members complete one C form which summarises the key findings identified on completion of the A and B forms, and provides an overall rank for each set of subject materials analysed, including the A level. In the first section of the C form, panel members are asked to highlight their key findings and overall impressions of each set of subject materials that they have analysed. In the second section of the C form, panel members are asked to rank all sets of

subject materials that they have analysed in order of overall level of demand, with the highest ranking first. Panel members are then asked to draw a line in their list to represent what they feel is the minimum acceptable level of demand that would properly prepare learners for entry to an honours degree programme at a UK university.

In each of the forms a rating scale of 1 (very undemanding) to 5 (very demanding) is available. Panel members are required to provide a written explanation for their rating, including appropriate references to the materials being analysed.

Assessment level

Panel members also undertake a separate analysis concentrating on assessments. In this CRAS (complexity, resources, abstractness and strategy) analysis², panel members are asked to evaluate the assessments that form part of the subject materials by rating a set of factors that are known to affect the demand of questions irrespective of the subject, against the standard that learners would be expected to have met before university entrance.

The CRAS analysis process is designed to consider a range of factors which might legitimately³ affect the demand of the questions or tasks that comprise an assessment.

The ratings use a scale of 1 (below the required level) to 4 (exceeding the required level), as explained in Table 1. These factors are:

- the complexity or number of processes required to respond to the question
- the extent to which the learner has to generate the response from their own knowledge or the extent to which the resources are provided
- the level of abstract thinking involved in the question
- the extent to which the learner has to devise a strategy for responding to the questions.

² The process was arrived at using a version of the Repertory Grid (Kelly, 1955), whereby practitioners were shown examples of questions and asked to identify differences between them by applying a numerical rating. This approach has been used for a number of years within Ofqual and its predecessor organisation in scrutiny and comparability reviews. Please see Pollitt et al. (2007, p.176) for more details.

³ It is possible to make questions more difficult by means which are less valid and therefore less legitimate, for example by greatly increasing the complexity of language in the questions.

Panel members will be asked to use the form flexibly according to the subject and the structure of each assessment or set of assessments. For example, it may be appropriate to undertake a CRAS analysis at question level in some assessments, at section level in others (where each section has very different types of questions or tasks), at assessment level, or at qualification/whole subject level, where all assessments are very similar.

Table 1: Guide to CRAS analysis ratings

Category		What is it?	Scoring		
			1	2-3	4
C	Complexity	The complexity of each component operation or idea and the links between them	Simple operations (i.e. ideas/steps)		Synthesis or evaluation of operations
			No comprehension, except that required for natural language		
			No links between operations		Requires technical comprehension
					Makes links between operations
R	Resources	The use of data and information	All and only the data/information needed is given		Learner must generate all the necessary data/information
A	Abstractness	The extent to which the learner deals with ideas rather than concrete objects or phenomena	Deals with concrete objects Avoids need for technical terms		Highly abstract Requires use of technical terms
S	Strategy	The extent to which the learner devises (or selects) and maintains a strategy for tackling and answering the question	Strategy for answer is given No need to monitor strategy No selection of information required No organisation required		Learner needs to devise their own strategy Learner must monitor the application of their strategy Learner must select content from a large, complex pool of information Learner must organise how to communicate response

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