CAMBRIDGE ASSESSMENT

Effects of modularisation

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Note on printing: Pages 99-100 of this report are best printed in colour to ensure that the colour graphs are clear.

Contents

EXECUTIVE SUMMARY

As part of the reform of 14-19 education, the national regulator in England has revised the subject criteria for GCSE (General Certificate of Secondary Education) examinations. One of the main changes to these qualifications is the increase in the number of unitised or modular specifications.

Up to 2008, modular GCSE specifications were mainly confined to English, mathematics and science subjects but, since September 2009, almost all specifications are modular in structure, meaning that the GCSEs are more in line with A-levels, which have been modular since 2000.

A modular specification is one in which the content is divided into a number of units or modules, each of which is examined separately. Module examinations may be taken in different sessions (*e.g.* January, March, June) and any or all modules may be retaken if the student wishes, with the highest mark for each module retained. However, GCSE qualification criteria states that unitised specifications must allow only one re-sit of an assessment unit with the better result counting towards the qualification and must allocate a weighting of at least 40% to terminal assessment. In particular, the assessment for the new OCR GCSEs is organised into units which can either all be taken at the end of the course in a linear fashion, or can be taken in different sessions to complement a more unitised approach to teaching and learning.

The proponents of modular schemes have long argued for their advantages in terms of curriculum flexibility (number and timing of modular examinations), short-term assessment goals, regular feedback, re-sit opportunities and increasing motivation for students. Critics of the modular assessment claim that it leads to fragmentation of learning, students entering examinations when not ready, more teaching to the test and over assessment. Furthermore, it is also being claimed that GCSEs are becoming less and less demanding, which might lead to a diminution of trust in the qualification as a whole among the general population.

Research questions

This project combined quantitative and qualitative research methods to address the impact of modular assessment on GCSE students. In particular, the research aimed to answer the following questions:

- Are there differences in performance between the students who take assessments in a terminal or linear approach and those who adopt a modular approach (taking units throughout the two-year course)?
- Are students at a disadvantage by their relative immaturity or narrow experience of the subject if they enter for an examination early?
- Are students benefiting from being able to re-sit modules?
- Does ongoing feedback motivate students and help them to identify their learning needs?
- Does modular assessment remove the pressure of an all-or-nothing exam?
- What are the characteristics of modular students' test-taking motivation?
- Do students in differing assessment routes show different levels of familiarity with their end-of-year examination during the year?

- What are teachers' attitudes towards modularisation and what is the impact of modular assessment on teachers' workload?

Research methods

Previous research has suggested that modular specifications work most successfully in subjects such as mathematics or physics and are less suited to subjects like English or modern foreign languages. Therefore, two contrasting subjects at GCSE level were selected for this research: English and mathematics. Only candidates who sat an examination in these subjects with the OCR awarding body were considered.

Examination outcomes in both subjects, at specification and at unit level, were obtained from OCR's examinations processing system. The data comprised personal details (name, sex, date of birth and school) and assessment grade details (session, tier, final mark and final grade). Six successive cohorts of English students (2004-2009) were investigated. However, as the unitised GCSE mathematics specification was first certificated in 2008, only two cohorts of mathematics students (2008-2009) were available for analysis.

Descriptive statistics were used to investigate the entries and the re-sit patterns for both assessment routes and regression analyses were carried out to explain the differences in attainment between linear and modular routes once the general ability of the students, measured by prior/concurrent attainment at school, was taken into account.

Questionnaires and face-to-face interviews with students and teachers in three schools offering either modular or linear GCSE English and/or mathematics were carried out in order to collect data on motivation, effects of feedback, exam pressure and workload. In particular, data on motivation was collected using an intrinsic motivation inventory survey; effects of feedback on students were mapped in interviews conducted after candidates had received the grade reports on the unit examination; and perceived workload data was collected via a self-report workload survey in the form of a workload chart for students and teachers to fill in retrospectively. In addition, modular and linear mathematics students' knowledge of their GCSE examinations was tested empirically using a mini-quiz embedded in the motivation survey.

Main findings

Entries and assessment route

- Higher percentages of candidates entering for a GCSE in English followed a linear assessment route than a modular assessment route. Despite the obvious differences in entry sizes, entries for the modular assessment route were on the increase in the period of study and entries for the linear route were decreasing.
- The majority of the candidates studying for a GCSE in mathematics followed a modular assessment route. However, entries for the modular assessment route dropped from 2008 to 2009 and entries for the linear assessment route increased in the same period.
- Patterns of entries differed by unit. In four of the five GCSE English units the majority of candidates took the examination in the terminal session. The entries for the remaining unit, unit 2433, were well spread throughout the two-year course. In GCSE mathematics, for all units, with the exception of unit M10, less than 20% of the entries were for the terminal session. This shows

that in mathematics, candidates made use of the flexible assessment by getting units out of the way rather than taking them in a narrow window at the end of the two-year course. In particular, the mathematics students interviewed in this research reported that they welcomed external examinations during the school year.

- The results from the qualitative strand of the research confirm that the students of mathematics were generally in favour of modular assessment and the students of English appreciated some characteristics of the modular assessment but they did not express a strong preference towards modularisation.
- Both strands of this research show that the introduction of the unitised specification in GCSE English did not lead to many changes in the way the subject was taught, studied and assessed, as it mostly continued to be addressed as if it were linear in design. This situation may change as time goes on. Factors such as maturity or parallel teaching across modules in English might have led many students to sit the majority of their modules terminally.
- The pattern of entries may be reflecting some experimentation on the part of the teachers in deciding the points in the course when their students should sit the examinations. Also, it is possible that different patterns of entry may emerge in the coming years as the modular schemes mature and teachers and candidates become more confident in making decisions regarding the most appropriate time to sit module examinations.

Linear assessment vs. modular assessment outcomes

- The quality of the entry in each of the assessment routes was different. GCSE English students following a linear assessment route had, on average, higher ability than candidates following a modular route. Mathematics students following a linear assessment route had slightly lower ability (ability was measured by prior/concurrent attainment).
- Modular routes in English led, on average, to lower grades than linear routes once students' ability was accounted for. However, in mathematics, candidates following a modular route obtained, on average, higher grades.
- It has been suggested that, in a modular scheme, setting targets throughout the course, having ongoing feedback and allowing a certain amount of re-taking within the course leads to candidates learning more – thereby obtaining higher grades.

Maturational effects

- GCSE English students certificating at the beginning or midway throughout the two-year course were at a disadvantage compared to those who opted for certificating at the end. Girls were at a greater disadvantage than boys. The gender effect was in line with previous research which showed that boys were more likely to take advantage of modular examinations than girls. On the other hand, girls following a linear assessment route and certificating early in the two-year course had a higher probability of achieving a given grade or above than those who certificated late.

  However, early assessment seemed to be an advantage for both girls and boys in the coursework units in both the linear and the modular routes. Students might have wanted to carry out their coursework assignments early

in the course to relieve the workload towards the end of the year and they worked hard to do so.

- GCSE mathematics students obtained, on average, significantly higher marks in early sessions than in later sessions. Therefore, for both girls and boys taking GCSE mathematics, early assessment was an advantage.

Patterns and impact of re-sits

- There was an increase over time in the percentage of students who re-sat at least one unit and an increase in the percentage of students re-taking each individual unit in both English and mathematics. The attitudes of the students interviewed in the qualitative strand of this research support the increasing popularity of re-sits, as they highly appreciated the opportunity to re-sit modules.
- In general, students who took re-sits were weaker than those who did not.
- In English and mathematics modular routes, students can only re-take each unit/module once. This research showed that the probability of obtaining good grades (A*-B) in either subject significantly decreased if more modules were re-taken. For example, in 2008, the probability of obtaining a grade A or above in English for a student averaging grade A at GCSE and who did not re-sit any modules was 0.75 whereas the same probability for a student who re-sat one or two modules once was 0.66 and 0.57, respectively.
- By contrast, there was evidence of the benefits from re-sitting units, with percentages of students obtaining an improvement in the unit grades ranging from 25% to 65%, depending on the unit and the subject (these are percentages of students taking re-sits and not percentages of the total entry in the relevant unit). It can be argued, therefore, that allowing a certain amount of re-sits within the course, candidates could be learning more. It could also be argued that candidates, through their re-sits, are more proficient at the topics covered earlier in the course than they would be had the examination been taken terminally.
- In both subjects, and across all units, the majority of candidates obtained higher marks on their second attempt at a unit than they had done on their first. However, this did not always lead to an improvement on the unit grade (see percentages above).
- It should be borne in mind, however, that the knowledge that a re-sit was available may have lessened a candidates' resolve to do their best at the first attempt. Students of modular syllabuses interviewed in the qualitative strand of the research mentioned that the possibility of re-sitting a module relieved some of the stress and pressure of the modular exams and admitted that they would have worked harder had there been only one chance for them to pass their examinations.
- The differences in the re-sitting patterns by centre type were small, with the percentage of students taking no re-sits being slightly higher in the independent sector.

Ongoing feedback

- Students of English and mathematics found feedback (positive and negative) useful and motivating and reported that it encouraged them to do better on the next modules and/or on the terminal papers.

- Mathematics students were more satisfied with their grade reports (most common form of feedback) and gained more information from them than students of English. Furthermore, mathematics students found it easier than English students to identify the strengths and weaknesses of their performances.
- However, grade reports were not helpful in identifying students' learning needs and informing their learning strategies. Students reported missing the opportunity of going through their own marked papers (as the scripts arrived too late after the examination) or receiving suggestions about the areas they needed to improve on in order to change, if necessary, their focus of learning and strategies of exam preparation.

The pressure of an all-or-nothing exam

- Modular assessment does not remove the stress and workload of an all-or-nothing exam.
- Students of modular mathematics experienced longer periods of higher workload than linear students did in the first half of the year. For students of English, the workload varied considerably during the course of the year and there were no differences in linear and modular students' workload levels.
- Students in the modular routes reported that the pressure to achieve a good grade placed significant stress on them during both the modular and the end-of-year examinations. However, the possibility to re-sit modular examinations was mentioned as helpful in alleviating some of the examination stress experienced during modular exams, as it gave some students confidence about what to expect on their subsequent exams.

Students' motivation on modular exams

- Modular mathematics students perceived their modular exams to be quite valuable, and they were generally motivated to do well.
- Mathematics students felt a considerable amount of stress and pressure and reported putting forth a lot of effort while sitting the modular examinations.
- Students of English scored highly on effort and value, which implies that they appreciated the usefulness of the examinations and made appropriate effort to do well on them. However, despite feeling under less pressure than mathematics students, students of English gave low ratings for intrinsic motivation (*i.e.* for enjoyment, competence and choice).

Familiarity with the end-of-year examination (mathematics students only)

- Modular mathematics students knew more about their end-of-year examinations and were more familiar with the requirements of their examinations than linear mathematics students. This suggests that modularisation does indeed help students in staying on track with their studies.
- In linear mathematics, more informed students experienced higher workloads. This might be explained by various personality factors, for example, students who were more familiar with the details of the final examination during the year might have been more conscientious, hard working or motivated than the rest.

Teachers' workload and attitudes towards modularisation

- Teachers in the modular assessment system appreciated the better planning opportunity around the exams, the clarity of the focus of their teaching requirements and felt that modular assessment contributed to their approach to assessment for learning. They also appreciated not having to re-motivate students at the end of the year. Teachers in the linear route appreciated having more space and control to deliver the content effectively; furthermore, they did not find it a burden to revisit topics and re-motivate students before the end-of-year examination.
- Mathematics teachers' workload levels varied with the assessment route: the linear assessment placed very high levels of workload on the teachers at certain times whilst the modular assessment provided a more evenly spread workload rising throughout the year.
- English teachers' workload levels were continually increasing between September and December, when teachers were marking mock exams and preparing for unit examinations in January. From that point onwards, workload levels varied by teacher.

This research has therefore addressed some of the key issues relating to the effects of unitised specifications at GCSE level (*e.g.* curriculum flexibility, short-term assessment goals, maturity, regular feedback to students, re-sits, increasing motivation) and provides evidence of students' and teachers' general attitudes to modularisation and reasons for the differences in the outcomes of students who took different assessments routes (linear vs. modular). It should be noted though, that the qualitative strand investigated only the views of a selected few students and teachers who do not represent all the population. However, by reporting the students' voice, the results of the statistical strand were enriched.

INTRODUCTION

GCSEs (General Certificates of Secondary Education) are the qualifications taken by the largest number of students in England. Over five million GCSEs were awarded in 2009, across a range of more than 40 subjects.

As part of the reform of 14–19 education, the national regulator in England has revised the subject criteria for GCSEs in collaboration with teachers, awarding bodies, subject associations, higher education organisations and other interested parties.

The revised criteria

- update the content of the GCSEs;
- encourage innovative teaching, learning and assessment;
- incorporate key elements of 14–19 curriculum developments;
- ensure that the revised GCSEs complement the new Diplomas;
- revise the assessment arrangements to stretch and challenge all learners and make assessment less formulaic and predictable;
- maintain standards.

Awarding bodies have written specifications to meet the new criteria and the new GCSEs will be available in three phases:

- New GCSE specifications in most subjects for first teaching from September 2009. These specifications have been accredited and are already available in centres.
- New GCSE specifications in English, English language, English literature, ICT and mathematics for first teaching from September 2010. These specifications will be available in centres in autumn 2009.
- New GCSE specifications for science subjects for first teaching in September 2011. These specifications will be accredited and available in centres in autumn 2010.

One of the main changes to the GCSEs is the increase in the number of modular or unitised specifications. Two-thirds of AQA's new GCSEs will be modular, Edexcel said all but one of its new GCSEs - statistics - would be offered in a modular structure, and OCR announced that all of its courses will be unitised, with schools given the chance to choose whether their pupils are assessed in a modular style during the course, or at the end.

A modular or unitised syllabus is one in which the content is divided into a number of units or modules, each of which is examined separately. Module examinations may be taken in different sessions (*e.g.* January, March, June) and any or all modules may be retaken if the student wishes, with the highest mark for each module retained regardless as to whether a later attempt proved less successful than an earlier one. However, GCSE qualification criteria (QCA, 2008) states that unitised specifications must:

- contain a maximum of four assessment units in a single award;
- allocate a weighting of at least 20% to each assessment unit;
- allow only one re-sit of an assessment unit with the better result counting towards the qualification;
- allocate a weighting of at least 40% to terminal assessment;

- ensure results for a unit have a shelf-life limited only by the shelf-life of the relevant specification.

An important issue to take into account when designing unitised syllabuses is whether or not modules can, or should, be free-standing or arranged in a hierarchy according to perceived academic difficulty or other criteria (Bloom, 1956; Shayer and Adey, 1981). Module designers will need to consider the extent to which prior knowledge and skills are needed for each unit, and to indicate pre-requisites where appropriate. There are some areas of study which permit a 'pick and mix' approach. There are other areas where a sequence of modules in ascending order of difficulty could be preferable.

Linear syllabuses are usually examined after two years of continuous study, and the candidate normally sits two, three or four papers.

Up to 2008, modular GCSE syllabuses were mainly confined to English, mathematics and science subjects, but as stated above, from 2009 almost all syllabuses will be modular in structure, meaning that the GCSEs will be more in line with A-levels, which have been modular since 2000.

OCR, in particular, took the opportunity to improve the quality of their GCSEs in three key areas:

- updated and relevant content;
- focus on developing students' personal, learning and thinking skills;
- flexible assessment.

This research will focus on the third key area: *flexible assessment*. This change, which was developed by OCR following extensive consultation (involving teachers, heads of department, local authority advisers, subject associations, professional membership groups and other subject experts), will give schools the flexibility to choose the assessment approach best suited to their students.

The assessment for the new OCR GCSEs is organised into units which can either all be taken at the end of the course in a linear fashion, or can be taken in different sessions (for many subjects, assessments will be available twice a year) to complement a more unitised approach to teaching and learning. It should be borne in mind that unitised does not mean staged. Units can be taken in any order, rather than being restricted to being assessed in a particular sequence.

When modular and linear paths exist for the same subject, it is left to individual schools to decide whether the assessment of any particular subject should be modular or whether they should enter candidates for the linear examination.

There is no requirement for teachers of modular courses to enter candidates before the whole course is taken but there might be an increasing pressure for them to do so. This pressure could come from the concern to ensure that the maximum number of students gains a pass grade, together with the generally helpful role that re-sits play in this process. By delaying entry until the end of the course, candidates will have to sit more examinations in one sitting than was previously the case with linear syllabuses.

An online consultation on the draft of the latest GCSE qualification criteria took place between May and September 2007, and the regulator received around 2000 responses. Respondents included, among other groups, teachers in all types of schools (independent, grammar and comprehensive schools and sixth form, tertiary and further education colleges), lecturers at colleges and universities, awarding bodies' representatives and students. The findings of the consultation, which can be found in the summary report of the GCSE criteria consultation (QCA, 2007a), show

that 43% of respondents did not feel that the unitisation of GCSE subjects would cause any problems, however 35% of respondents thought it would. 71% of respondents agreed that in order to ensure that assessment in unitised GCSEs does not become fragmented and atomised at least 50% of all assessment should be at the end of the course.

ADVANTAGES AND DISADVANTAGES OF MODULAR COURSES AND ASSESSMENT

Over recent years, there has been a clear trend in the development of the upper secondary curriculum to increase the use of modular or unitised qualifications. In particular, in the 1980s much interest was shown in modular courses and many such courses were developed and introduced in British secondary schools. As a result, the rationale for modularisation and many of the issues arising from it were addressed (see, for example, SEC, 1987; Moon, 1998; Warwick, 1987).

The drive behind some of the attempts to modularise qualifications came from teachers seeking to make the curriculum more relevant to their students and to provide increased extrinsic motivation through the setting of short-term assessment targets.

An early example of modular assessment within the school examination system at GCSE is described in Thomas (1993), who discussed the introduction of a modular science course and the reactions of teachers to this course, focusing, in particular, on the impact on organisational issues and teaching methodology.

The earliest attempts to modularise A-levels occurred in the 1980s (*e.g.* the Wessex A-levels (Macfarlane, 1992) or the UCLES scheme (UCLES, 1986; Nickson, 1994)). However, by the early 1990s there were concerns about modular courses being too easy in comparison with terminally examined courses. Some of the reasons for these concerns were: modular courses had been associated with lower attaining students, candidates could retake modules to improve grades and candidates could be examined on parts of a subject rather than on the entire syllabus (Hayward and McNicholl, 2007). Others argued that modularisation could make the courses more difficult because candidates were expected to work and be assessed at A-level standard from the first module taken early in the first year and therefore might be potentially disadvantaged by their relative immaturity, if not their narrower experience of the subject. In fact, on the subject of modular syllabuses, UCAS (1994) stated 'It should be clearly understood that modular syllabuses are no easy option, as all modules are assessed to full GCE A level standard without allowance for maturation, including those taken at an early stage in the course'. It was the Dearing Review (Dearing, 1996) that provided the template for the current model of modular A-levels and led to the development of the 'Curriculum 2000'. As a result of the implementation of this initiative, a number of evaluations and reviews were carried out to ensure the validity and reliability of the modular assessment and the challenges to the quality of teaching and learning.

The proponents of modular schemes have long argued for their advantages in terms of curriculum flexibility, short-term assessment goals and increasing extrinsic motivation for students. Critics of modular assessment claim that its disadvantages lead to a diminution of trust in the qualification as a whole among the general public, higher education tutors and admission staff (Hayward and McNicholl, 2007). Studies have identified a number of advantages and disadvantages to modular assessment; these will be discussed in detail below.

Flexibility

A well-designed and constructed modular curriculum might well offer students more flexibility and variety than other, more conventional, forms of curricular organisation. Flexibility in the number and timing of the modular examinations is one of the main advantages of unitised qualifications, with many positive implications. Proponents of modularisation argue that students can take units at the time their teachers feel is most appropriate for them (assessment can be matched to the point of learning within the course), and that exam stress, which is experienced by a large number of GCSE students at the end of Year 11, is likely to be reduced by the possibility of taking exams over a longer period of time, rather than concentrating them all into a narrow window at the end of the course. Also, the pressure of an 'all or nothing' assessment is removed.

Ownership

Thomson (1988) argues that a modular curriculum helps both teachers and students to develop an ownership of the study programme; teachers by contributing to the development of the innovation or its implementation in their school, and students by taking full responsibility for their own learning, through planning their own pace of studying and assessment. This should lead to less disaffection for both parties involved.

Improved student-teacher relationship

As teachers and students need to negotiate short-term goals, planning and teaching methods, they will build an effective working relationship. Module choices will require staff counselling and even parental support, and these, in turn, will improve teaching and learning styles. However, it was also reported that modules are a hindrance to the teacher-student relationship, as teachers' 'slack' time, which could be devoted to students' needs, is taken up by a continuous preparation for assessment (Thomson, 1988).

Spread of assessment vs. fragmentation of learning and over-assessment

Another advantage of the modular assessment is the spread of the assessment throughout the course, which can be seen as a motivating factor and a benefit from these types of qualifications. However, according to critics, it can lead to fragmentation of learning and over-assessment. The concern that students will learn a particular part of the course and then forget it is one of the main issues against modularisation. Also, there is a danger of fragmentation of learning and a lack of coherence in the learning experience, endangering what is called 'synoptic understanding' (*e.g.* Hart and Howieson, 1994; Hayward and McNicholl, 2007). Thomson (1988) reported that the short time-span of the modular course leaves no opportunity for the students to achieve their full potential. Tan (1992) for example, has found a profound negative impact on medics' level of understanding of physiology taught and assessed in a modular structure; students adopted a surface reproductive approach in order to pass their exams, rather than a high-level conceptual development of understanding the subject. As a consequence, they had difficulty in relating theory to practice later. Another downside of frequent assessments is the danger that assessment becomes dominant throughout the course, rather than towards the end of it. Priestley (2003) reported that the modularisation of A-levels led to more teaching to the test and to a 'climate of cramming', while Hodgson and Spours (2001) suggested that, with the modular assessment, teachers spend much valuable learning time preparing for examinations. This assessment load has other implications: increased workloads produce student stress leading to dropout and less opportunity for enrichment such

as taking part in extra-curricular activities (Hodgson and Spours, 2001; Priestley, 2003).

A report from the Nuffield Review (Wilde *et al.*, 1996) showed that higher education lecturers and university admissions staff had concerns about over-assessment in the 14–19 curriculum and about the perceived tendency for modularised assessment. The report states that 'the modular nature of 14–19 qualifications was a matter of concern across almost all institutions and was viewed as causing a number of problems, including over-assessment, compartmentalised learning, a lack of incremental learning, a poorly developed overview of subjects and an inability to connect discrete areas of knowledge'.

Regular feedback

Another source of strength of modular assessments is that they provide regular feedback to students. McClune (2001) argues that regular feedback to pupils and teachers on performance is a perceived benefit from modularisation, as this can help to identify the students' learning needs. Others argue that sitting modules soon after they have been taught exposes shortcomings and misunderstandings but at a point in the course when something can be done to correct them. On the same issue, the OCR's head of qualifications development, explained that 'there is something very motivational about getting a unit in the bag and receiving the result and ongoing feedback, and I am sure it will help to keep students locked into the programme'. However, studies suggest that feedback needs to be designed to stimulate correction of errors through a thoughtful approach to them in relation to the original learning relevant to the task in order to have a beneficial effect on later performance (Black and Wiliam, 1998). Furthermore, receiving negative feedback (and having to re-sit modules) might be detrimental for some low-achieving students' motivation, leading to a widening performance gap between high and low achieving students. This phenomenon is known as the Matthew-effect in education (Merton, 1988).

Re-sit opportunities

Another aspect of modular courses that can be seen as a benefit is the ability to re-sit units. An Ofsted report on modular A-levels (Ofsted, 1999) states that the modular system allows more students to eventually reach a higher standard than is the case with linear courses and that many candidates, in particular weaker students, benefit from being able to re-sit modules and from being tested in smaller amounts of content at one sitting. In particular, the new GCSE courses will offer students the opportunity to do partial re-sits rather than repeating the entire assessment. Also, the highest mark for each module will be retained regardless of whether a later attempt proved less successful than an earlier one. However, some schools have the view that the number of re-sits should be limited since they are expensive, cause timetabling problems and many students do not make sufficient progress in grade improvement to warrant them. The knowledge that a re-sit is available may also lessen students' resolve to do their best at the first attempt. Also, receiving feedback and the re-sitting modules create an opportunity for students to 'remedy weaknesses before it's too late' (Hayward and McNicholl, 2007). However, as mentioned above, receiving negative feedback and having to re-sit modules might be de-motivating for some low-achieving students.

The opportunity to re-sit modules also ties in with another advantage of the modular curriculum, that of enabling students to plan their way forward in both studying and completing a course (Hayward and McNicholl, 2007). Gray (2001) reports that, at A-level, re-sits often take place in early sessions, with less pressure from other examinations and when candidates can concentrate their efforts on a particular unit. The author also mentions that when early modules are re-sat in a terminal session, they sometimes produce results lower than previously obtained. One explanation of

this might be a lack of focus, especially when a reasonable result has already been obtained.

Focus of teaching

Proponents of modularisation claim that modular curriculum gives due weight to all the elements within a curriculum and not just to those that form part of examination syllabuses. However, critics argue that in the modular course, 'teaching to the test' time is heightened and this undermines enrichment activities or time spent on topics not in the test (Thomson, 1988). Moreover, teachers may find the constant repetition of modules tedious, and this might result in dull teaching of a very narrow range of subjects. However, proponents of modularisation argue that the greater accountability of teachers and students leads to the revision of teaching strategies in the delivery of the module. This in turn, might result in teachers 'glamourising' their subject (Thomson, 1988).

Workload

One concern regarding the effects of modularisation on teachers' workload is that implementing a modular approach requires large initial workload for teachers, as it 'may involve a considerable investment of time, preparation and energy. The risks may be great' (Warwick, 1987). Others are concerned that teachers' workload remains elevated throughout the course, as their time consuming non-teaching demand (*e.g.* record-keeping, paperwork and administrative work) would also rise: 'Some teachers have argued that the proportion of time devoted to assessment and administration rather than teaching is proportionally greater than in a conventional curriculum' (Thomson, 1988).

Shorter duration of examinations

Another advantage of modularisation could be the duration of the examinations (Gray, 2001). Most modular examinations, though greater in number, are shorter in duration than the usual 2 or 3 hours, mainly because of the lesser module content. Thus, it can be argued that a higher level of concentration can be sustained throughout the examination leading to better performances and the cumulative effect over all modules may be manifest in an enhanced overall grade. Although the total number of examinations is often greater than those set for the conventional examinations, the burden is seen as lighter.

Disregard for individual intellectual maturity

There can be powerful arguments for linear assessments as certain skills may develop progressively through several modules. Candidates taking modules early will not have the experience of a two-year course and may be at different levels of age and maturity (Clarke, 1996; Taverner and Wright, 1997). It has been argued that a candidate might be at a disadvantage if he/she is not intellectually ready and a period of consolidation of knowledge might be necessary before a candidate reaches the expected standard.

The new modular GCSE syllabuses can be seen as a method of giving pupils a degree of choice in syllabus content and thus helping to maintain pupil motivation throughout the two-year course. Each module can be presented to the student as a fresh start and each completed module as a step along the road leading to the award of a GCSE grade. The following lists sum up the advantages and disadvantages of the new unitised GCSE courses.

Summary of advantages

- choice of learning approach – linear or unitised;
- the assessment can be timed to match the point of learning within the course, making it easier for candidates to show what they know, understand and can do;
- students can re-sit a unit rather than repeat the entire assessment; modular feedback enables students to 'remedy weaknesses' before the final examination;
- students are better motivated as they receive feedback on performance more frequently and earlier in the course;
- the pace of students' work is brisk at the beginning of the course;
- a unitised approach makes it easier for students to stay on track with their studies and manage their time effectively;
- the assessment load is spread more evenly over two years and the pressure of an 'all or nothing' assessment is removed;
- examination stress is reduced by permitting assessment over a longer period;
- revision is more manageable;
- assessment is potentially more reliable because it is based on more assessed work in total;
- with a similar format to A-levels and Diplomas, the unitised GCSEs will help prepare students for the next phase of their education;
- enables students to plan their studies;
- a sense of ownership is forged, leading to less disaffection among students.

Summary of disadvantages

- there is a danger of fragmentation of learning and lack of coherence in learning programmes due to both the methods of curriculum delivery and the assessment practices;
- poorly developed overview of subjects and an inability to connect discrete areas of knowledge;
- adopting a modular approach can disrupt the provision of a coherent and developmental course;
- assessment becomes dominant throughout the course, rather than towards the end of it;
- deadlines on units can limit a teacher's ability to teach important topics in the way that he or she would choose;
- it is possible to enter for examinations before the candidate is ready;
- short-term targets often dominate over longer-term goals;
- if re-sits are not well managed, students re-sit too many modules. This increases pressure on school resources and on students' workload.

AIMS OF THE RESEARCH

This project combines quantitative and qualitative research to address the effects of modularisation at GCSE level.

STATISTICAL STRAND

The main aim of the statistical strand of this research is to explore the differences in outcomes for candidates who take assessments in GCSE specifications in a terminal or linear approach (all units at the end) and those who adopt a modular approach (taking units throughout the two-year course).

In particular, the research addresses:

1) *Whether there are differences in outcomes between the two groups at unit and specification level, once concurrent or prior attainment has been taken into account.*

   Anecdotal evidence suggests that with modular syllabuses it is easier to attain higher grades than with linear ones. However, there is not much research-supported evidence for this claim.

2) *Whether there are any maturational or gender effects.*

   Students might be at a disadvantage if they are entered for an examination before being ready as they might not have the experience of the two-year course and might be at different levels of age and maturity. Therefore, there can be powerful arguments for linear assessments as certain skills may develop progressively through several modules.

   Previous research into modular qualifications has indicated that boys are more likely to take advantage of the features of modular qualifications. This research will also investigate this claim.

3) *The degree to which opportunities to retake units influence outcomes.*

   Re-sits are thought of as one of the reasons why candidates 'allegedly' achieve higher grades in modular examinations. It has been claimed that some candidates, in particular weaker candidates, benefit from being able to re-sit modules and from being tested in smaller amounts of content at one sitting. Also, even though students are taught a module only once, it is said that repeated assessments on the same skills and content lead to a greater knowledge and that the use of techniques learnt earlier during a course could help to improve understanding and therefore lead to better grades.

QUALITATIVE STRAND

This strand of the project aims to investigate, in the school context, the claims made by OCR about the advantages of modularisation of GCSEs (http://www.ocr.org.uk/qualifications/type/gcse/flex/index.aspx). Therefore, the focus of the study is the effects of modularisation on students and teachers in terms of motivation, consistency and amount of workload, exam pressure and effects of feedback.

The immediate advantages of flexible assessment were described as follows:

- some students are motivated by ongoing feedback and this helps them identify their learning needs;

- a unitised approach makes it easier for students to stay on track with their studies and manage their time effectively;
- the pressure of an 'all or nothing' assessment is removed;
- examination stress is reduced by permitting assessment over a longer period so that not all assessments are concentrated in a narrow window at the end of two years.

A pilot study was carried out in order to assess what examiners (some of them teachers) thought about modularisation, in order to tap into the general views and attitudes of professionals who would be closely affected by the changes in the GCSEs. The methodology and results of the pilot study can be found in Appendix A.

The above claims and the findings from the pilot study were used to formulate the hypotheses of the qualitative strand of the research, resulting in the following research questions:

1) *Does ongoing feedback (positive and negative) motivate students? Does negative feedback de-motivate students?*
2) *Does ongoing feedback help students in identifying their learning needs?*
3) *Does modular assessment remove the pressure of an all-or-nothing exam?*
4) *What are the characteristics of modular students' test-taking motivation?*
5) *How does modularisation influence teachers' workload and attitudes?*
6) *Staying on track: do students in differing assessment routes show different levels of familiarity with their end-of-year examination during the year?*

Furthermore, the study aims to tap into candidates' and teachers' general attitudes towards modular assessment.

METHODOLOGY

Previous research has suggested that modular syllabuses work most successfully in subjects such as mathematics or physics and are less suited to subjects like English or modern foreign languages (Ofsted, 1999). Therefore, two contrasting subjects at GCSE level were selected for this research: English and mathematics.

GCSE in English

The OCR GCSE in English (1900) has a unit-based structure, enabling both linear and modular assessment routes. Units which are externally assessed by written examination contain two options: a foundation tier component and a higher tier component. The foundation tier assesses grades G to C and the higher tier assesses grades D to A*. Coursework units are not tiered. Table 1 shows the specification structure.

Table 1: OCR GCSE in English structure (OCR, 2003)

Unit	Option	Title	Format
1	2431 F	Non-fiction, media and information (Foundation Tier)	Written Exam
	2431 H	Non-fiction, media and information (Higher Tier)	Written Exam
2	2432 F	Different cultures, analysis and argument (Foundation Tier)	Written Exam
	2432 H	Different cultures, analysis and argument (Higher Tier)	Written Exam
3	2433 F	Literacy heritage and imaginative writing (Foundation Tier)	Written Exam
	2433 H	Literacy heritage and imaginative writing (Higher Tier)	Written Exam
4	2434	Literacy heritage and imaginative writing	Coursework
5	2435	Speaking and Listening	Coursework

Candidates may enter for either the foundation or the higher tier paper in units 1, 2 and 3. It is not necessary for candidates to enter at the same tier in every unit. Candidates may, if they wish, attempt papers at both tiers, but not in the same examination session, since the papers are timetabled simultaneously. The final qualification grade awarded is independent of the tier and based on the total uniform marks[1].

In order to certificate for a GCSE in this subject, at least four units must be taken, including:

- one component from Unit 1
- one component from Unit 2
- *either* one component from Unit 3 *or* Unit 4
- Unit 5

Although the specification is unit-based, it is possible to follow a traditional linear route through the course.

[1] To make unit results compatible and comparable (so that they can be added together to get the overall grade), raw marks are converted to points on a uniform mark scale (UMS).

For the modular/unitised route, four or more units, as specified above, may be entered across two or more examination sessions. Units may be re-taken once, if wished, prior to certification and the better score will be used towards the overall grade. However, GCSE general criteria require at least 50% of the qualification to be taken as terminal external assessment.

The first certification session for this qualification was June 2004. Thereafter, assessment was available in January and June each year.

GCSE in mathematics

OCR offers three different routes to obtain a GCSE in mathematics.

- GCSE mathematics A (J512) Linear Assessment
- GCSE mathematics B (J518/J519) Mathematics in Education and Industry
- GCSE mathematics C (J516/J517) Graduated Assessment

The focus of this report is on GCSE mathematics A and C. Both subjects are identical in content but different in structure.

GCSE mathematics A - Linear Assessment (OCR, 2006a)

The scheme of assessment for this subject consists of two tiers, foundation and higher. The foundation tier assesses grades G to C and the higher tier assesses grades D to A*. Candidates can be entered for either the foundation tier or the higher tier (two papers and coursework).

Candidates wishing to re-sit this qualification must re-sit both written papers at the appropriate level but may carry forward their coursework mark. This qualification was first certificated in June 2008. Thereafter, assessment was available in January and June each year.

GCSE mathematics C - Graduated Assessment (OCR, 2006b; OCR, 2007)

This specification has been divided into a series of ten stages which are graduated in content and level of difficulty. Corresponding to each stage a module test was set. Tables 2 and 3 show, respectively, the qualification structure for the J516 (graduated assessment with coursework) and J517 (graduated assessment without coursework) specifications.

Table 2: OCR GCSE in mathematics (J516) structure (OCR, 2006b)

Units	Target grade	Weighting
M1	G	15%
M2	G,F	15%
M3	F	15%
M4	F,E	15%
M5	E	15%
M6	D	15%
M7	C	15%
M8	B	15%
M9	A	15%
M10	A*	15%
TF - Terminal Paper (Foundation)	G-F, E-C	50%
TH - Terminal Paper (Higher)	D-C, B-A*	50%
CA - Coursework (Centre marked)	G-A*	20%
CB - Coursework (OCR set and marked)	G-A*	20%

Table 3: OCR GCSE in mathematics (J517) structure (OCR, 2007)

Units	Target grade	Weighting
M1	G	25%
M2	G,F	25%
M3	F	25%
M4	F,E	25%
M5	E	25%
M6	D	25%
M7	C	25%
M8	B	25%
M9	A	25%
M10	A*	25%
TF - Terminal Paper (Foundation)	G-F, E-C	50%
TH - Terminal Paper (Higher)	D-C, B-A*	50%

The J516 qualification (graduated assessment with coursework) was first certificated in June 2008 and the final session in which it was available was January 2009. The J517 qualification was first certificated in June 2009. The two versions of the graduated assessment, J516 and J517, run in the January 2009 session. The vast majority of entries was for J517 units, graduated assessment without coursework.

There are three assessment sessions in each year: January, March and June. However, not all units are available in all sessions (see OCR (2006b) or OCR (2007) for unit availability).

Candidates will normally take the course over two years and must enter at least two different module tests. Most modules are available in January, March and June sessions and in most cases they target a pair of grades.

All candidates have to take one terminal examination. The tier of entry for the terminal examination will determine the overall grades available to the candidate.

In 2008, candidates wanting to certificate in GCSE mathematics J516 had to submit two types of task, both of which counted towards the mark for unit CA (coursework marked by the centre) or CB (coursework set and marked by OCR). In the 'statistical aspects of modularisation' strand of this work, coursework in GCSE mathematics will not be considered due to its removal in specification J517.

Candidates may re-sit any module test once prior to certification. The better score will be used in the aggregation. After certification, candidates who wish to re-sit must sit at least the terminal paper again, but might carry forward their coursework mark and/or their module test marks.

Methodology of the statistical strand

Candidates

The analyses performed in the statistical strand of this project have been carried out by cohort, that is, for each examination year, candidates' age was restricted and only candidates that were 15 years old at the start of the two-year GCSE course were included.

For GCSE English, the following cohorts were considered:

- *Cohort 1 (2004): Candidates who were born between 01/09/1987 and 31/08/1988 and certificated in the June 2004 session and who took the necessary units to certificate in June 2003, January 2004 or June 2004.*
- *Cohort 2 (2005): Candidates who were born between 01/09/1988 and 31/08/1989 and certificated in either June 2004, January 2005 or June 2005 and who took the necessary units to certificate in January 2004, June 2004, January 2005 or June 2005.*
- *Cohort 3 (2006): Candidates who were born between 01/09/1989 and 31/08/1990 and certificated in either January 2005, June 2005, January 2006 or June 2006 and who took the necessary units to certificate in January 2005, June 2005, January 2006 or June 2006.*
- *Cohort 4 (2007): Candidates who were born between 01/09/1990 and 31/08/1991 and certificated in either January 2006, June 2006, January 2007 or June 2007 and who took the necessary units to certificate in January 2006, June 2006, January 2007 or June 2007.*
- *Cohort 5 (2008): Candidates who were born between 01/09/1991 and 31/08/1992 and certificated in either January 2007, June 2007, January 2008 or June 2008 and who took the necessary units to certificate in January 2007, June 2007, January 2008 or June 2008.*
- *Cohort 6 (2009): Candidates who were born between 01/09/1992 and 31/08/1993 and certificated in either January 2008, June 2008, January 2009 or June 2009 and who took the necessary units to certificate in January 2008, June 2008, January 2009 or June 2009.*

For GCSE mathematics, the following cohorts were considered:

- *Cohort 1 (2008): Candidates who were born between 01/09/1991 and 31/08/1992 and certificated in June 2008 and who took the necessary units to certificate in January 2007, March 2007, June 2007, January 2008, March 2008 or June 2008.*
- *Cohort 2 (2009): Candidates who were born between 01/09/1992 and 31/08/1993 and certificated in June 2009 and who took the necessary units to certificate in January 2008, March 2008, June 2008, January 2009, March 2009 or June 2009.*

GCSE results

OCR GCSE results in English from 2004 to 2009 and OCR GCSE results in mathematics from 2008 to 2009, both at specification level and at unit level and for all examination sessions, were obtained from EPS[2]. This data comprises candidate details (name, sex, date of birth and school) and assessment grade details (session, tier, final mark and final grade).

General attainment data

A measure of students' general attainment (proxy for ability) was computed using data from the National Pupil Database. The National Pupil Database, compiled by the

[2] OCR's examinations processing system.

Department for Children, Schools and Families, holds national examination data for all candidates that sat an examination in an academic year.

A mean GCSE score was used as a measure of general attainment for English students in cohorts 1 to 5 and for mathematics students in cohort 1. For English students in cohort 6 and mathematics students in cohort 2, Key Stage 3 scores were used instead. The reason for this change was the lack of data (when this research was being carried out) at GCSE level for 15 year-old students sitting GCSE English or GCSE mathematics in the 2009 sessions. Final GCSE results for all subjects, from all awarding bodies, were not available until January 2010.

Mean GCSE

By assigning marks to the GCSE grades (A*=8, A=7, B=6, C=5, D=4, E=3, F=2, G=1, U=0) it was possible to arrive to a total GCSE score for each student. The 'mean GCSE' indicator was calculated by dividing the total score by the number of subjects attempted. If a subject had been attempted twice, the highest grade was considered. The mean GCSE score ranges from 0 to 8.

Key Stage 3 score

All pupils in Key Stage 3 must follow a programme of education in at least 15 areas. At the end of this stage, pupils are tested and are awarded attainment levels depending on what they are able to do. These tests cover English, mathematics and science. The average of the total marks in these three subjects was used as a general attainment measure in this research. Key Stage 3 scores range from 0 to 100.

Entries in GCSE English and GCSE mathematics by assessment route

Tables 4 and 5 present the total number of candidates considered in this research who took, respectively, GCSE English and GCSE mathematics by assessment route.

Table 4: GCSE English entries by assessment route, 2004-2009

	Linear Assessment		Modular Assessment		Total number of candidates
	Candidates	%	Candidates	%	
Cohort 1 (2004)	60230	84.35	11173	15.65	71403
Cohort 2 (2005)	59584	85.82	9842	14.18	69426
Cohort 3 (2006)	56497	86.13	9095	13.87	65592
Cohort 4 (2007)	48604	84.36	9010	15.64	57614
Cohort 5 (2008)	40265	80.86	9533	19.14	49798
Cohort 6 (2009)	33631	79.82	8501	20.18	42132

Table 5: GCSE mathematics entries by assessment route, 2008-2009

	Linear Assessment		Modular Assessment[3]		Total number of candidates
	Candidates	%	Candidates	%	
Cohort 1 (2008)	31603	35.07	58504	64.93	90107
Cohort 2 (2009)	32415	37.57	53853	62.43	86268

In this research, linear candidates of GCSE English are studying for a modular syllabus but sit all the module examinations in one session and do not re-sit any modules. These candidates are, in some aspects, like modular candidates, in that they follow a syllabus divided into units and sit module examinations but in other aspects they are like linear candidates in that they take all the examinations in one session.

Methodology of the qualitative strand

In order to investigate the research questions of the qualitative strand, interview and survey-based methodologies were employed. While the statistical strand aimed at shedding light on broad patterns using all students' data, this investigation was of a qualitative nature, with the aim of gaining a deep understanding of the issues at hand.

Participating schools

As the qualitative strand focussed on only a limited sample of students and teachers due to the nature of the investigation, participating centres needed to be chosen carefully. Therefore, mixed comprehensive schools enrolling a large number of candidates, teaching either modular or linear GCSE English and/or GCSE mathematics were approached and invited to take part in the study.

As most schools enrolled students for GCSE English coursework unit 2434 (rather than for unit 2433), the pool of possible participating centres was further defined along this criteria. Also, as the research plans included face-to-face interviews with students and teachers, only centres within reasonable travelling distance from Cambridge were considered.

Unfortunately, no schools with the above characteristics entered students for OCR's examinations in both GCSE English and GCSE mathematics. Also, from the available data on centres' practices in enrolling students for GCSE English, it became apparent that no centre fitting the above criteria offered candidates purely modular or purely linear courses; in most cases, some students showed a more unitised approach in their completion of the course than others. These conditions made it necessary for three centres to be included in the study: (1) one centre enrolling candidates for modular GCSE mathematics; (2) one centre for linear GCSE mathematics; and (3) one centre with a large number of candidates with a good mix of modular and linear routes in English GCSE.

[3] In 2008, the entries for the modular assessment route correspond to the J516 specification. Entries in 2009 correspond to the J517 specification.

Participating teachers and students

Following the above criteria and restrictions, three schools were recruited as participating centres:

- one centre for modular mathematics, represented by the assistant Head Teacher of mathematics and 22 of his students, including two boys participating in the interviews;
- one centre for linear mathematics, participating with the subject leader in mathematics and her 39 students, four of whom (two girls and two boys) participated in the interviews;
- and one centre for GCSE English with the Head of English and one of the class teachers, along with 62 of their students, four of whom (three girls and one boy) participated in the interviews.

The linear/modular make-up of participating students at the centre for GCSE English was the following: all students took four GCSE English units (2431, 2432, 2434, and 2435) in January 2009 in their second year. Out of the 62, 24 of them certificated in January, and did not take any units in June 2009, which means that these students were following a truly linear style of assessment. The majority of these students (20 out of 24) reported in February that they did not plan to re-sit any of the examinations in June, therefore they were truly linear both in their intention and their behaviour. The remaining students re-sat the same four units in June 2009. The examination data for one student was incomplete. The remaining 37 students were classified in two groups: 10 students, for whom units from both sessions (January and June 2009) counted towards the final grade, were following a modular course (only 4 of them reported re-sitting plans on at least one unit already in February); and another 27 students for whom only units taken in June counted for the final grade, essentially following what could be called a linear course with re-sits (only 8 of them reported re-sit intentions in February). In this analysis, the 'linear with re-sits' students were considered to be following a modular course, as although they re-sat all the units, they knew that their best mark in each unit would be used for aggregation – a feature unique to the modular route. Also, students' test-taking behaviour, rather than their intention was taken into account, as the latter might be influenced by other factors such as self-confidence, social pressure, insight, etc. Therefore, this study had 24 linear GCSE English students and 37 modular GCSE English students as participants. Table 6 summarises the characteristics of the participants.

Teachers were asked to find articulate candidates for the interviews; ideally, a good mix of students in terms of ability and gender was preferred. Unfortunately, not all centres could secure access to girls and boys in the same proportion. However, the ten students interviewed had a good mix of abilities and attitudes, and they were easy to talk to.

Students of English who participated in the interviews were selected by the teacher from the 'higher set' and the 'lower set' classes, roughly representing their abilities and the examination tier they were aiming to sit.

Before the data collection, all participants were informed about the requirements of the study and the confidentiality of their personal data, and students were reassured that their participation would not have any impact on their examination procedures or results. All participants signed consent forms agreeing to take part in the research.

Table 6: Summary of participating centres, teachers and students

Centres	Subject	Route	Teacher(s)	Number of students surveyed	Students interviewed (Interview IDs and abilities)
Centre 1	Mathematics	Modular	Assistant Head Teacher	22	2 boys; (Students 1-2, similar abilities)
Centre 2	Mathematics	Linear	Subject leader	39	2 boys, 2 girls; (Students 3-6, mix of abilities)
Centre 3	English	Linear (24 students)	Head of English and one class teacher	62	1 boy, 3 girls; (Students 7-10; one 'higher set', 3 'lower set')
		Modular (37 students)			

Research tools

In order to collect data on the research questions, questionnaires and face-to-face interviews were administered. Students in the modular routes were asked to provide information on which units they had just taken, and whether they had any re-sit plans. Also, data on motivation, perceived workload and familiarity with their GCSE examinations was collected from all students (see Table 7 for a summary of research question and methods).

Measuring students' test-taking motivation

In order to investigate whether ongoing feedback (both positive and negative) motivates students, candidates' test-taking motivation levels and motivation characteristics were considered in this study.

One popular definition of being motivated is 'to be moved to do something' (Ryan and Deci, 2000). Researchers agree on the importance of motivation within the realm of education and testing. For example, according to Pintrich *et al.* (1986), the two most important factors influencing student learning are intelligence and motivation; Sundre and Kitsantas (2004) state that examinee motivation in consequential (high stakes) examination conditions has been positively associated with test performance in a variety of settings.

Motivation, however, is not a unitary phenomenon; people can be motivated to various levels and can experience different kinds of motivation. The Self-Determination Theory (Ryan and Deci, 2000) gives an overview of the continuum of motivation, from amotivation (lack of motivation) through extrinsic motivation (doing something because it leads to an outcome) to intrinsic motivation (when the activity is carried out for the inherent satisfaction it carries). Ryan and Deci (2000) suggest that while most things people do are not intrinsically motivated, if the values or utility of the activity are internalised, some externally imposed tasks may also involve the ego involvement which is characteristic of intrinsic motivation.

The current study employed an adapted version of the Intrinsic Motivation Inventory (IMI) survey developed by Ryan and Deci (undated) to measure the extrinsic as well as the intrinsic aspects of students' test-taking motivation (see Appendix B for the IMI survey administered to students of modular mathematics). The IMI survey is a standardised questionnaire, and has been used in several research studies (*e.g.* Johnson, 2007). Its six subscales measure participants' interest/enjoyment

(considered to be the self-report measure of intrinsic motivation); perceived competence and perceived choice (positive predictors of both self-report and behavioural measures of intrinsic motivation); effort; value/usefulness (an indicator of internalised values); and pressure/tension (negative predictor of intrinsic motivation). The IMI survey was designed for administration after participants completed their examinations.

Feedback and motivation

The effect of feedback on candidates' motivation was investigated in the present study. While it is normally expected that positive feedback motivates students' learning, the effect of negative feedback on motivation is not that straightforward. However, it is crucial to investigate the effects of negative feedback, as it may lead to the so-called 'Matthew effect' (Merton, 1988). This term originally referred to the disproportionate allocation of peer recognition for scientific work, where scholars of greater repute were gaining larger recognition of subsequent academic merit than lesser known scientists. The term derives from the first book of Matthew in the New Testament (13:12 and 25:29): 'For unto everyone that hath shall be given, and he shall have abundance; but from him that hath not shall be taken away even that which he hath'. The term and concept has since been used widely in different areas of investigation, referring to the differential rate of improvement depending on previously existing differences. This 'the rich get richer, the poor get poorer' phenomenon could occur in the context of the modularisation of GCSEs: disappointing GCSE modular examination results might lead to lower motivation levels on subsequent exams, leading to a widening gap between students of differing abilities. To test this hypothesis, the effects of negative feedback on students' motivation were mapped in interviews, conducted after candidates had received their grade reports on their module GCSE examinations.

Measuring workload

One of the claims in favour of modularisation of GCSEs is that it removes the pressure of an 'all-or-nothing' examination. Pressure can mean different things in terms of examinations: it can refer to the mental and physical workload as well as the temporal demands of studying, reading, thinking and revising involved in preparing for and taking an examination; however, pressure might also mean psychological pressure, or examination stress. The present analysis took both definitions into consideration: students' workload levels were measured in the surveys, and psychological stress was discussed in the interviews.

Although there is general interest among researchers and educators regarding monitoring students' workload, there seems to be considerable disagreement in the literature as to what constitutes workload and how it should be measured. The disagreement seems to engage professionals on one side of what could be called the 'objective versus subjective nature of workload' debate, which obviously has consequences on the choice of workload measurement researchers might employ. The disagreement concerns whether students' own perceptions of their workload or some form of external indicator of 'actual workload' is the more valid and reliable measure. This issue is further complicated by researchers' struggling to define what constitutes 'actual' workload, and also whether the researchers' ideas of what contributes to students' workload is in line with students' own perceptions (Kember and Leung, 1998). Studies could be categorised into one of three types depending on the researchers' perceptions of the above issues.

The first type of studies conceptualise and measure workload based solely or mostly on the amount of time students need to complete all learning activities in order to achieve the learning outcomes; here, workload translates as hours of work (González and Wagenaar, undated). Consequently, in this approach, students are asked to

write a meticulous diary of their actual tasks and keep track of the hours they spend working in order to provide an external measure of their actual workload. Also, teachers might be asked to estimate how much time students needed to complete assignments. However, there is no guarantee that students put in the same amount of work in all their work hours (*e.g.* in terms of mental effort and concentration), or that these hours are comparable across subjects or students. Some studies, therefore, combine time information with students' estimates of the difficulty of the materials (Lockwood, 2005).

Authors in the second type of studies assume that there are factors contributing to students' workload other than time spent studying. For example, in one questionnaire-based study at Monash University, Australia, questions also focussed on the amount, the rhythm and the quality of students' workload, and they also polled students for their opinions on the amount and distribution of their work (Gough and Monday, 1979).

The third type of workload measure usually combines students' perceptions of workload with some type of 'objective', external indicator: work hours in and out of the classroom, measures of students' ability in a given subject (credit points, GPA, (Gough and Monday, 1979), or a combination of all these (Kember and Leung, 1998)).

As the present research aimed to tap into students' workload during the months preceding high-stakes examinations, asking students to keep diaries of the number or quality of their work hours while preparing for their exams was considered to be impractical. Furthermore, the meticulous method of log-keeping requires that participants are highly motivated to cooperate, are engaged with the aims of the study and are highly organised; these conditions were not seen to be guaranteed. Moreover, these 'objective' methods might also add to participants' workload, thereby distorting the very phenomenon under scrutiny.

Also, it was considered that the 'subjective' nature of workload cannot be disregarded as useless and unreliable, because the very definitions of low or high workload are solely dependent on the respondents, and can only be meaningful in their own contexts: the same task or homework might represent low workload for one person and high workload for another, due to various factors of personality (motivation, interest, intelligence, persistence, devotion, etc.) and circumstances (amount of any extracurricular tasks, the availability of social support or suitable equipment, etc.).

Ramsden (1992) argued that rather than some (subjectively chosen) 'objective' measures, students' own perceptions and accounts of workload should be taken into consideration: 'We are dealing here with the students' own perceptions of assessment, teaching and courses, and not with objective characteristics such as the division of teaching methods into tutorials, practicals and lectures, or assessment methods into examinations and assignments…Students respond to the situation they perceive, and it is not necessarily the same situation that we have defined. It is imperative to be aware of this routine divergence between intention and actuality…'.

Along these lines, the present study included a simple self-report workload survey in the form of a workload chart for students to fill in retrospectively, covering a few months. The chart indicated the period under investigation on the X axis (from early September to mid-January for English students, and early September to early March for mathematics students), and a 20-point scale with four qualitative labels for every 5-point interval on the Y axis (low, medium, high, very high workload). The chart came with detailed instructions and an example on how to fill it in. The chart and the instructions were embedded in the survey booklets used to compile information on motivation and personal data (see Appendix C for the workload chart used for modular mathematics students). The method was piloted on two 16-year olds

preparing for high-stakes examinations; they reported having no problems understanding the instructions or completing the chart. A similar workload chart focusing on teaching tasks was filled in by teachers.

'Staying on track'

One of the claimed advantages of modularisation of GCSEs is that the unitised approach makes it easier for students to stay on track regarding their studies, implying that students in the modular assessment route should be more familiar with the requirements of their examinations. In order to test this hypothesis, modular and linear mathematics students' knowledge of their GCSE examinations was tested empirically in this study using a mini-quiz embedded in their surveys, consisting of 19 questions for the modular route and 28 questions for the linear route (see Appendix D).

Table 7: Summary of research methods

Research question	Methods of investigation
Does ongoing feedback (both positive and negative) motivate students? Does negative feedback de-motivate students?	Interviews with modular students after grade reports
Does ongoing feedback help students in identifying their learning needs?	Interviews with modular students after grade reports
Does modular assessment remove the pressure of an all-or-nothing exam?	Workload charts and interviews asking about examination stress for all participants (regardless of route)
What are the characteristics of modular students' test-taking motivation?	Intrinsic Motivation Inventory survey after module exams (modular students only)
How does modularisation influence teachers' workload and attitudes?	Workload charts and interviews with all teachers
Staying on track: do students in differing assessment routes show different levels of familiarity with their end-of-year examination during the year?	Mini-quiz on the requirements and structure of end-of-year examinations in surveys (only students of mathematics)

Interviews

Semi-structured interviews were designed to focus on the main research topics. The first interviews with students and teachers were carried out after participants had completed their workload surveys (see Table 8) and used their completed workload charts as prompts, asking participants to elaborate on their charts, emphasising that there were no 'right or wrong answers'. Interview schedules allowed space and time for follow-up questions for clarification or for eliciting further details. Appendix E1 contains the interview schedule for students of modular mathematics (students of English were administered an adapted version); Appendix E2 shows questions asked to students of linear mathematics. Students were interviewed in pairs during the first interview in order to make them feel more secure and also to allow them to reflect on each others' ideas. Students did ease into the interview situation very quickly, and

were very open about their ideas regarding modularisation and examinations. The second round of interviews on the effects of feedback were carried out with one student at a time, and used each student's individual grade report as prompt for the discussion (see Appendix E3). Care was taken to keep students' grades confidential in front of other interview participants.

The interview schedule with the teachers of the modular subjects can be found in Appendix E4; the interview schedule for the teacher of linear mathematics is shown in Appendix E5. As a semi-structured interview technique was used, some questions reported here had not been included in the original schedules, but were rather asked as spontaneous follow-up questions during the data collection.

In order to ensure the reliability of the interview as a technique for data collection, the suggestions in Simmons (1993) were taken on board. According to this source, reliability of the interview technique is ensured by:

- the possibility of replication: clearly worded unambiguous questions in a clear, pre-determined (preferred but modifiable) sequence;
- using same instructions for both administration and completion for all participants;
- ensuring that the population under study is well-defined and all the details provided in the research report.

Table 8: Timetable of data collection for the qualitative strand [response rates]

Month	English	Modular mathematics	Linear mathematics
January	Unit exams		
February	Surveys [62] Interviews with students and teachers		
March	Grade reports Interviews with students	Modular exams Surveys [22] Interviews with students and teachers	 Surveys [39] Interviews with students and teachers
April			
May		Grade report Interviews with students	Terminal papers 1 and 3
June	Unit exams Workload survey with teachers (neither replied) Surveys [0]	Terminal paper Modular exams Workload survey with teacher Surveys [4]	Terminal papers 2 and 4 Workload survey with teacher Surveys [8]

Data collection timetable

The study entailed collecting data after each modular examination and for both routes at around the same time to enable comparison. Interviews were carried out again after the grade reports were issued, in order to investigate the effect of

feedback on students' motivation. Participants were also contacted after the final examinations in June.

The IMI survey on motivation required that students fill it in after their end-of-year examinations had taken place. Therefore, students were approached again in June, using different methods in each case. For each school, one on-line version of the second survey booklet (regarding the June examinations) for students and one for teachers were created using Surveymonkey (www.surveymonkey.com). For the teachers and students of English, personal emails were sent out reminding them to complete their contribution to the project, providing the link to the online survey (email addresses had been provided by the students). However, none of the students or the teachers completed their surveys. In the case of linear mathematics, students were personally visited during their final meeting in the school, and their surveys were handed to them; although 50 students agreed to fill them in, only eight surveys were returned. Their teacher was contacted and her workload chart was filled in during a face-to-face meeting. In the case of participants in the modular mathematics route, links to the online surveys were linked to students' portfolios on the school's server by the teacher. From this school only the teacher and four students provided data through the online surveys. The unavailability of respondents after the June examinations was a major limitation for the study, as some of the research questions could not be investigated due to missing data.

RESULTS

STATISTICAL ASPECTS OF MODULARISATION

The results from the statistical analyses are presented in two sections. Section one contains the analysis of the examination data relating to GCSE English. Its five sub-sections contain the analysis of the examination data relating to each of the five units that contribute to the GCSE English. Section two contains the analysis of the data relating to GCSE mathematics and its units.

Both sections (and the subsections within the first one) have been written to be almost self-contained, *i.e.* anyone for whom mathematics is of particular interest (*e.g.* subject officers) could read this section without referring to any other part of the results. For this reason, the content of each section and subsection follows the same order and particular information might seem repetitive.

In this report, module and unit were used as synonyms.

GCSE IN ENGLISH

There are two assessment sessions in each year of the two-year GCSE course: January and June. For simplicity, the following notation will be used throughout this section of the report:

Session 1: January session in the first year of the course

Session 2: June session in the first year of the course

Session 3: January session in the second year of the course

Session 4: June session in the second year of the course

ANALYSIS AT SPECIFICATION LEVEL

Entries, unit combinations and assessment routes

Table E1 presents the numbers and percentages of candidates who obtained a GCSE in English in the period of study. For each cohort, the majority of the candidates (lowest percentage being 88.13% in cohort 6) obtained the GCSE in session 4. However, the percentage of candidates certificating in session 3 increased significantly from 2005 (1.40%) to 2009 (9.37%). In the other sessions the number of candidates certificating remained fairly stable over time.

Table E1: GCSE English entries, 2004-2009

		Session 1	Session 2	Session 3	Session 4	All sessions
Cohort 1 (2004)	Candidates	-	-	-	71403	71403
	%				**100.00**	
Cohort 2 (2005)	Candidates	-	798	971	67657	69426
	%		**1.15**	**1.40**	**97.45**	
Cohort 3 (2006)	Candidates	1	671	1247	63673	65592
	%	**0.01**	**1.02**	**1.90**	**97.07**	
Cohort 4 (2007)	Candidates	9	787	2034	54784	57614
	%	**0.02**	**1.37**	**3.53**	**95.09**	
Cohort 5 (2008)	Candidates	5	979	2932	45882	49798
	%	**0.01**	**1.97**	**5.89**	**92.14**	
Cohort 6 (2009)	Candidates	1	1053	3949	37129	42132
	%	**0.00**	**2.51**	**9.37**	**88.13**	

There were many different unit combinations, including linear and modular paths, which led to a GCSE in English. It should be noted, however, that the most frequent unit combinations are more likely to reflect the teaching resources available within a centre rather than any other factor. The total number of unit combinations is shown in Table E2 and, for each cohort, the combinations taken by more than 200 candidates are presented in Tables F1-F6 in Appendix F. There was a big increase in the number of unit combinations in 2005 (the second year the qualification was offered). The number of combinations remained fairly stable until 2008, when it started to rise again.

Table E2: Number of different unit combinations in GCSE English, 2004-2009

Cohort	Number of combinations
Cohort 1	110
Cohort 2	169
Cohort 3	141
Cohort 4	145
Cohort 5	171
Cohort 6	196

GCSE English candidates can enter for either the foundation tier or the higher tier paper in units 1, 2 and 3. It is not necessary for candidates to enter at the same tier in every unit. Candidates may, if they wish, attempt papers at both tiers, but not in the same examination session. Table E3 shows, for each cohort, the number of students that mixed tiers. There is evidence of a slight increase over time in the percentage of students mixing tiers, with an increase of 1.41 percentage points from cohort 1 to cohort 6. Among the students who mixed tiers, the percentages were higher when a modular assessment route was followed (Table E4).

Table E3: Number and percentage of candidates mixing tiers in GCSE English, 2004-2009

	Number of students mixing tiers	Percentage of students mixing tiers
Cohort 1	949	1.33
Cohort 2	837	1.21
Cohort 3	730	1.11
Cohort 4	778	1.35
Cohort 5	970	1.96
Cohort 6	1145	2.74

Table E4: Percentages of candidates mixing tiers[4] in GCSE English by assessment route, 2004-2009

	Linear	Modular
Cohort 1	24.03	75.97
Cohort 2	30.77	69.23
Cohort 3	24.66	75.34
Cohort 4	34.06	65.94
Cohort 5	25.05	74.95
Cohort 6	19.39	80.61

For each cohort, higher percentages of candidates entering for a GCSE in English followed a linear assessment route rather than a modular assessment route (Figure E1). Despite the obvious differences in entry sizes, entries for the modular assessment route are on the increase and entries for the linear route are decreasing.

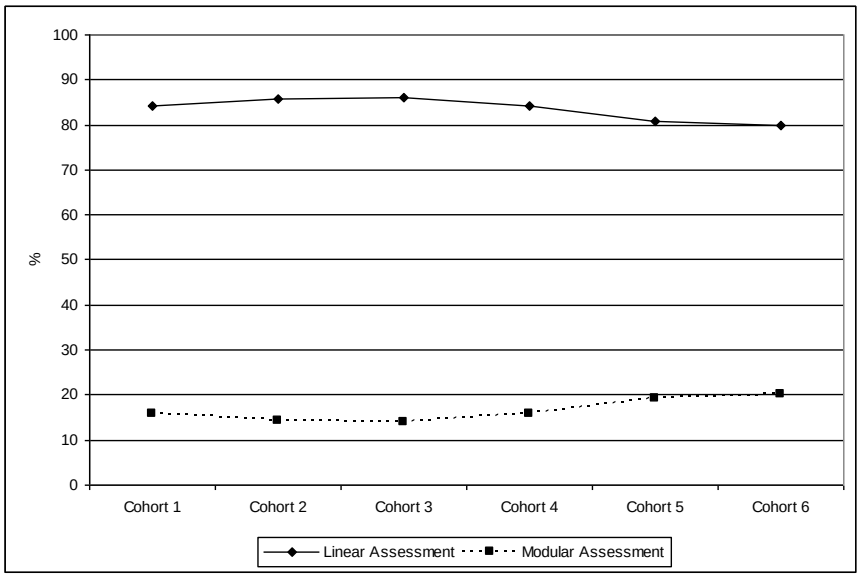


Figure E1: Percentages of candidates entering for GCSE English: Linear vs. Modular assessment route, 2004-2009

[4] as a percentage of the students mixing tiers.

Figure E2 shows the percentages of candidates who followed each assessment route in each of the sessions. For the latest two cohorts the figure shows that, in session 3, more candidates certificated in GCSE English following a modular assessment route than following a linear one.

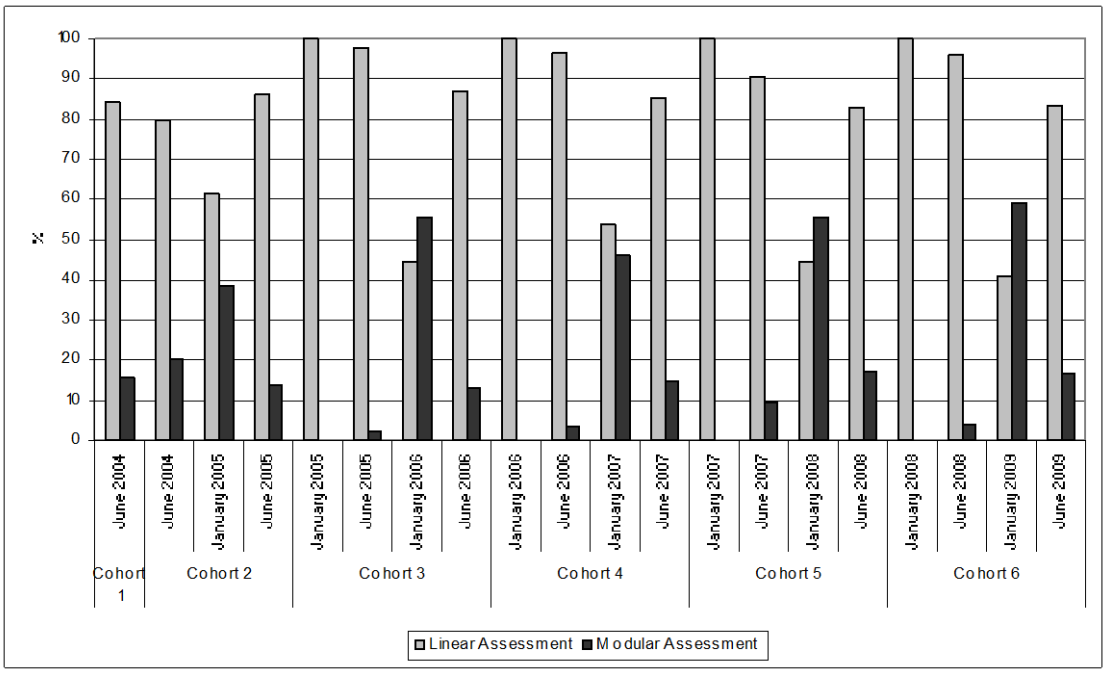


Figure E2: Percentages of candidates per cohort and session obtaining a GCSE in English: Linear vs. Modular assessment route, 2004-2009

Overall performance in GCSE English

The percentages of good grades (A*-C) in this subject increased in the period of study from 63.82% in 2004 to 73.24% in 2009. The grade distributions by cohort are shown in Tables F7-F12 in Appendix F.

For each cohort, and independently of the session, the percentages of students obtaining grades A*-B in GCSE English were higher among the students who took the linear assessment route – with the exception of the candidates in cohort 4 (2007), cohort 5 (2008) and cohort 6 (2009) who certificated in the first June session (session 2). Grade distributions by cohort and assessment route are shown in Figures F1-F6 in Appendix F. In general, there were fewer U grades awarded in the modular assessment route than in the linear route, as the former scheme allows candidates not to apply for certification if their unit grades are not 'good enough'.

Table E5 shows, for all six cohorts, the average grade in GCSE English for each session and for each assessment route. The differences in the average grade between the linear and modular assessment routes and the differences between sessions were, in all instances, statistically significant at the 0.05 level. For the linear assessment, the best outcomes were obtained, on average, in the sessions of the first year of the qualification (sessions 1 and 2). This may be due to better students wanting to certificate early to focus on other subjects during the second year of the qualification. For the modular assessment, the worst outcomes were obtained by the students certificating in session 3. In cohorts 2 and 3 the best outcomes were obtained in the final session. This pattern reversed, and for the later cohorts (cohorts 4 to 6) the best outcomes were obtained earlier in the course (session 2).

Table E5: Average grade[5] in GCSE English by session and assessment route, 2004-2009

	Session	Linear		Modular	
		Mean	SD[6]	Mean	SD
Cohort 1	Jan-03	-	-	-	-
	Jun-03	-	-	-	-
	Jan-04	-	-	-	-
	Jun-04	4.99	1.79	4.66	1.72
Cohort 2	Jan-04	-	-	-	-
	Jun-04	5.17	2.35	3.04	2.22
	Jan-05	4.67	2.04	3.65	1.34
	Jun-05	5.10	1.99	4.80	1.70
Cohort 3	Jan-05	8.00[7]	-	-	-
	Jun-05	5.92	1.45	4.35	1.91
	Jan-06	5.22	1.94	3.66	1.41
	Jun-06	5.13	1.73	5.02	1.61
Cohort 4	Jan-06	5.89	1.67	-	-
	Jun-06	5.46	1.87	6.21	1.50
	Jan-07	5.34	1.77	3.79	1.60
	Jun-07	5.28	1.69	4.96	1.65
Cohort 5	Jan-07	7.60	0.89	-	-
	Jun-07	5.50	1.52	5.77	1.48
	Jan-08	5.92	1.39	3.71	1.50
	Jun-08	5.38	1.67	4.92	1.66
Cohort 6	Jan-08	7.00[7]	-	-	-
	Jun-08	5.55	1.53	5.19	2.33
	Jan-09	5.59	1.46	3.74	1.48
	Jun-09	5.49	1.65	5.01	1.59

Contrary to anecdotal evidence which suggests that with modular syllabuses it is easier to attain higher grades, in almost all sessions modular routes lead, on average, to lower grades.

But, is this still the case when students' ability is taken into account?

GCSE English outcomes by assessment route controlling for students' ability

In this section, the question ***"****Are there differences in outcomes between the group of students who followed a linear assessment route and the group who followed a modular assessment route once concurrent/prior attainment has been taken into account?"* is answered.

As explained in the methodology section of this report, the mean GCSE score was used as a measure of general attainment (proxy for ability) for students in cohorts 1 to 5. For students in cohort 6, the average of the Key Stage 3 scores was used instead.

[5] For grades at GCSE, 8 points were assigned to each A*, 7 to each A, 6 to each B, etc.

[6] Standard deviation.

[7] In cohorts 3 and 6, there was only one candidate that followed the linear assessment route and certificated in session 1 and there were no candidates that followed the modular assessment route.

Significant mean differences in the general attainment scores between students who followed a linear assessment route and those who followed a modular route were found. Table E6 shows that students who followed a linear assessment route had higher scores than those who followed a modular one.

Table E6: General attainment scores[8]. Linear vs. Modular assessment route, 2004-2009

	Linear		Modular	
	Mean	SD	Mean	SD
Cohort 1	4.88	1.78	4.52	1.74
Cohort 2	4.96	1.76	4.60	1.71
Cohort 3	5.04	1.75	4.83	1.67
Cohort 4	5.18	1.72	4.72	1.70
Cohort 5	5.38	1.68	4.76	1.66
Cohort 6	53.14	11.53	50.75	11.44

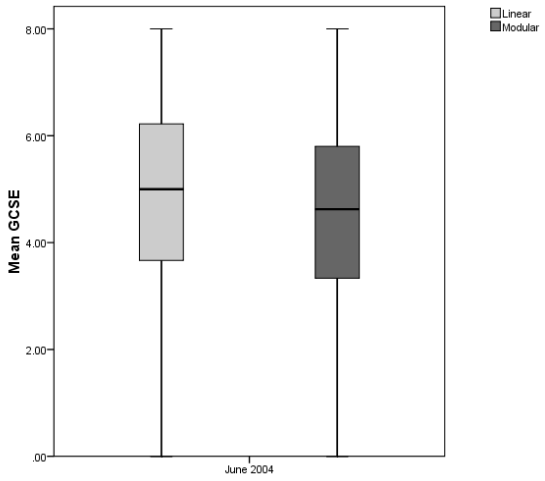
Figure E3 shows the general attainment score by session and assessment route for all cohorts. The bottom and top of the boxes are the 25th and 75th percentiles of the score, and the bands near the middle of the boxes are the medians.

For each cohort, the students who certificated in session 2 (first June session of the two-year course) were the ones with higher ability. They were followed, in most cases, by the ones who certificated in session 4 (second June session). For each session, students who followed the linear assessment route had higher general attainment. There were two exceptions: in cohorts 4 and 5 students certificating in session 2 and following a modular route had higher general attainment.

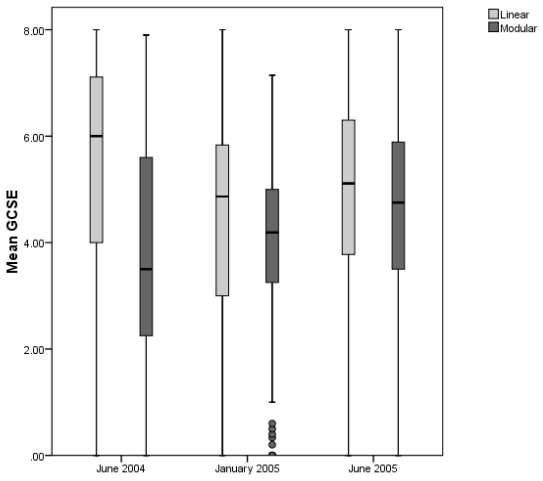
The differences in attainment scores between the linear and modular assessment routes in each session and the differences between sessions were all statistically significant at the 0.05 level.

In order to find out if there were differences in the grades between the two assessment routes once general attainment (either mean GCSE or Key Stage 3 scores) had been taken into account, logistic regression was used. In particular, the overall grade obtained in GCSE English was modelled as a function of the gender of the student, the general attainment score and whether the assessment was linear or modular. An interaction term between gender and assessment route was also included. For more details about the logistic regression technique used in this section see Appendix G.

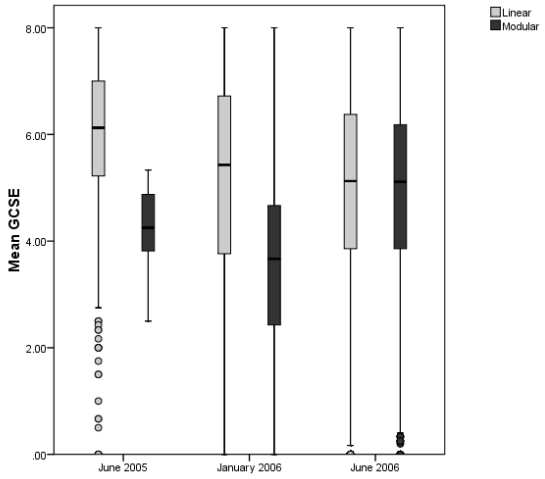
[8] The mean GCSE score ranges from 0 to 8 (cohorts 1 to 5) and the Key Stage 3 score from 0 to 100 (cohort 6).



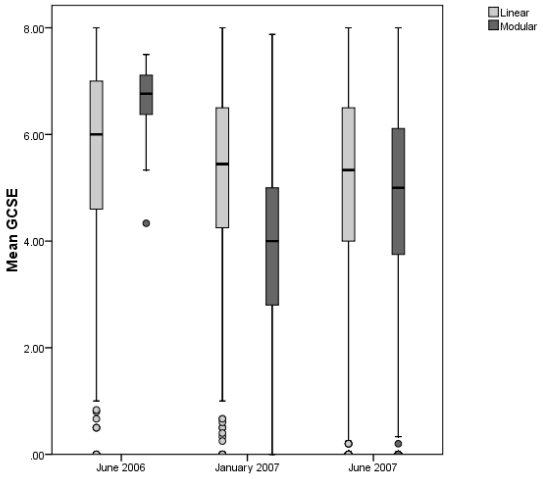
(a) Cohort 1



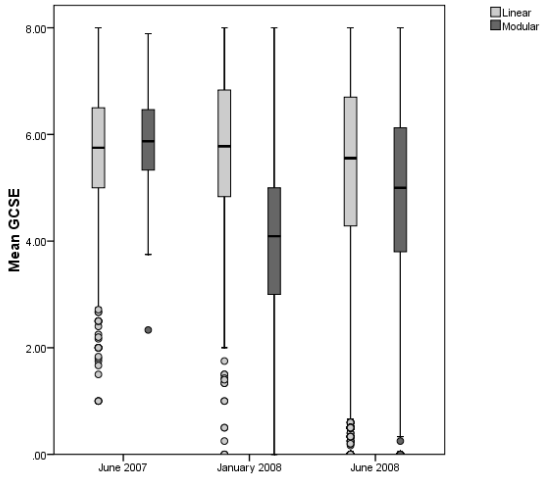
(b) Cohort 2



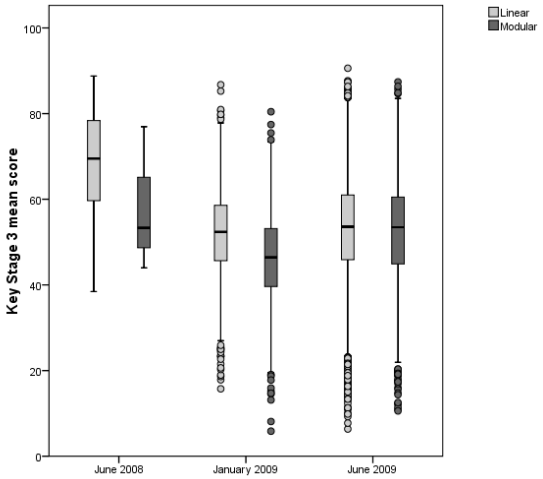
(c) Cohort 3



(d) Cohort 4



(e) Cohort 5



(f) Cohort 6

Figure E3: General attainment score of GCSE English candidates by session and assessment route, 2004-2009

Tables F13-F18 in Appendix F present the regression parameters and the odds ratios for each of the grades in the six cohorts. All significant effects are highlighted in bold type. Regression parameters and odds ratios for candidates in cohort 1 are presented in Table E7 below.

Table E7: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Cohort 1 (2004)

Grade	Gender (G)		Assessment Route (L)		General attainment	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.24**	**1.27**	**0.51**	**1.67**	**2.76**	**15.77**
At least grade A	**0.26**	**1.30**	**0.22**	**1.25**	**2.22**	**9.21**
At least grade B	**0.35**	**1.42**	**0.12**	**1.13**	**2.21**	**9.12**
At least grade C	**0.73**	**2.08**	0.01	1.01	**2.14**	**8.50**
At least grade D	**0.97**	**2.64**	-0.07	0.93	**1.97**	**7.17**
At least grade E	**1.05**	**2.86**	**-0.09**	**0.91**	**1.85**	**6.36**
At least grade F	**0.88**	**2.41**	-0.10	0.90	**1.79**	**5.99**
At least grade G	**0.70**	**2.01**	0.14	1.15	**1.85**	**6.36**

Grade	Gender (G) * Assessment Route (L)	
	Estimate	Odds Ratio
Grade A*	-0.15	1.43
At least grade A	0.12	1.41
At least grade B	**0.17**	**1.34**
At least grade C	-0.03	0.98
At least grade D	0.00	0.93
At least grade E	-0.01	0.91
At least grade F	0.13	1.03
At least grade G	0.09	1.26

A positive significant gender effect means that, for a given value of the general attainment score and a specific assessment route, the probability of obtaining a given grade or above is significantly higher for girls than for boys. Table E7 and Tables F14-F18 show that, for all cohorts, there were positive significant gender effects for all the grades, which indicates that, for a particular assessment route and a given general attainment score, the probability of obtaining a grade or above in GCSE English was higher for girls than for boys.

Also, for all cohorts and all grades there were positive significant 'General attainment' effects, which means that the probability of obtaining a grade or above in GCSE English significantly increased with increasing scores in the attainment measure.

A positive significant 'Assessment Route' effect means that, for a given general attainment score, the probability of obtaining at least a given grade is significantly higher for a student following the linear assessment route than for a student following the modular route. Table E7 shows that the probability of obtaining grade A*, grade A or above and grade B or above was significantly higher for candidates following a linear assessment route than for candidates following a modular one. On the other hand, a negative significant 'Assessment Route' effect means that, for a given general attainment score, the probability of obtaining at least a given grade or above

is significantly higher for a student following the modular assessment route than for a student following the linear one. This was the case for grade E or above.

A significant 'Assessment Route by Gender' interaction effect indicates that the probability of obtaining a grade or above in each assessment route differs by gender. A positive effect means that the effect of the 'Assessment Route' is greater for girls than for boys. A negative effect means that the effect is greater for boys. For cohort 1, the only significant interaction effect was for grade B or above (Table E7). As mentioned in the paragraph above, there was a positive significant 'Assessment Route' effect for grade B or above, meaning that the probability of obtaining grade B or above was significantly higher for a student taking the linear assessment route than for a student taking the modular route. The effect was greater for girls than for boys.

The odds ratio for each independent variable gives the relative amount by which the odds of obtaining a grade increase (odds ratio greater than one) or decrease (odds ratio less than one) when the value of the independent variable is increased by one unit. It could be used as a measure of the effect size.

For example, the variable "Gender" is coded as 1 (=girls) and 0 (=boys) and the odds ratio for this variable, for cohort 1 and for at least grade B, was 1.42. This means that the odds of girls obtaining grade B or above in GCSE English were about one and a half times higher than the odds of boys.

Similarly, the odds of a girl following the linear assessment route obtaining grade B or above were about 1.34 the odds of a girl following the modular assessment route. For a boy following the linear assessment route, the odds of obtaining grade B or above were 1.13 the odds of a boy following the modular route.

For cohorts 2 to 6, 'Assessment Route' and 'Assessment Route by Gender' effects were very similar to the effects in cohort 1 described above (see Tables F14-F18).

Figure E4 displays the predicted probability of a girl obtaining grade A or above by the general attainment score and assessment route. Figure E5 displays the same probability for a boy. These figures show that the difference in the probabilities of obtaining a given grade between linear and modular assessment routes was fairly small and in favour of the linear assessment route.

Therefore, at grade A, there was no evidence of candidates getting higher grades when they follow a modular assessment route instead of a linear route, once general attainment has been taken into account. The same result was found for all other grades with the exception of grade E or above among candidates in cohort 1.

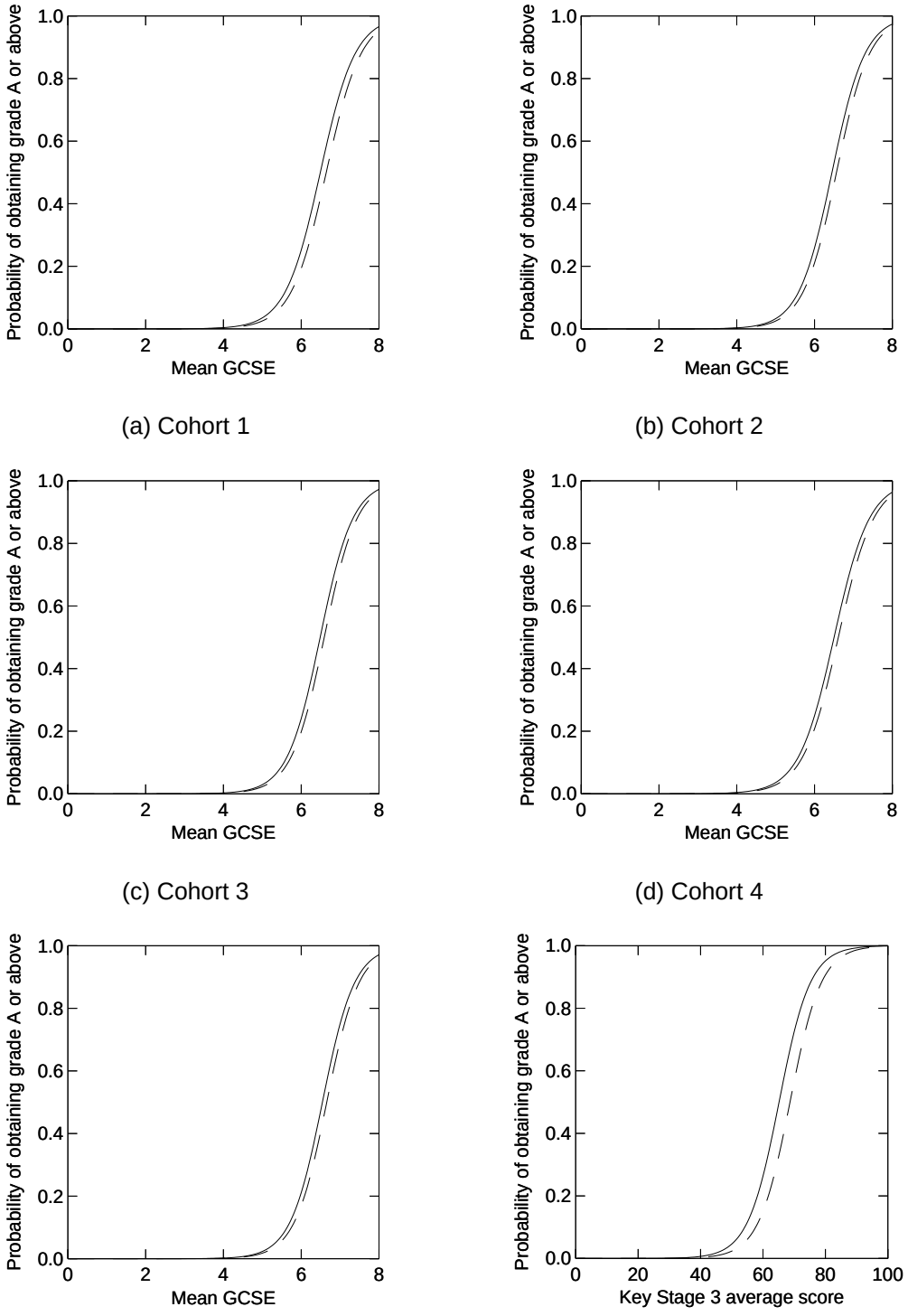
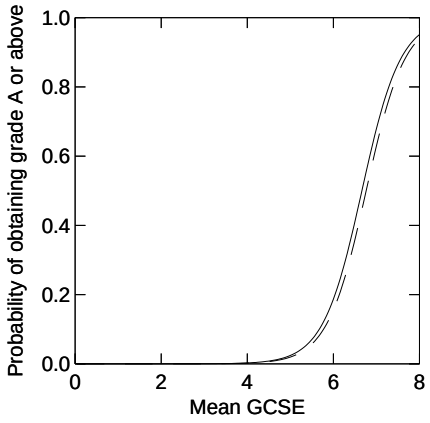
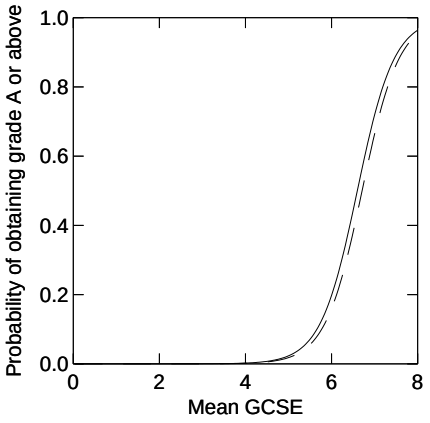


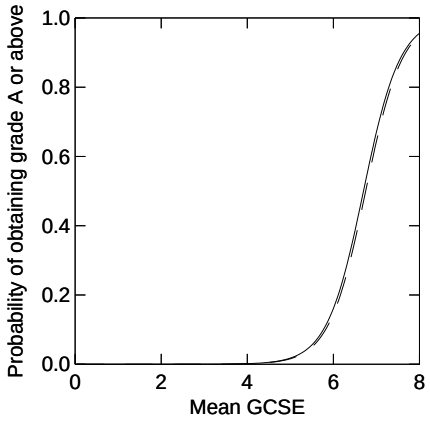
Figure E4: Predicted probability of a girl obtaining at least grade A in GCSE English by general attainment (solid line for linear assessment route and dashed line for modular assessment route)



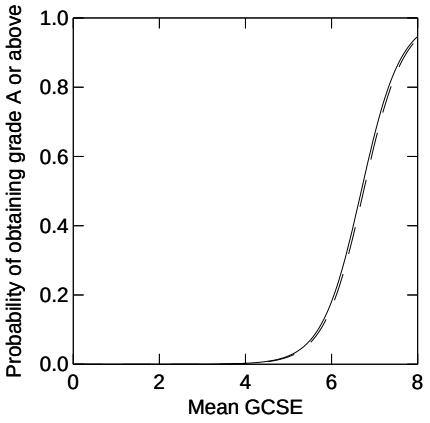
(a) Cohort 1



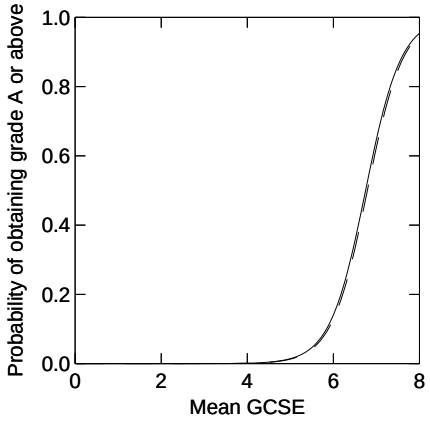
(b) Cohort 2



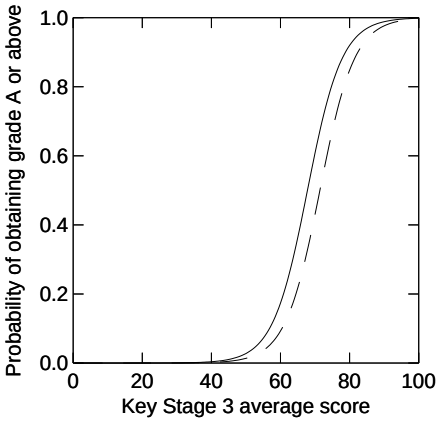
(c) Cohort 3



(d) Cohort 4



(e) Cohort 5



(f) Cohort 6

Figure E5: Predicted probability of a boy obtaining at least grade A in GCSE English by general attainment (solid line for linear assessment route and dashed line for modular assessment route)

Maturational effects

Due to the unit-based structure of the GCSE in English, students can take units at the end of the two-year course in a linear fashion or at specific points before the final session of year 2. For example, they can take units at the end of the first year of study (session 2), or in the January session of the second year of study (session 3).

In this section, the following question: *"Are there differences in outcomes at specification level between the group of students who sat the exams before the final session of year 2 and those who sat the exams early once concurrent/prior attainment has been taken into account?"* is answered separately for both assessment routes.

Since previous research into modular qualifications has indicated that boys are more likely to take advantage of the features of modular qualifications (*e.g.* McClune, 2001), gender effects are also reported in this section.

Modular assessment

The overall grade in GCSE English was used to compare the performance of students certificating in the final session of year 2 and of those doing it early (any other session). Figure E6 presents the average grade in GCSE English by session and gender[9].

For both groups of students (girls and boys), differences between sessions in attainment in English were significant at the 0.05 level, with better results, in most cases, for the students certificating in the final session. In general, girls performed better than boys.

But, is this still the case when students' ability is taken into account?

To answer the above question, the grade obtained in GCSE English was modelled, using logistic regression, as a function of the gender of the students, the session in which the student certificated and a general ability measure. An interaction term between session and gender was also included in the logistic model. The baseline category for the 'session' variable, to which all the other categories of the variable are compared, is the terminal session (session 4).

Effects (odds ratios) of session on the probability of obtaining a grade or above in GCSE English are presented in Table E8. For categorical variables (such as gender and session) this represents the odds as compared to the baseline category, for example, the odds of obtaining grade A or above in an early session compared to the odds in the terminal session. Also, if the odds ratio is greater than one, then there is a positive effect of the session. For example, if the odds ratio for grade A or above and session 3 were greater than one, then the probability of obtaining grade A or above would be higher in session 3 than in session 4 (baseline category). On the other hand, if the odds ratio is smaller than one, then there is a negative effect of the session. For example, if the odds ratio for grade A or above and session 3 were smaller than one, then the probability of obtaining grade A or above would be lower in session 3 than in session 4 (baseline category).

In the following, the effects of session by gender for each cohort are described.

[9] This analysis was not carried out for Cohort 1 (2004), since candidates could only certificate in one session, June 2004.

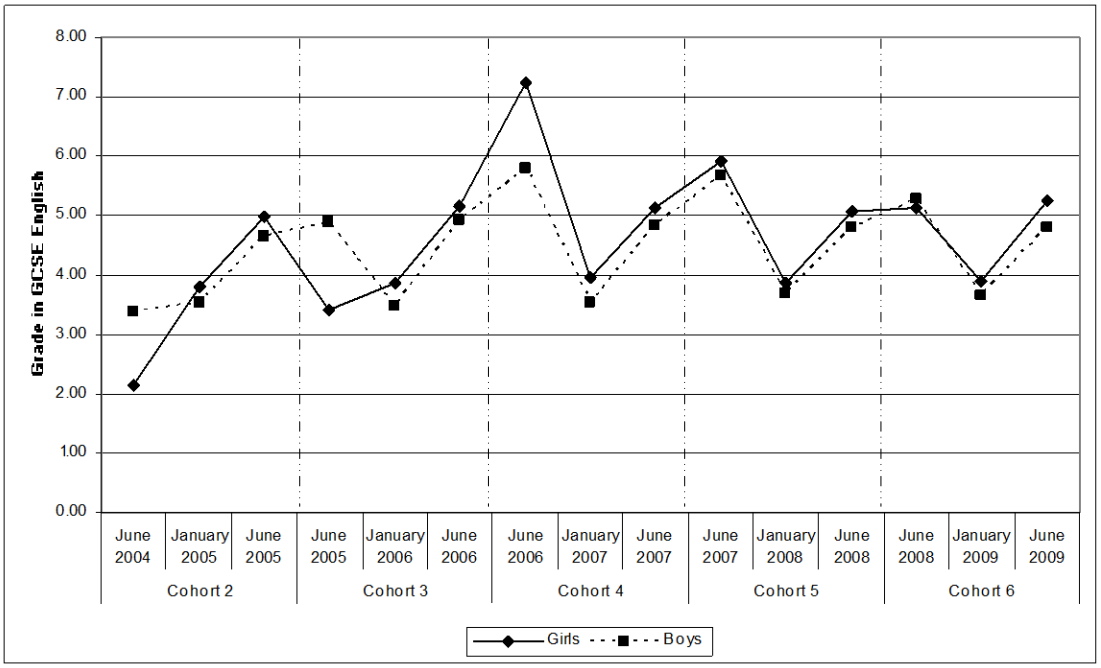


Figure E6: Average grade in GCSE English by session and gender[10]. Modular assessment route, 2005-2009

In 2005 (cohort 2), for most of the grades, with the exception of grade A*, there was a significant session effect once students' ability was taken into account. Candidates who certificated in session 3 had lower probability of obtaining a certain grade or above than those certificating in session 4. This effect was the same for boys and girls for almost all grades. The exceptions were grade B or above, grade E or above and grade F or above where girls were even more likely than boys to have lower probability of obtaining a certain grade or above in session 3 than in session 4.

In 2006 (cohort 3), candidates who certificated in session 3 had lower probability of obtaining grades A or above to C or above than those certificating in the terminal session.

In 2007 and 2008 (cohorts 4 and 5), and for each grade, candidates who certificated in session 3 had lower probability of obtaining a certain grade or above than those certificating in the terminal session. The effect was the same for both girls and boys.

In cohort 5 (2008) only, candidates who certificated in session 2 had lower probability of obtaining grades D, F or G (or above) than those who certificated in the terminal session. The effect was, again, the same for both girls and boys.

In 2009 (cohort 6) candidates who certificated in session 3 had lower probability of obtaining a certain grade or above than those certificating in the terminal session. The effect was the same for girls and boys for all grades except for grade C or above, where girls were even more likely than boys to have lower probability of obtaining grade C or above in session 3 than in session 4.

[10] The number of students following a modular route and certificating in session 2 was very small. Also, it was not possible to follow a modular route and certificate in session 1.

Table E8: Effects (odds ratios) of session and gender on the probability of obtaining a certain grade or above in GCSE English, 2005-2009. Modular assessment route[11]

Cohort (Year)	Variable	A*	A	B	C	D	E	F	G
Cohort 2 (2005)	Gender (G)	1.47	1.39	1.35	1.79	2.13	2.81	2.17	1.45
	Session 3		0.10	0.17	0.06	0.49	0.31	0.23	0.12
	Session 3 (G)			0.03			0.12	0.07	
	Mean GCSE	19.90	10.14	9.10	8.28	6.08	5.37	4.34	3.54
Cohort 3 (2006)	Gender (G)	-[12]	1.40	1.74	2.33	2.87	3.05	2.20	1.84
	Session 2	-							
	Session 3	-	0.07	0.08	0.23				
	Session 2 (G)	-							
	Session 3 (G)	-		0.28					
	Mean GCSE	-	8.36	9.92	8.10	7.41	6.06	5.76	4.57
Cohort 4 (2007)	Gender (G)	-	1.29	1.71	2.33	3.39	3.69	3.36	1.88
	Session 2	-							
	Session 3	-	0.15	0.24	0.21	0.57	0.43	0.44	0.36
	Session 2 (G)	-							
	Session 3 (G)	-	0.56						
	Mean GCSE	-	8.92	9.89	8.45	6.83	5.61	4.55	3.52
Cohort 5 (2008)	Gender (G)	-	1.35	1.72	2.22	2.77	2.73	2.66	1.96
	Session 2	-				0.21		0.10	0.09
	Session 3	-	0.26	0.36	0.26	0.43	0.47	0.48	0.61
	Session 2 (G)	-							
	Session 3 (G)	-							
	Mean GCSE	-	9.52	11.13	8.07	6.21	4.66	3.89	3.35
Cohort 6 (2009)	Gender (G)	-		1.96	2.29	2.34	1.91	1.45	2.66
	Session 2	-							
	Session 3	-	0.16	0.21	0.22	0.51	0.48	0.33	0.22
	Session 2 (G)	-							
	Session 3 (G)	-			0.15				
	Key Stage 3	-	1.20	1.16	1.15	1.16	1.14	1.11	1.08

It should be noted that some of the significant session effects were fairly small and led to small changes in the probability of obtaining a certain grade or above. One of the biggest negative effects was in session 3 of cohort 2, at grade C, with an odds ratio of 0.06. This means that the probability of obtaining a grade C or above, for a girl averaging grade C at GCSE, was 0.35 in session 3 and 0.88 in session 4 (an increase in the probability of 0.53).

From this analysis it seems that students following a modular assessment route and certificating early in the two-year course had lower probability of achieving a certain grade or above than those who certificated late. This may indicate that, in an assessment route that allows students to sit the exams at different points in the course, students opting for certificating at the beginning or midway through the course may be at a disadvantage compared to those who opt for certificating at the end. Girls might be at a greater disadvantage than boys.

[11] Only significant effects are reported.

[12] Effects no calculated due to the small number of candidates obtaining a grade A* in some of the sessions.

The gender effect is in line with previous research which showed that girls were less likely to take advantage of modular examinations than boys (McClune, 2001).

In a modular assessment route, the result above might suggest that students, in particular girls, could benefit from delaying examination to the later part of the course.

Linear assessment

The overall grade in GCSE English was used to compare the performance of students certificating in the final session of year 2 and of those doing it early (any other session). Note that candidates may certificate early taking all units in one session. This counts as a linear route. Figure E7 presents the average grade in GCSE English by session and gender[13].

For both groups of students (girls and boys) in cohorts 1 to 5, differences between sessions in attainment in GCSE English were significant at the 0.05 level, with better results, in most cases, for the students certificating in session 2 and the worst results for students certificating in the terminal session. There was one exception: in cohort 5, students who certificated in session 3 obtained the best results. There were no statistically significant differences between sessions in GCSE English performance for candidates in cohort 6. In general, girls performed better than boys.

But, is this still the case when students' ability is taken into account?

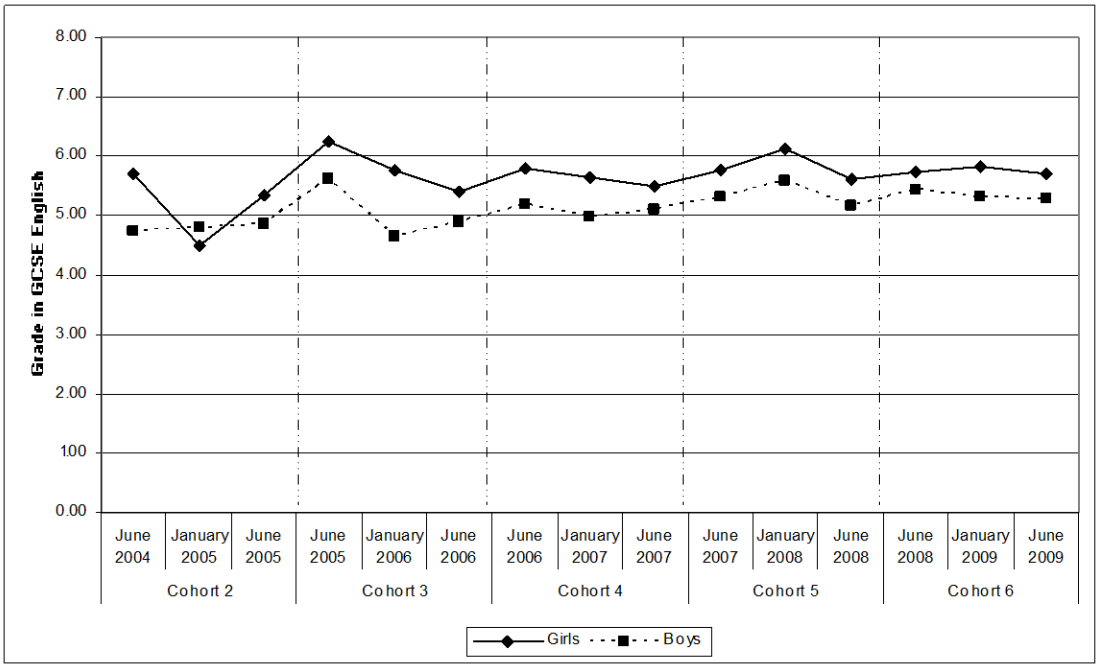


Figure E7: Average grade in GCSE English by session and gender. Linear assessment route, 2005-2009

[13] This analysis was not carried out for Cohort 1 (2004), since candidates could only certificate in one session, June 2004.

The grade in GCSE English was modelled, using logistic regression, as a function of the gender of the students, the session in which the student certificated and a general ability measure. An interaction term between the session and the gender was also included in the model. The baseline category for the 'session' variable, to which all the other categories of the variable are compared, is the terminal session (session 4).

Effects (odds ratios) of session and gender on the probability of obtaining a certain grade or above in GCSE English are presented in Table E9. For categorical variables (such as gender and session) this represents the odds as compared to the baseline category, for example, the odds of obtaining grade A or above in an early session compared to the odds in the terminal session. Also, if the odds ratio is greater than one, then there is a positive effect of the session. For example, if the odds ratio for grade A or above and session 3 were greater than one, then the probability of obtaining grade A or above would be higher in session 3 than in session 4 (baseline category). On the other hand, if the odds ratio is smaller than one, then there is a negative effect of the session. For example, if the odds ratio for grade A or above and session 3 were smaller than one, then the probability of obtaining grade A or above would be lower in session 3 than in session 4 (baseline category).

In the following, the effects of session by gender for each cohort are described.

There were not any clear patterns in the performance of candidates in GCSE English by session but, when there was a significant session effect, it usually had the same effect for girls and boys. It is possible, however to draw a couple of interesting findings from Table E9.

Firstly, in cohorts 2 and 4, and for grade A* only, girls certificating in session 3 had a higher probability of obtaining a grade A* than those certificating in the terminal session. There was no effect for boys.

And secondly, for all cohorts the probability of obtaining grade C or above was higher for those candidates who certificated early (sessions 2 or 3) than for those who certificated in the terminal session. In some cases, girls had even a higher probability than boys of obtaining grade C or above in sessions 2 or 3 than in session 4.

Contrary to the results for the modular assessment route, in some cohorts girls following a linear assessment route and certificating early in the two year course had higher probability of achieving a certain grade or above than those who certificated late.

Impact of unit re-sits on overall outcome

Of all the features of the modular assessment route, the one that has given rise to the most controversy is that of re-sits. This section focuses on the number of units candidates re-sit and briefly evaluates the impact (if any) of the number of unit re-sits on the overall GCSE grade.

Table E9: Effects (odds ratios) of session and gender on the probability of obtaining a certain grade or above in GCSE English, 2005-2009. Linear assessment route[14]

Cohort (Year)	Variable	A*	A	B	C	D	E	F	G
Cohort 2 (2005)	Gender (G)	1.16	1.43	1.63	2.14	2.55	2.70	2.45	1.84
	Session 2					0.33	0.15	0.15	0.30
	Session 3				2.43	0.51		2.50	
	Session 2 (G)				0.40				
	Session 3 (G)	3.94						0.28	0.39
	Mean GCSE	16.09	10.41	9.98	9.37	7.81	6.92	6.47	7.63
Cohort 3 (2006)	Gender (G)	1.38	1.70	1.85	2.07	2.56	2.87	2.62	2.07
	Session 2	0.54			2.29				
	Session 3				4.46			1.86	
	Session 2 (G)	1.31			8.84				
	Session 3 (G)		1.92						
	Mean GCSE	18.34	10.89	10.66	9.63	7.73	6.29	5.93	6.50
Cohort 4 (2007)	Gender (G)	0.98	1.49	1.78	2.20	2.92	3.17	2.88	2.29
	Session 2				2.07				3.49
	Session 3			0.55	4.20		0.50	0.47	
	Session 2 (G)				1.41		0.46		
	Session 3 (G)	1.31	1.40						
	Mean GCSE	14.98	1.02	8.87	8.88	7.51	6.58	6.29	6.87
Cohort 5 (2008)	Gender (G)	1.21	1.60	1.69	2.08	2.61	2.57	2.37	1.81
	Session 2		0.72	0.68	1.87			0.44	
	Session 3		1.60		10.74	1.85			
	Session 2 (G)			1.54			0.25		
	Session 3 (G)								
	Mean GCSE	22.94	11.71	11.45	9.79	7.62	5.94	5.38	5.51
Cohort 6 (2009)	Gender (G)	1.68	1.70	1.79	2.00	2.37	2.57	2.33	1.91
	Session 2								0.03
	Session 3		0.63	0.57	3.51	1.74	1.60		
	Session 2 (G)								
	Session 3 (G)				5.78	3.10			
	Key Stage 3	1.25	1.22	1.19	1.19	1.20	1.18	1.14	1.11

Table E10 displays the number of re-sits for each GCSE English unit (percentage in brackets). Each unit may be re-taken only once, if wished, prior to certification and the better score contributes towards the overall grade. Note that candidates that want to re-sit a modular qualification can do partial re-sits rather than necessarily repeating the whole assessment. The percentages of re-sits in each of the units were relatively small (7.43% being the highest – unit 2431, cohort 6), indicating that each unit is only taken once by the majority of the candidates.

[14] Only significant effects are reported.

Table E10: Numbers (percentages) of re-sits in GCSE English units, 2004-2009

	Unit				
	2431	2432	2433	2434	2435
Cohort 1	1242 (1.74)	995 (1.39)	502 (0.70)	563 (0.79)	162 (0.23)
Cohort 2	1178 (1.70)	1106 (1.59)	466 (0.67)	293 (0.42)	209 (0.30)
Cohort 3	1787 (2.72)	1145 (1.75)	195 (0.30)	788 (1.20)	519 (0.79)
Cohort 4	1357 (2.36)	1337 (2.32)	396 (0.69)	673 (1.17)	549 (0.95)
Cohort 5	2521 (5.08)	2320 (4.68)	423 (0.85)	1104 (2.23)	835 (1.68)
Cohort 6	3129 (7.43)	2987 (7.09)	597 (1.42)	1654 (3.93)	1505 (3.57)

There is evidence of an increasing percentage of students re-taking each individual unit over time. The largest percentage point increase was in two of the external assessed units (units 2431 and 2432) with an increase of 5.69 percentage points from cohort 1 to cohort 6 in unit 2431 and an increase of 5.70 percentage points in unit 2432.

Figure E8 illustrates the pattern of re-sits in GCSE English. It shows that the percentages of candidates re-sitting GCSE English units are increasing over time. In particular, it shows a small but constant rise of candidates who took three or four re-sits[15].

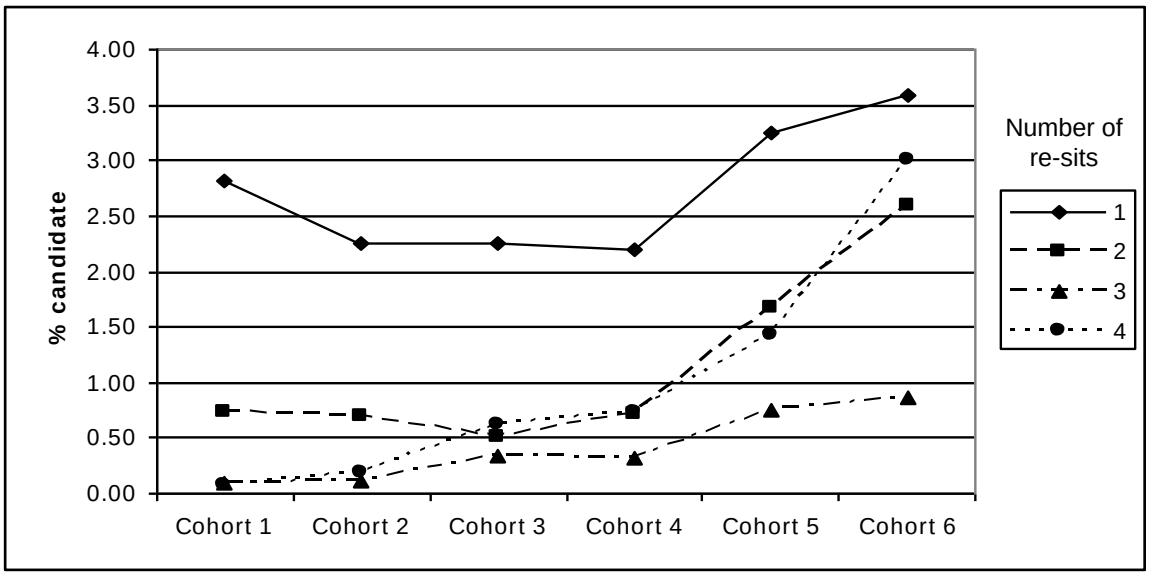


Figure E8: Percentages of candidates re-sitting 1, 2 3 or 4 GCSE English units, 2004-2009

Figure E9 shows the overall grade distribution in GCSE English for candidates who re-sat at least one unit and those who did not take any re-sits. The grade distributions for both groups of students were quite different. The percentages of students with

[15] This means candidates taking three or four units twice and not one unit three or four times (GCSE criteria (QCA, 2008) does not allow the later).

grades A*-B was higher among the students who did not take any re-sits. On the other hand, the percentages of students obtaining grades C-G were higher among the students that took at least one unit twice. This figure shows that, in general, the students who took re-sits were weaker in GCSE English than those who did not.

To investigate the impact of the re-sits on the overall grade in this subject, logistic regression was used. In particular, the overall grade obtained in GCSE English was modelled as a function of the gender of the student, the general attainment of the student and the total number of units re-sat (from 0 to 4).

Tables F19 to F24 in Appendix F present the regression parameters and the odds ratios for each of the grades in the six cohorts. Regression parameters and odds ratios for candidates in cohort 1 are presented in Table E11 below. All significant effects are highlighted in bold type.

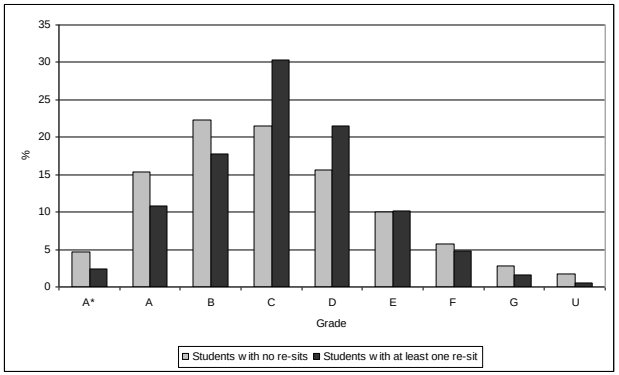
Table E11: Regression parameters and odds ratios for gender, number of units re-sat and general attainment. Cohort 1 (2004)

Grade	Gender (F)		Number of units re-sat		General attainment	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.06**	**1.06**	-0.15	0.86	**2.77**	**15.98**
At least grade A	**0.19**	**1.21**	**-0.14**	**0.87**	**2.22**	**9.24**
At least grade B	**0.25**	**1.28**	**-0.47**	**0.62**	**2.22**	**9.18**
At least grade C	**0.35**	**1.42**	-0.01	0.99	**2.14**	**8.51**
At least grade D	**0.48**	**1.62**	**0.29**	**1.34**	**1.97**	**7.19**
At least grade E	**0.53**	**1.69**	**0.34**	**1.40**	**1.85**	**6.36**
At least grade F	**0.50**	**1.65**	**0.49**	**1.63**	**1.79**	**5.97**
At least grade G	**0.39**	**1.48**	**0.54**	**1.72**	**1.85**	**6.35**

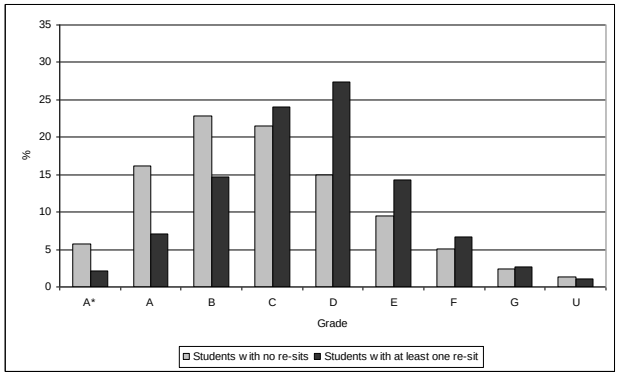
There were positive significant effects for gender, which indicate that, for a given number of units re-sat and a given general attainment score, the probability of obtaining at least a given grade was higher for girls than for boys. This was the case for all the grades.

As expected, for all cohorts and all grades there were positive significant 'General attainment' effects, meaning that the probability of obtaining a given grade or above in GCSE English increased significantly with increasing scores in the attainment measure.

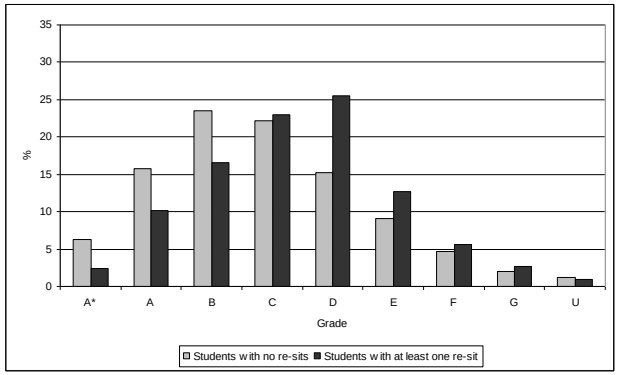
A positive significant 'Number of units re-sat' effect indicates that, for a given general attainment score, the probability of obtaining at least a given grade significantly increases when the number of units re-sat increases. For example, Table E11 shows that the probability of obtaining grade E or above for a student taking one unit twice was higher than the probability of a student taking all units only once. There were positive significant effects for grade D or above to grade G or above. This result confirms the claims that some students, in particular weaker ones, benefit from being able to re-sit units. On the other hand, there was a negative 'Number of units re-sat' effect for at least grade A and at least grade B, indicating that for a given mean GCSE score, the probability of obtaining those grades significantly decreased if more modules were re-taken. For example, in 2004, the probability of obtaining a grade A or above for a student averaging grade A at GCSE and who did not re-sit any modules was 0.67 whereas the same probability for a student who re-sat one or two modules once was 0.64 and 0.60, respectively.



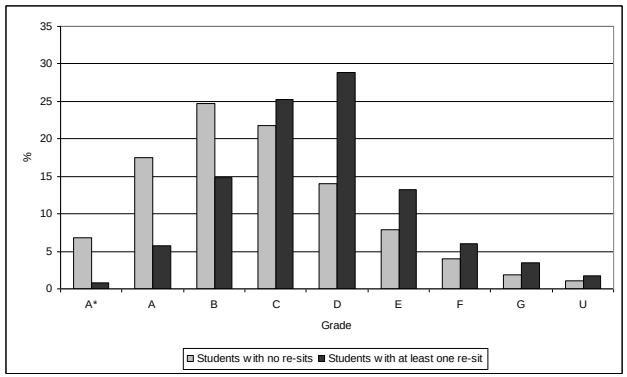
(a) Cohort 1



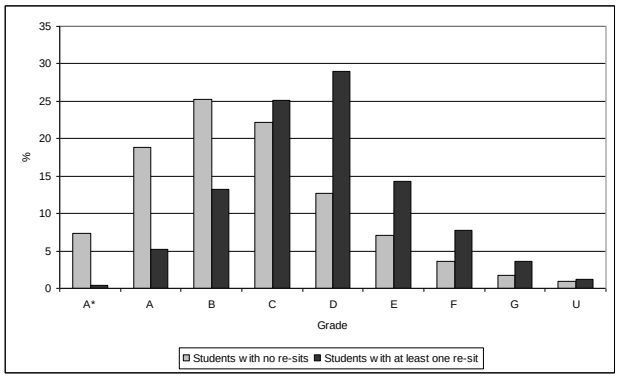
(b) Cohort 2



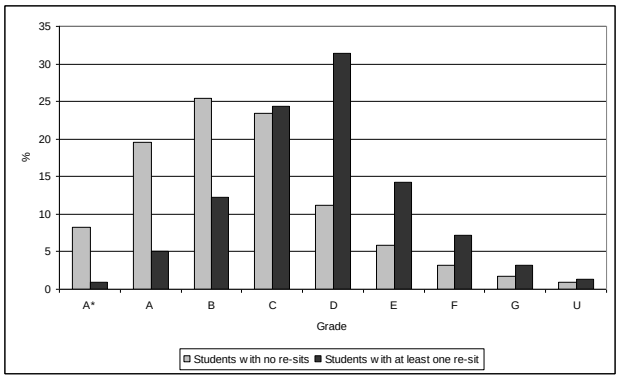
(c) Cohort 3



(d) Cohort 4



(e) Cohort 5



(f) Cohort 6

Figure E9: Grade distribution in GCSE English for students with and without re-sits, 2004-2009

For candidates in cohorts 2 to 6, the ‘Number of units re-sat’ effect was very similar to the effect for candidates in cohort 1 (Tables F20-F24).

Figure E10 displays the predicted probability of obtaining at least grade A by general attainment for a girl re-sitting none, one or two units. Figure E11 displays the same probability for a boy. These figures show that, in all cohorts, the probability of obtaining grade A or above decreased if more units were re-sat. The differences between the curves, though small, were bigger in the later cohorts, meaning that for candidates in those cohorts the effect of the number of units re-sat was stronger.

Figure E12 displays the predicted probability of obtaining at least grade E by general attainment for a girl re-sitting none, one or two units. Figure E13 displays the same probability for a boy. These figures show the opposite effect to the one mentioned for grade A or above: the probability of obtaining grade E or above increased with an increasing number of units re-sat and the effect was stronger for candidates in the early cohorts.

Figure E14 displays the percentages of students that re-sat GCSE English units by type of school. It shows that the percentage of students taking no re-sits was higher in the independent sector. Also, from this figure it is possible to see that the increase in numbers of re-sits from Cohort 1 to Cohort 6 shown in Figure E8 was mainly due to increases in the state sector.

The differences in the re-sitting patterns by centre type were, nevertheless, small. This is in line with a study carried out by QCA (2007b) about re-sitting patterns and policies in respect to GCE A-levels in seven subjects (including English literature and mathematics) which indicated that there was very little difference in the scale of re-sitting behaviour in terms of centre type.

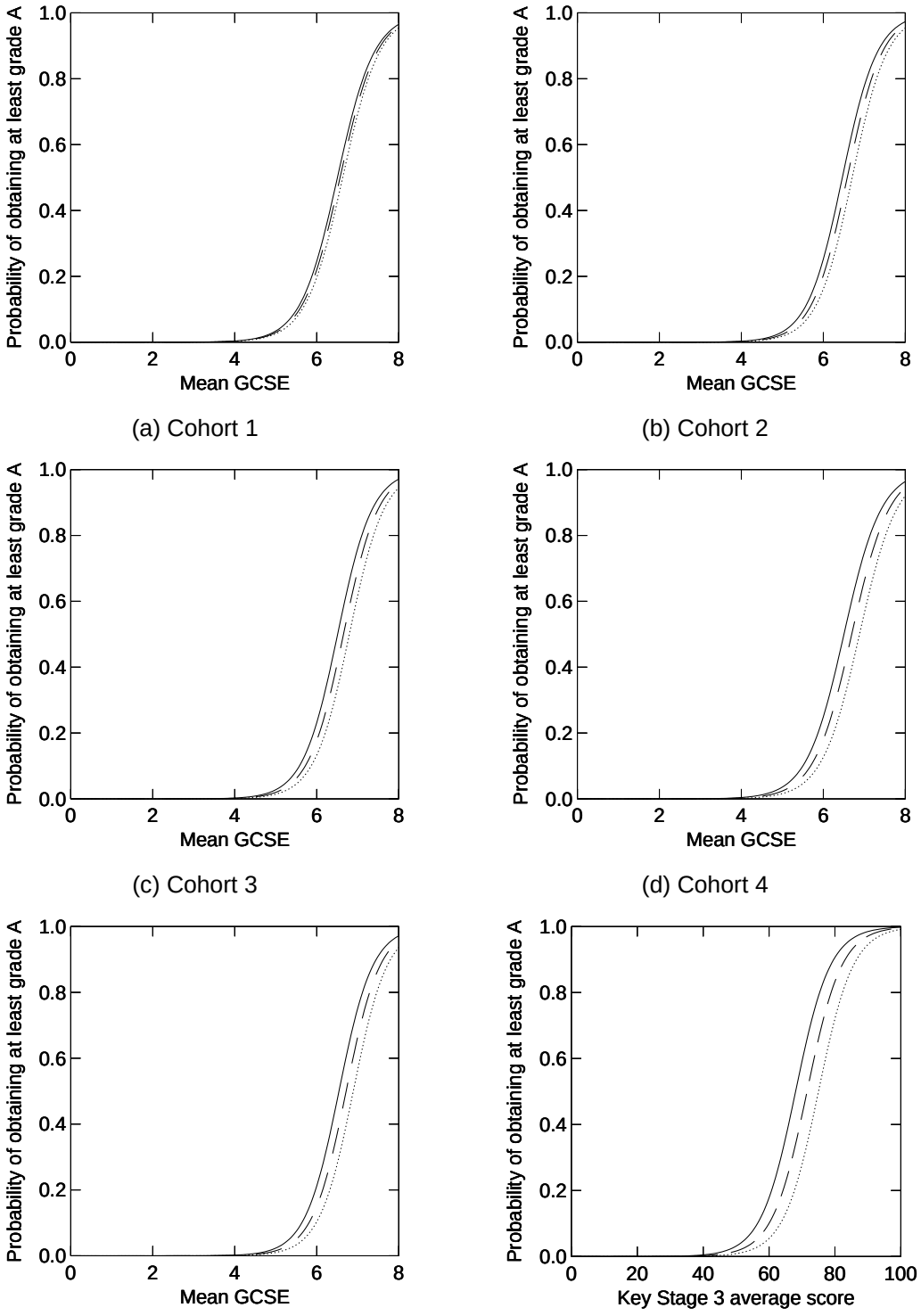
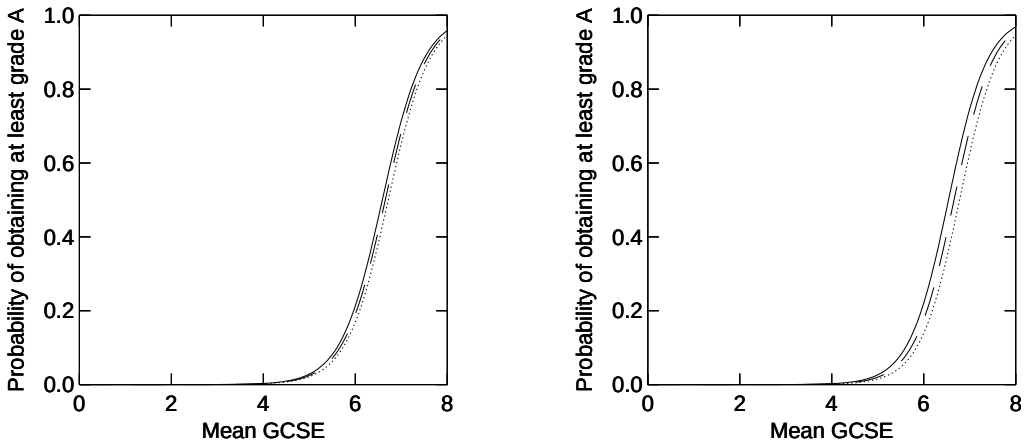
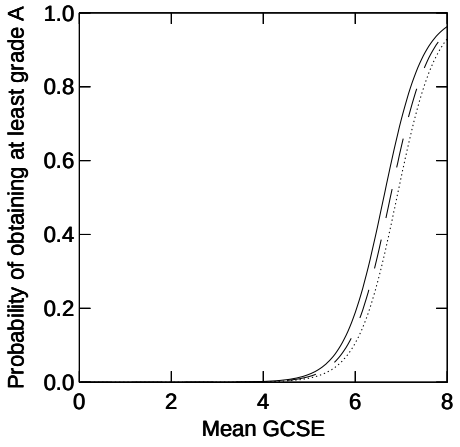


Figure E10: Predicted probability of a girl obtaining at least grade A in GCSE English by general attainment (solid line for 'no re-sits', dashed line for 'one unit re-sat' and dotted line for 'two units re-sat')

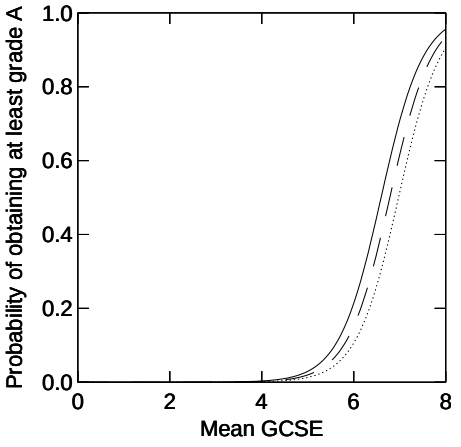


(a) Cohort 1

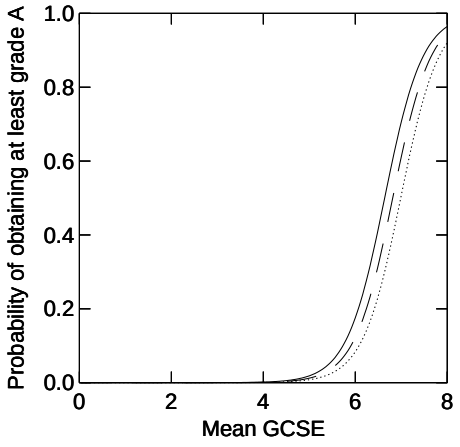
(b) Cohort 2



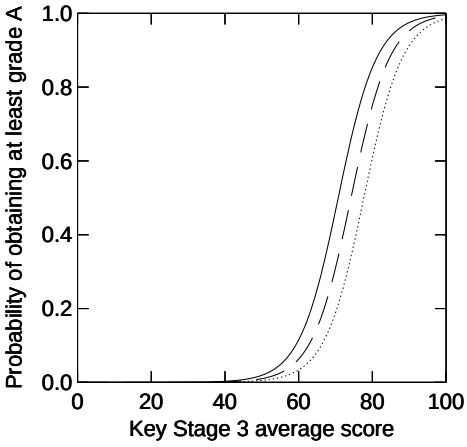
(c) Cohort 3



(d) Cohort 4

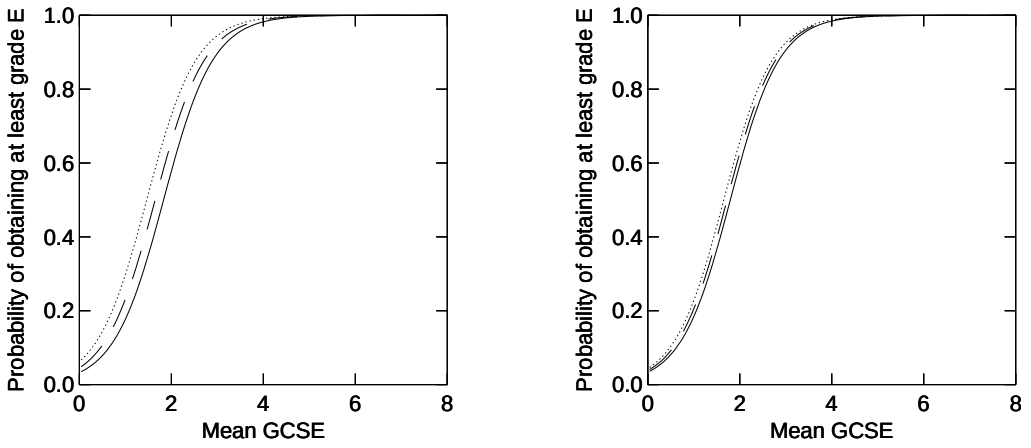


(e) Cohort 5



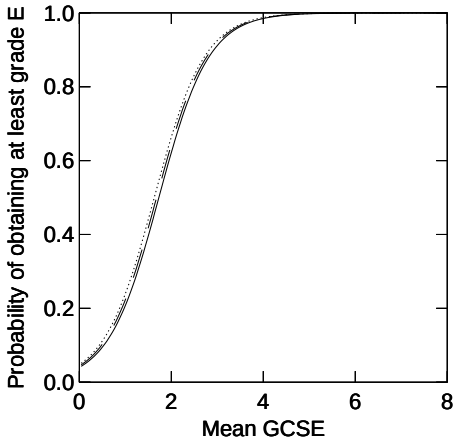
(f) Cohort 6

Figure E11: Predicted probability of a boy obtaining at least grade A in GCSE English general attainment (solid line for ‘no re-sits’, dashed line for ‘one unit re-sat’ and dotted line for ‘two units re-sat’)

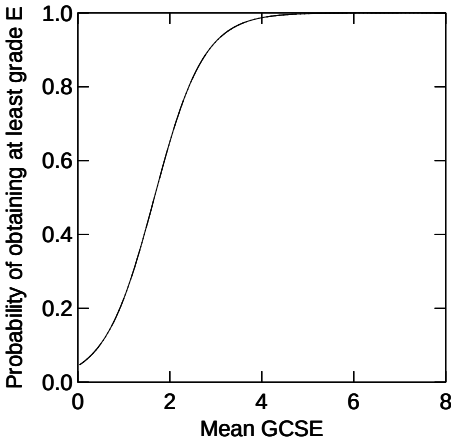


(a) Cohort 1

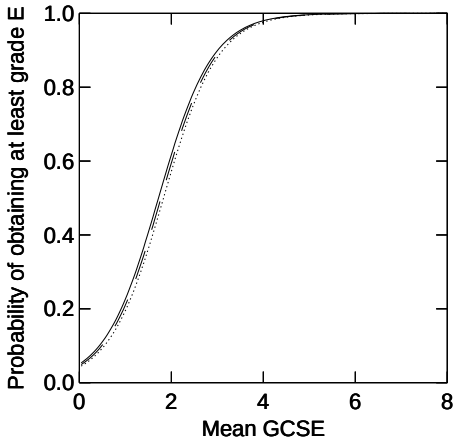
(b) Cohort 2



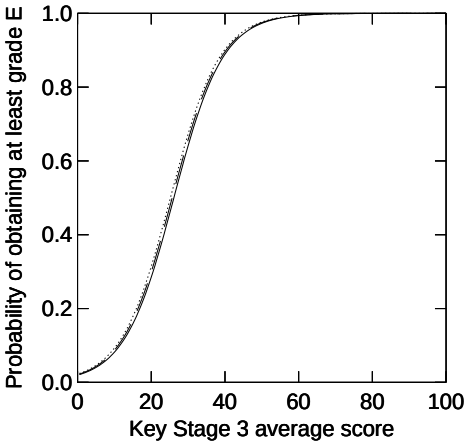
(c) Cohort 3



(d) Cohort 4

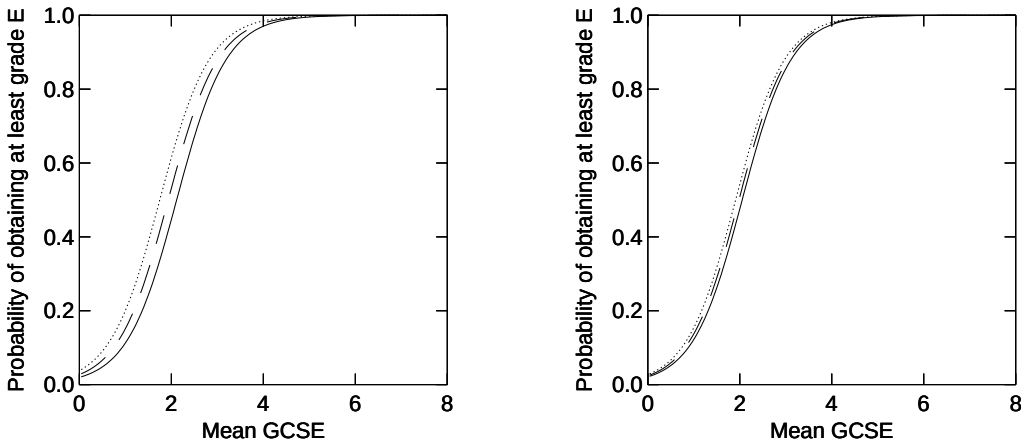


(e) Cohort 5



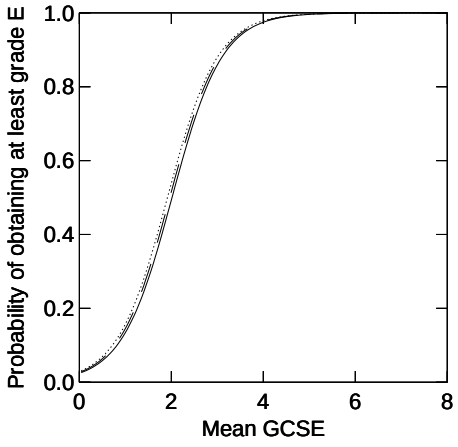
(f) Cohort 6

Figure E12: Predicted probability of a girl obtaining at least grade E in GCSE English by general attainment (solid line for ‘no re-sits’, dashed line for ‘one unit re-sat’ and dotted line for ‘two units re-sat’)

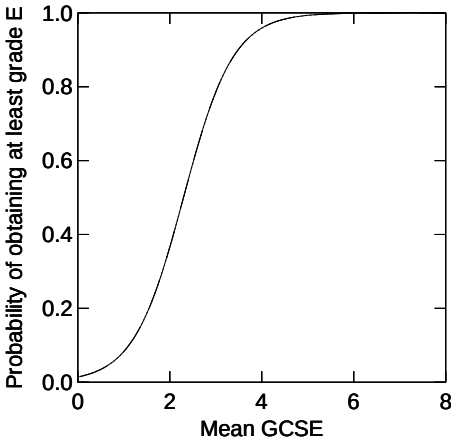


(a) Cohort 1

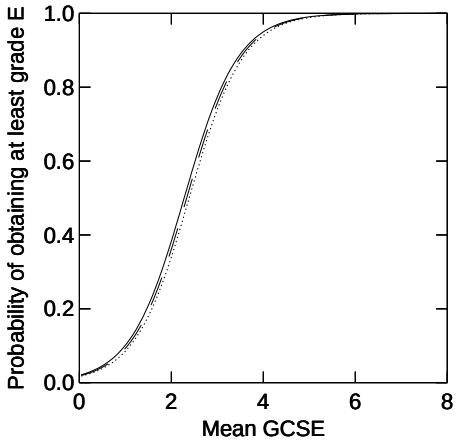
(b) Cohort 2



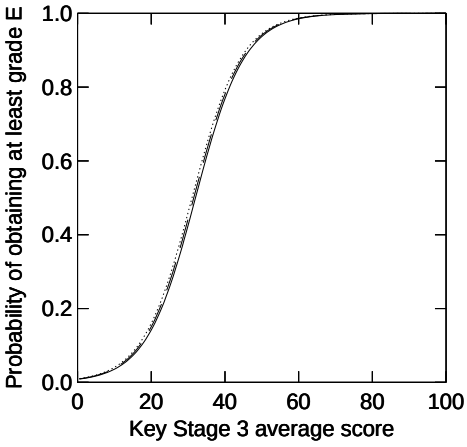
(c) Cohort 3



(d) Cohort 4

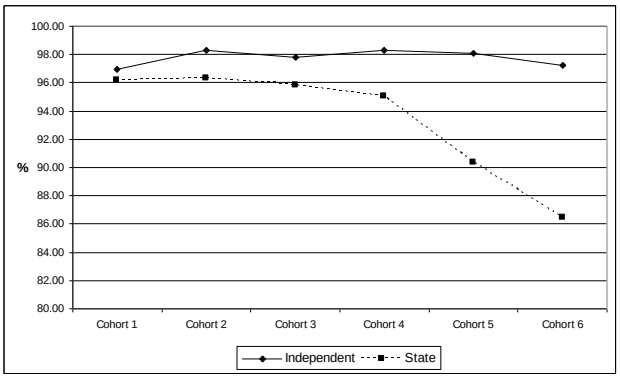


(e) Cohort 5

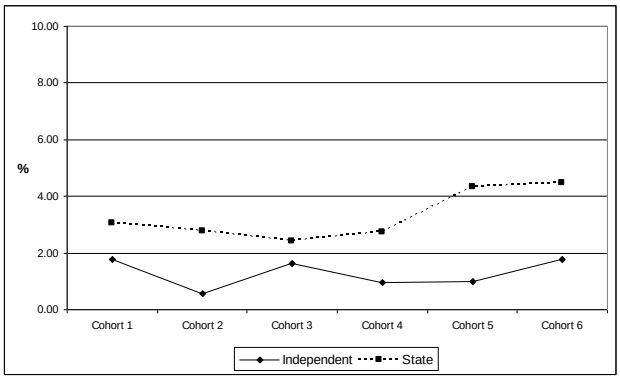


(f) Cohort 6

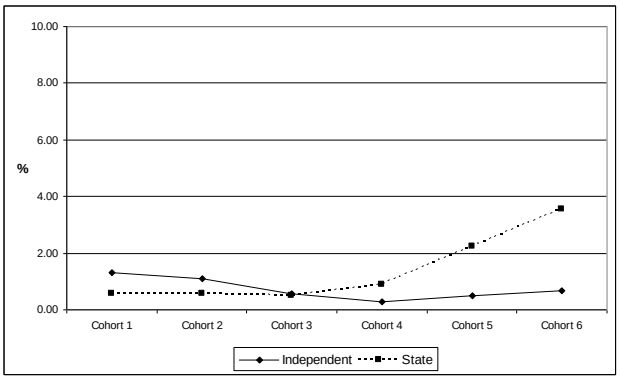
Figure E13: Predicted probability of a boy obtaining at least grade E in GCSE English by general attainment (solid line for ‘no re-sits’, dashed line for ‘one unit re-sat’ and dotted line for ‘two units re-sat’)



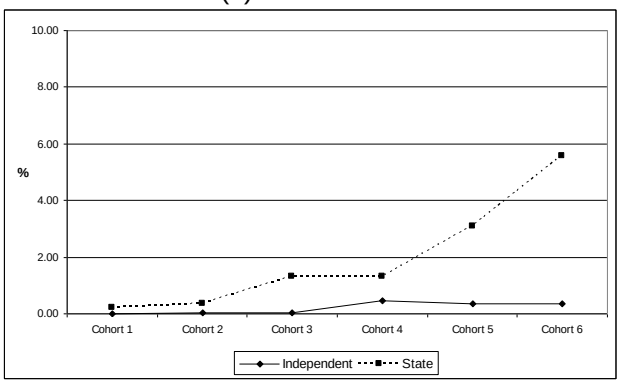
(a) No re-sits



(b) 1 unit re-sat



(c) 2 units re-sat



(d) 3 or more units re-sat

Figure E14: Percentages of students with re-sits in GCSE English by type of school, 2004-2009

ANALYSIS AT UNIT LEVEL

In this section, the analysis of examination data relating to the five units that contribute to the GCSE English qualification is reported in turn.

UNIT 1 – 2431

Entries, assessment routes and unit performance

Table EU1 presents the entries in GCSE English unit 2431 in the period of study. Note that the number of entries is different from the number of candidates, as candidates can enter an examination for the unit more than once. For all cohorts, the majority of the candidates took unit 2431 in the terminal session (session 4). However, the percentages of candidates sitting this unit in session 3 increased significantly from 2006 (2.82%) to 2009 (10.73%).

Table EU1: GCSE English unit 2431 entries, 2004-2009

		Session 1	Session 2	Session 3	Session 4	All sessions
Cohort 1 (2004)	Entries		505	1572	70634	72711
	%		**0.69**	**2.16**	**97.14**	
Cohort 2 (2005)	Entries	177	1676	1510	67378	70564
	%	**0.25**	**2.38**	**2.14**	**95.48**	
Cohort 3 (2006)	Entries	49	1470	1900	64114	67484
	%	**0.07**	**2.18**	**2.82**	**95.01**	
Cohort 4 (2007)	Entries	243	1057	2498	55373	58928
	%	**0.41**	**1.79**	**4.24**	**93.97**	
Cohort 5 (2008)	Entries	37	1620	4101	46562	52283
	%	**0.07**	**3.10**	**7.84**	**89.06**	
Cohort 6 (2009)	Entries	128	1884	4884	38639	45535
	%	**0.28**	**4.14**	**10.73**	**84.86**	

Table EU2 presents, for all cohorts, the average grade obtained in the unit by session and assessment route. For each session (if the unit was available in both assessment routes), differences in the unit's average grade between the linear and modular assessment routes were significant at the 0.05 level. There was one exception: in cohort 2, the differences were significant only in session 4. In all cohorts and all sessions, the unit's average grades were lower for the modular assessment route than for the linear route.

Earlier in this report it was shown that students of English who followed a modular assessment route had significantly lower general attainment than those who followed a linear one. In the following section, the differences in unit outcomes by assessment route taking into account students' general attainment are reported.

Unit outcomes by assessment route controlling for students' ability

In this section, the probability of achieving at least a certain grade in unit 2431 was modelled as a function of the gender and general ability of the student and whether the assessment was linear or modular. Tables H1-H6 in Appendix H present the regression parameters and the odds ratios for each of the grades in the six cohorts. Significant effects are highlighted in bold type.

Table EU2: Average grade in GCSE English unit 2431 by session and assessment route, 2004-2009

	Session	Linear		Modular	
		Mean	SD	Mean	SD
Cohort 1	Jan-03	-	-	-	-
(2004)	Jun-03	-	-	4.81	1.77
	Jan-04	-	-	4.05	1.71
	Jun-04	4.97	1.85	4.67	1.77
Cohort 2	Jan-04	-	-	3.36	1.65
(2005)	Jun-04	5.37	2.23	4.23	2.00
	Jan-05	4.47	2.03	3.80	1.59
	Jun-05	5.09	1.81	4.73	1.75
Cohort 3	Jan-05	-[16]	-	3.61	1.24
(2006)	Jun-05	5.88	1.48	4.25	1.76
	Jan-06	4.95	1.97	3.63	1.93
	Jun-06	4.99	1.86	4.76	1.77
Cohort 4	Jan-06	5.56	1.42	4.16	1.51
(2007)	Jun-06	5.18	1.97	3.82	2.08
	Jan-07	5.16	1.88	3.55	1.78
	Jun-07	5.09	1.81	4.68	1.80
Cohort 5	Jan-07	7.80	0.45	5.58	1.48
(2008)	Jun-07	5.22	1.65	4.10	1.65
	Jan-08	5.55	1.57	3.83	2.01
	Jun-08	5.18	1.76	4.49	1.73
Cohort 6	Jan-08	-[16]	-	2.12	2.10
(2009)	Jun-08	5.21	1.58	3.84	1.64
	Jan-09	5.29	1.75	3.69	1.79
	Jun-09	5.25	1.76	4.42	1.66

From this point onwards, the focus will be on grade A or above and grade C or above only. The A/B and C/D grade boundaries are judgemental[17] and are decided by the awarding committee. All other grade boundaries are determined arithmetically (see Ofqual (2009) for more information on how to determine grade boundaries).

For a given value of the general attainment score and for a specific assessment route, the probability of obtaining any grade or above in unit 2431 was, in most cases, significantly higher for girls than for boys.

For all cohorts, the probability of obtaining any grade or above in unit 2431 increased significantly with increasing scores in the general attainment measure.

With regard to the 'Assessment Route' effect, for cohorts 2-6, the probability of obtaining grade A or above was significantly higher for candidates following the linear assessment route than for those following a modular route. For cohorts 1, 4 and 6, there were significant 'Assessment Route by Gender' effects. In the case of cohort 1, the effect was positive, indicating that, for girls, the probability of obtaining grade A or above was higher if they followed the linear assessment route than if they followed the modular one. In cohorts 4 and 6 the effect of the assessment route was greater for boys than for girls. In any other cohort, the assessment route effect was the same for girls and boys.

[16] Although it was possible to follow a linear assessment route and sit unit 2431 in session 1, only 1 candidate did that.

[17] F/G is also a judgemental grade boundary, but it will not be considered here.

The probability of obtaining grade C or above was higher for candidates following a modular route than for candidates following a linear one in cohort 1 and lower in cohort 6. For any other cohort there were not any significant effects on the probability of obtaining grade C or above.

Figures EU1 and EU2 display the predicted probability of a girl and a boy, respectively, obtaining grade A or above by general attainment score and assessment route. These figures show that the differences in the probabilities of obtaining a grade A or above for the different assessment routes were small and in favour of the linear assessment route.

Maturational effects

This section looks at differences in unit outcomes by session. As for the specification level, the research question is addressed separately for both assessment routes.

For a detailed explanation of how to interpret the results presented in this section's tables, refer to the equivalent section in the 'Specification level' analysis.

Modular assessment

In each cohort, the differences between sessions in the average grade in unit 2431 were statistically significant for both girls and boys. Both groups of candidates performed better in this unit at the end of the two-year course (session 4) than in early sessions. There was an exception: boys' best performance in cohort 2 occurred in session 3. In most sessions, girls obtained significantly better results than boys in this unit.

But, is this still the case when students' ability is taken into account? The same analyses as for the specification level were carried out and results are presented in Table EU3 (the focus is on grades A and C).

If the odds ratio is greater than one, then there is a positive effect of the session. For example, if the odds ratio for grade A or above and session 3 were greater than one, then the probability of obtaining grade A or above would be higher in session 3 than in session 4 (baseline category). On the other hand, if the odds ratio is smaller than one, then there is a negative effect of the session. For example, if the odds ratio for grade A or above and session 3 were smaller than one, then the probability of obtaining grade A or above would be lower in session 3 than in session 4 (baseline category).

In 2004 (cohort 1), girls taking the unit in session 3 had lower probability of obtaining grade A or above than those taking the unit in the final session. There was no effect for boys. The same effect appeared for grade C or above.

In 2005 (cohort 2), candidates taking the unit in session 2 had lower probability of obtaining grade A or above than those taking the unit a year later (session 4). There were no other significant effects.

In 2006 (cohort 3), there were negative significant session effects for session 3 on both grade A or above and grade C or above, with candidates taking the unit in that session having lower probability of obtaining that grade than those taking it in the terminal session. For grade C, girls were even more likely than boys to have lower probability of obtaining grade C or above in session 3 than in session 4.

In 2007 (cohort 4), candidates taking the unit in session 3 had a lower probability of obtaining grade A or above than those taking the unit in session 4. There were no other significant effects.

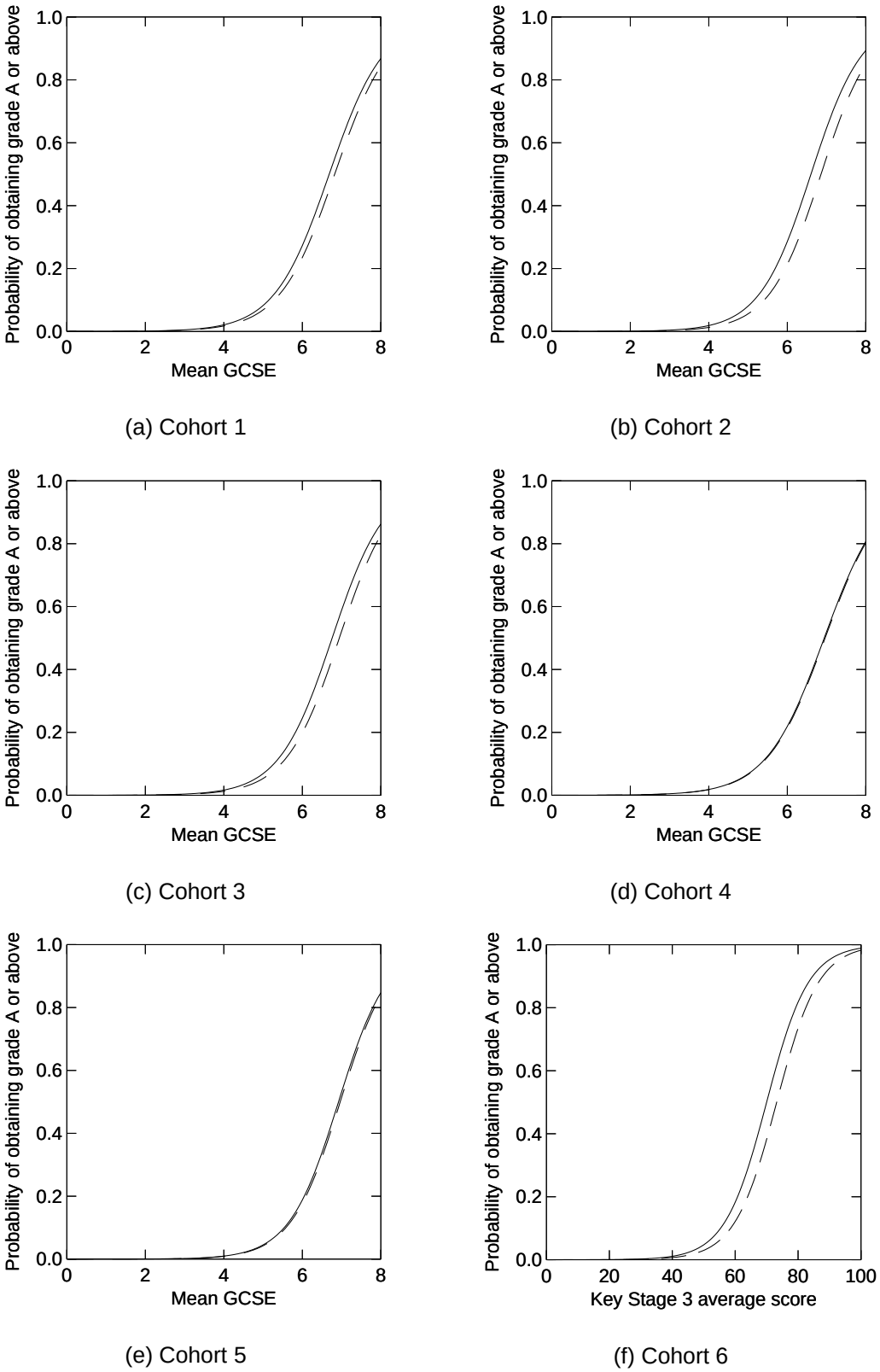


Figure EU1: Predicted probability of a girl obtaining at least grade A in unit 2431 by general attainment (solid line for linear assessment route and dashed line for modular assessment route)

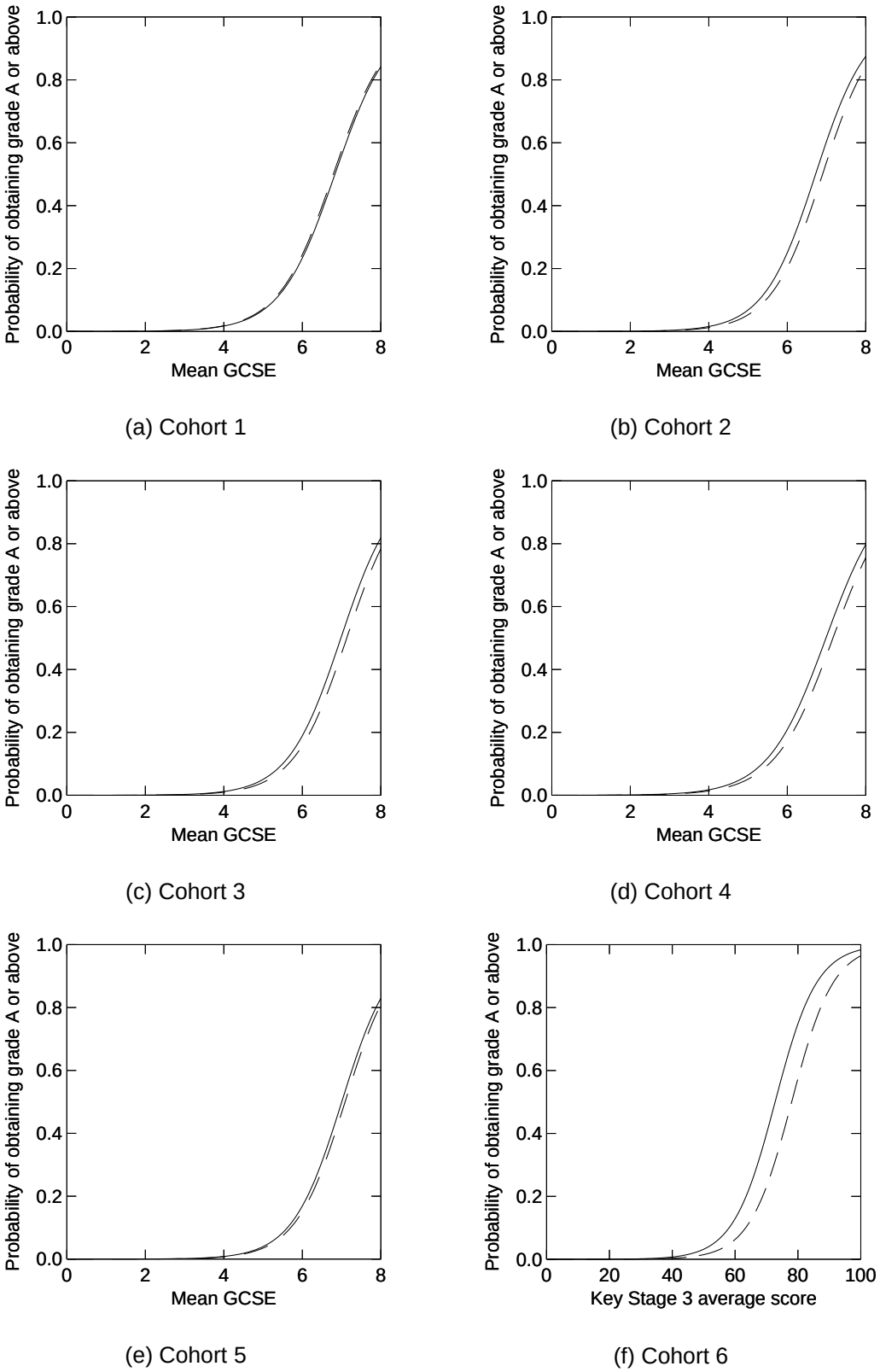


Figure EU2: Predicted probability of a boy obtaining at least grade A in unit 2431 by general attainment (solid line for linear assessment route and dashed line for modular assessment route)

Table EU3: Effects (odds ratios) of session and gender on the probability of obtaining a grade or above in unit 2431, 2004-2009. Modular assessment route[18]

Cohort (Year)	Variable	A	C
Cohort 1 (2004)	Gender (G)		1.22
	Session 2		
	Session 3		
	Session 2 (G)		
	Session 3 (G)	0.38	0.34
	Mean GCSE	4.22	4.68
Cohort 2 (2005)	Gender (G)		1.65
	Session 2	0.10	
	Session 3		
	Session 2 (G)		
	Session 3 (G)		
	Mean GCSE	5.04	4.41
Cohort 3 (2006)	Gender (G)	1.29	1.83
	Session 2		5.80
	Session 3	0.21	0.50
	Session 2 (G)		
	Session 3 (G)		0.21
	Mean GCSE	3.61	5.01
Cohort 4 (2007)	Gender (G)	1.29	2.17
	Session 2		
	Session 3	0.41	
	Session 2 (G)		
	Session 3 (G)		
	Mean GCSE	3.86	4.32
Cohort 5 (2008)	Gender (G)	1.28	1.68
	Session 2		2.36
	Session 3	2.00	
	Session 2 (G)		
	Session 3 (G)		
	Mean GCSE	5.33	5.06
Cohort 6 (2009)	Gender (G)	2.15	1.81
	Session 2		0.05
	Session 3		2.22
	Session 2 (G)		
	Session 3 (G)		
	Key Stage 3	1.19	1.15

In 2008 (cohort 5), there were positive significant session effects for sessions 3 and 2 on grade A or above and grade C or above, respectively, with candidates taking the unit in those sessions having higher probability of obtaining the grade than those taking it in the terminal session. These effects were in the opposite direction to all the effects reported previously.

[18] Only significant effects are reported.

Finally, in 2009 (cohort 6), there were no significant session effects on grade A or above. However, candidates taking the unit in session 2 had lower probability of obtaining grade C or above than those taking it in the terminal unit and candidates taking the unit in session 3 had a higher probability of obtaining grade C or above than those taking it in the terminal unit.

It is difficult to draw conclusions with respect to the issue of maturation from the results above (as significant effects varied in size and by cohort) but, in cohorts 1 to 4, students taking unit 2431 early in the two-year course (session 3) had lower probability of achieving grade A or above and grade C or above than those who took the unit in the terminal session. The pattern changed in the 2008 and 2009 cohorts, where candidates taking the unit early (session 3) had higher probability of obtaining a given grade or above than those taking it in the terminal session.

Linear assessment

For both girls and boys, the differences in the unit's performance between the sessions were statistically significant in cohorts 1 to 5. Girls obtained the worst results in the terminal session and their best results in session 3. On the contrary, boys performed better in the first available session and worst in session 3. As for the modular assessment route, girls obtained better results than boys.

Results from analyses taking into account students' ability are presented in Table EU4[19].

In 2005 (cohort 2), there was a significant positive effect for session 2 on grade A, meaning that candidates had higher probability of obtaining grade A or above in session 2 than in session 4. For students in cohort 2, there was also a significant negative effect, only for girls, on the probability of obtaining grade C or above in session 2. This means that girls taking the unit in session 2 had lower probability of obtaining grade C or above than those taking the unit in session 4.

In 2006 (cohort 3), boys taking unit 2431 in session 3 had lower probability of obtaining grade A than those taking the unit in the terminal session and girls had higher probability of obtaining grade A or above in session 3 than in session 4. With respect to grade C, both girls and boys had higher probability of obtaining the grade or above in session 2 than in session 4.

In 2007 (cohort 4), the effect of session 3 on girls and boys was the same as in 2006. In addition, candidates in this cohort had lower probability of obtaining grade A if they took the unit examination in session 2 than if they did so in session 4.

In 2008 (cohort 5), there was a negative effect on the probability of obtaining grade A or above in session 2, that is, candidates who sat the unit in session 2 had lower probability of obtaining grade A or above than those who sat the unit in the terminal session. Also, the probability of a girl obtaining grade A or above in session 3 was higher than in session 4.

In 2009 (cohort 6), there were no significant session effects on either grade A or above or grade C or above.

[19] There is no data for 2004 because for the linear assessment in that year, all units had to be taken in the June 2004 session.

From the results above, once general ability was taken into account, it seems that, when following a linear assessment route, girls could gain a better grade in unit 2431 if they sit the examination in session 3. Boys, on the other hand, could benefit from taking this unit in the final session of the two-year course.

Table EU4: Effects (odds ratios) of session and gender on the probability of obtaining a grade or above in unit 2431, 2005-2009. Linear assessment route[20]

Cohort (Year)	Variable	A	C
Cohort 2 (2005)	Gender (G)	1.21	1.68
	Session 2	1.43	
	Session 3		
	Session 2 (G)		0.54
	Session 3 (G)		
	Mean GCSE	4.52	5.03
Cohort 3 (2006)	Gender (G)	1.39	1.61
	Session 2		1.61
	Session 3	0.63	
	Session 2 (G)		
	Session 3 (G)	1.22	
	Mean GCSE	4.53	4.98
Cohort 4 (2007)	Gender (G)	1.04	1.71
	Session 2	0.66	
	Session 3	0.71	
	Session 2 (G)		
	Session 3 (G)	1.83	
	Mean GCSE	3.89	4.53
Cohort 5 (2008)	Gender (G)	1.10	1.63
	Session 2	0.68	
	Session 3		
	Session 2 (G)		
	Session 3 (G)	1.82	
	Mean GCSE	4.81	4.78
Cohort 6 (2009)	Gender (G)	1.55	1.77
	Session 2		
	Session 3		
	Session 2 (G)		
	Session 3 (G)		
	Key Stage 3	1.16	1.16

Impact of unit re-sits on unit grade

For each student who took unit 2431 twice, changes in marks and grades between the first and second attempts were computed. The differences between attempts were statistically significant, with marks/grades being higher in the second attempt (about five UMS[21] marks or half a grade). Table EU5 shows the average mark and grade in unit 2431 for all six cohorts and both attempts.

[20] Only significant effects are reported.

[21] To make the unit results compatible and comparable (so that they can be added together to get the final grade, even if they were taken at different times), raw marks are converted to points on the uniform mark scale (UMS).

Table EU5: Average mark and grade for unit 2431 in the first and second attempts, 2004-2009

		First attempt		Second attempt	
		Mean	SD	Mean	SD
Mark	Cohort 1	49.67	15.18	54.22	16.24
	Cohort 2	47.38	16.87	51.06	17.41
	Cohort 3	49.40	15.80	52.40	15.96
	Cohort 4	45.77	14.53	50.55	14.62
	Cohort 5	45.67	14.40	49.27	13.38
	Cohort 6	45.93	1377	49.53	13.44
Grade	Cohort 1	4.06	1.73	4.57	1.81
	Cohort 2	3.79	1.86	4.10	1.94
	Cohort 3	3.95	1.89	4.37	1.76
	Cohort 4	3.55	1.75	4.15	1.69
	Cohort 5	3.49	1.79	4.00	1.59
	Cohort 6	3.55	1.73	4.03	1.55

Table EU6 shows, for all cohorts, the percentages of re-sits leading to changes in the unit grade (not necessarily in the overall grade). In around 50% of the cases (the lowest percentage corresponded to cohort 3, being 42.47%) the grade was better in the second attempt and therefore the re-sit led to an improvement in the unit grade. In around 20% of the cases, the unit grade was better in the first attempt and in the remaining cases (around 30%) the re-sit did not lead to a change in the grade.

Table EU6: Percentages of re-sits leading to changes in unit 2431 grade, 2004-2009

	Original grade better	Re-sit grade better	No change in grade
Cohort 1	17.95	51.13	30.92
Cohort 2	20.46	48.73	30.81
Cohort 3	21.43	42.47	36.09
Cohort 4	16.88	53.35	29.77
Cohort 5	20.71	45.70	33.60
Cohort 6	20.97	47.24	31.80

In modular qualifications students are allowed to ‘mix and match’ tiers and it is possible to re-sit a unit with a change of tier. In the case of unit 2431, Table EU7 shows the percentages of candidates (among those doing a re-sit) who changed tiers. There were higher percentages of students changing from the foundation to the higher tier than from the higher to the foundation tier. Although the percentages were fairly small, there is evidence of an increase in the number of candidates changing tiers over time, going from 6.04% of the candidates changing tiers in 2004 to 14.19% in 2009.

Table EU7: Percentages of candidates who changed tiers when re-sitting unit 2431, 2004-2009

	Foundation to Higher	Higher to Foundation	Total
Cohort 1	2.50	3.54	6.04
Cohort 2	5.35	1.61	6.96
Cohort 3	5.93	4.92	10.85
Cohort 4	5.90	3.98	9.88
Cohort 5	8.01	5.32	13.33
Cohort 6	7.25	6.94	14.19

UNIT 2 – 2432

Entries, assessment routes and unit performance

For all cohorts, the majority of the GCSE English candidates took unit 2432 in the terminal session (Table EU8). However, as for unit 2431, the percentages of candidates sitting this unit early (sessions 1 to 3) increased significantly from 2004 (3.30%) to 2009 (15.19%).

Table EU8: GCSE English unit 2432 entries, 2004-2009

		Session 1	Session 2	Session 3	Session 4	All sessions
Cohort 1 (2004)	Entries		912	1481	70077	72470
	%		**1.26**	**2.04**	**96.70**	
Cohort 2 (2005)	Entries	84	1644	2000	66930	70658
	%	**0.12**	**2.33**	**2.83**	**94.72**	
Cohort 3 (2006)	Entries	1	1524	1759	63587	66871
	%	**0.00**	**2.28**	**2.63**	**95.09**	
Cohort 4 (2007)	Entries	21	1545	2580	55017	59163
	%	**0.04**	**2.61**	**4.36**	**92.99**	
Cohort 5 (2008)	Entries	97	1652	4117	46257	52123
	%	**0.19**	**3.17**	**7.90**	**88.75**	
Cohort 6 (2009)	Entries	87	2055	4754	38510	45406
	%	**0.19**	**4.53**	**10.47**	**84.81**	

For all cohorts and all sessions (if the unit was available in both assessment routes), differences in the units' average grade between the linear and assessment routes were statistically significant at the 0.05 level. Table EU9 shows that, for all sessions, average grades for unit 2432 were higher for the linear assessment route than for the modular assessment route. For the linear route, the worst results were obtained in the terminal session. On the contrary, for the modular route the best results were obtained in the terminal session.

Table EU9: Average grade in GCSE English unit 2432 by session and assessment route, 2004-2009

	Session	Linear		Modular	
		Mean	SD	Mean	SD
Cohort 1	Jan-03	-	-	-	-
(2004)	Jun-03	-	-	5.11	1.53
	Jan-04	-	-	3.83	1.80
	Jun-04	4.88	2.01	4.50	1.92
Cohort 2	Jan-04	-	-	1.81	1.43
(2005)	Jun-04	5.07	2.49	4.66	1.89
	Jan-05	4.50	2.14	4.08	1.79
	Jun-05	4.98	1.96	4.70	1.95
Cohort 3	Jan-05	-	-	-	-
(2006)	Jun-05	5.75	1.67	4.48	1.83
	Jan-06	5.14	2.13	4.05	1.89
	Jun-06	5.01	1.94	4.89	1.87
Cohort 4	Jan-06	5.67	1.22	4.92	0.99
(2007)	Jun-06	5.42	2.01	4.22	2.00
	Jan-07	5.23	1.78	3.83	1.82
	Jun-07	5.21	1.90	4.75	1.98
Cohort 5	Jan-07	7.40	1.34	3.78	1.42
(2008)	Jun-07	5.30	1.69	4.06	1.94
	Jan-08	5.76	1.57	3.81	1.90
	Jun-08	5.27	1.96	4.60	2.00
Cohort 6	Jan-08	-	-	3.94	1.28
(2009)	Jun-08	5.44	1.88	4.11	1.89
	Jan-09	5.45	1.55	3.70	1.73
	Jun-09	5.41	1.91	4.64	1.88

Unit outcomes by assessment route controlling for students' ability

This section describes the effects of gender and assessment route in unit 2432 outcomes after controlling for students' general attainment (Tables H7-H12 in Appendix H).

For a given value of the general attainment score and for a specific assessment route, the probability of obtaining any grade in unit 2432 was, in most cases, significantly higher for girls than for boys.

For all cohorts, the probability of obtaining any grade or above in unit 2432 increased significantly with increasing scores in the general attainment measure.

With regard to the 'Assessment Route' effect, the probability of obtaining grade A or above was significantly higher for candidates following the linear assessment route in cohorts 1 and 6 and significantly lower in cohort 3. The probability of obtaining grade C or above was significantly lower for candidates following the linear assessment route than for candidates following the modular assessment route in cohorts 1 and 3 and significantly higher in cohort 6. There were no other significant effects.

Figures EU3 and EU4 display the predicted probability of a girl and a boy, respectively, obtaining grade A or above by the general attainment and assessment route.

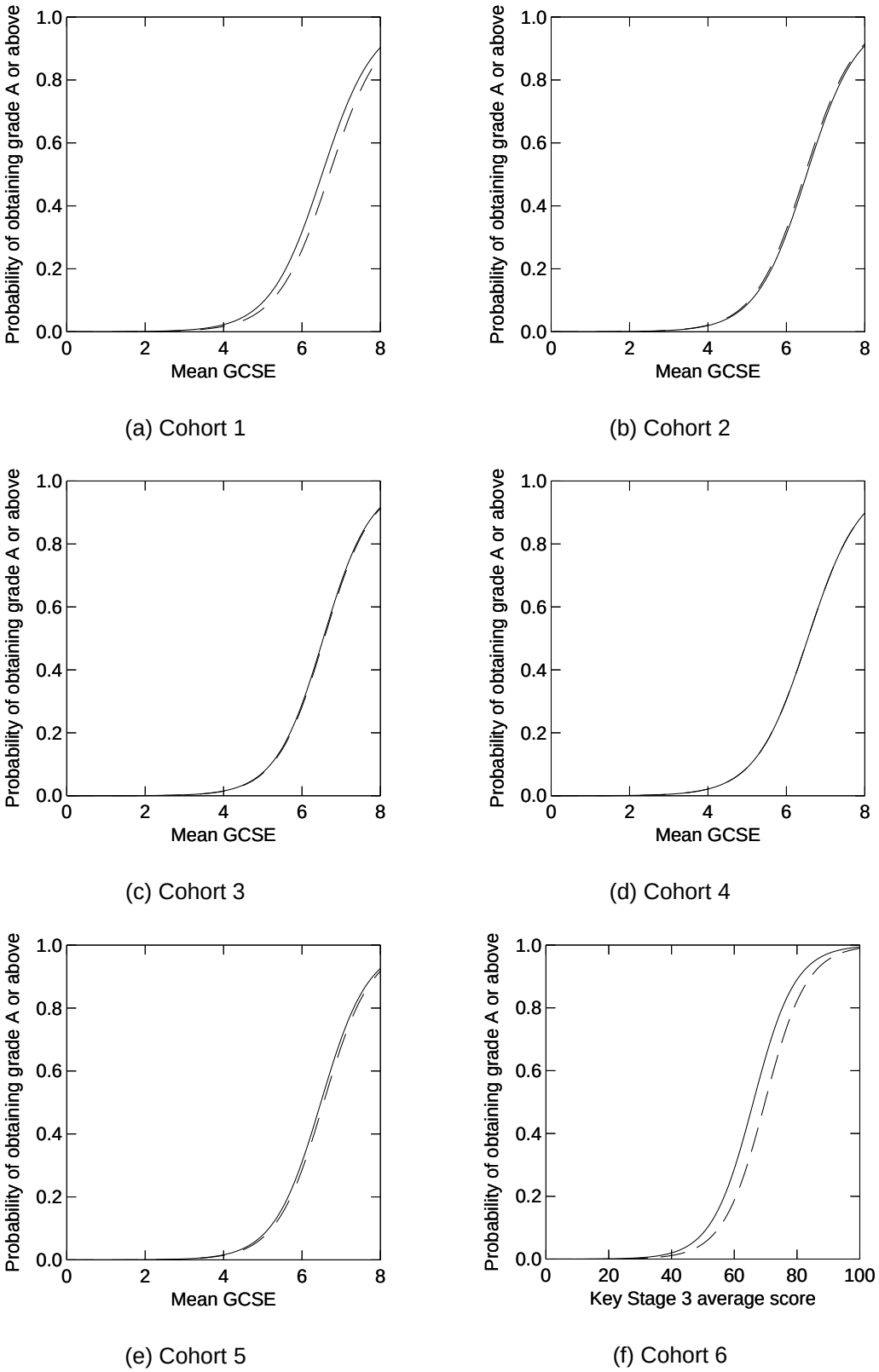


Figure EU3: Predicted probability of a girl obtaining at least grade A in unit 2432 by general attainment (solid line for linear assessment route and dashed line for modular assessment route)

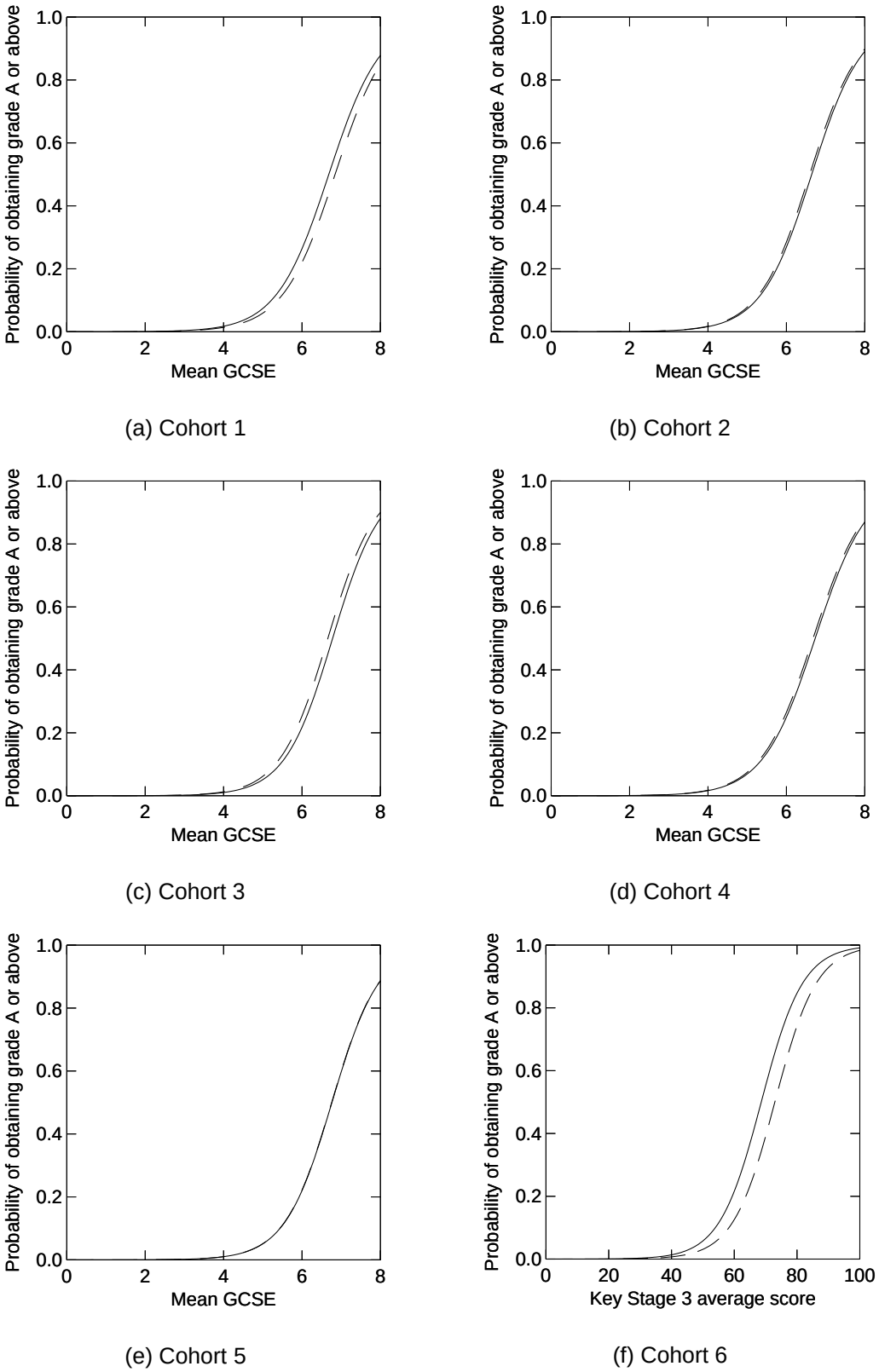


Figure EU4: Predicted probability of a boy obtaining at least grade A in unit 2432 by general attainment (solid line for linear assessment route and dashed line for modular assessment route)

Maturational effects

This section looks at differences in unit outcomes by session. The research question is addressed separately for both assessment routes.

For a detailed explanation of how to interpret the results presented in this section's tables, refer to the equivalent section in the 'Specification level' analysis.

Modular assessment

In each cohort, the differences between sessions in the average grade in unit 2432 were statistically significant for both girls and boys. Both groups of candidates performed better in this unit in session 2 and obtained the worst results in session 3.

In the following, the significant effects (odds ratios) of session by gender, once student's ability was taken into account, are presented.

If the odds ratio is greater than one, then there is a positive effect of the session. For example, if the odds ratio for grade A or above and session 3 were greater than one, then the probability of obtaining grade A or above would be higher in session 3 than in session 4 (baseline category). On the other hand, if the odds ratio is smaller than one, then there is a negative effect of the session. For example, if the odds ratio for grade A or above and session 3 were smaller than one, then the probability of obtaining grade A or above would be lower in session 3 than in session 4 (baseline category).

In 2004 (cohort 1), candidates taking unit 2432 in session 2 had a lower probability of obtaining grade A or above than those taking the unit in session 4. Candidates taking the unit in session 3 had also a lower probability of obtaining grade A or above than those taking it in the terminal session. This last effect appeared for grade C or above as well.

In 2005 (cohort 2), the probability of obtaining either grade A or above or grade C or above was lower for candidates taking unit 2432 in session 2 than for those taking the unit in the terminal session. Girls taking this unit in session 3 had lower probability of obtaining grade A or above than those taking the unit in session 4. Finally, candidates taking unit 2432 in session 3 had higher probability of obtaining grade C or above than those taking the unit in session 4.

In 2006 (cohort 3), candidates taking unit 2432 in session 2 had lower probability of obtaining grade A or above than those taking the unit in session 4. Boys taking this unit in session 3 had lower probability of obtaining grade A or above than those taking it in the terminal session. On the contrary, girls taking this unit in session 3 had higher probability of obtaining grade A or above than those taking it in the terminal session. Finally, candidates taking unit 2432 in session 3 had lower probability of obtaining grade C or above than those taking the unit in session 4.

In 2007 (cohort 4), boys taking unit 2432 in session 3 had lower probability of obtaining grade A or above than those taking the unit in session 4. The probability of a girl obtaining grade A or above was, on the contrary, higher in session 3 than in session 4. The probability of obtaining grade C or above was higher in session 2 than in session 4 for both boys and girls.

In 2008 (cohort 5), candidates taking unit 2432 in session 3 had lower probability of obtaining grade A or above and higher probability of obtaining grade C or above than those taking the unit in session 4.

In 2009 (cohort 6), there were no significant session effects on grade A or above. However, candidates taking the unit early (either in session 2 or session 3) had

higher probability of obtaining grade C or above than those taking it in the terminal unit.

In general, students following a modular assessment route had lower probability of achieving a grade A or above in unit 2432 in an early session than in the terminal session. This may indicate that, in an assessment route that allows students to sit the exams at different points in the course, students opting for sitting this particular unit at the beginning or midway throughout the course may be at a disadvantage compared to those who opt for sitting the unit at the end.

Table EU10: Effects (odds ratio) of session and gender on the probability of obtaining a grade or above in unit 2432, 2005-2009. Modular assessment route[22]

Cohort (Year)	Variable	A	C
Cohort 1 (2004)	Gender (G)	1.31	1.87
	Session 2	0.59	
	Session 3	0.53	0.59
	Session 2 (G)	0.25	
	Session 3 (G)		
	Mean GCSE	4.70	4.32
Cohort 2 (2005)	Gender (G)	1.24	1.27
	Session 2	0.41	0.52
	Session 3		1.56
	Session 2 (G)		
	Session 3 (G)	0.66	
	Mean GCSE	4.62	5.38
Cohort 3 (2006)	Gender (G)	1.11	2.01
	Session 2	0.58	
	Session 3	0.28	0.60
	Session 2 (G)		
	Session 3 (G)	1.02	
	Mean GCSE	4.84	5.20
Cohort 4 (2007)	Gender (G)	1.18	2.08
	Session 2		3.82
	Session 3	0.51	
	Session 2 (G)		
	Session 3 (G)	1.42	
	Mean GCSE	5.13	5.06
Cohort 5 (2008)	Gender (G)	1.48	1.96
	Session 2		
	Session 3	0.59	1.98
	Session 2 (G)		
	Session 3 (G)		
	Mean GCSE	4.74	5.35
Cohort 6 (2009)	Gender (G)	1.65	2.09
	Session 2		5.31
	Session 3		1.66
	Session 2 (G)		
	Session 3 (G)		
	Key Stage 3	1.18	1.15

[22] Only significant effects are reported.

Linear assessment

In each cohort, the differences between sessions in the average grade in unit 2432 were statistically significant for both girls and boys. Both groups of candidates performed better in this unit in session 2. Girls obtained the worst results in session 4 and boys in session 3.

In the following, the significant effects of session by gender (once students' ability was taken into account) are presented[23].

Table EU11: Effects (odds ratios) of session and gender on the probability of obtaining a grade or above in unit 2432, 2005-2009. Linear assessment route[24]

Cohort (Year)	Variable	A	C
Cohort 2 (2005)	Gender (G)	1.21	1.61
	Session 2		0.62
	Session 3	0.65	
	Session 2 (G)		
	Session 3 (G)		
	Mean GCSE	4.74	5.11
Cohort 3 (2006)	Gender (G)	1.47	1.77
	Session 2		
	Session 3	0.65	1.78
	Session 2 (G)		
	Session 3 (G)	1.52	
	Mean GCSE	5.22	5.22
Cohort 4 (2007)	Gender (G)	1.30	2.01
	Session 2		
	Session 3	0.66	
	Session 2 (G)	1.38	
	Session 3 (G)	1.04	
	Mean GCSE	4.39	5.08
Cohort 5 (2008)	Gender (G)	1.64	1.83
	Session 2		0.55
	Session 3	1.41	1.43
	Session 2 (G)	0.31	1.52
	Session 3 (G)	1.00	
	Mean GCSE	5.38	5.89
Cohort 6 (2009)	Gender (G)	1.45	1.76
	Session 2		
	Session 3	0.36	
	Session 2 (G)		
	Session 3 (G)	0.64	1.74
	Key Stage 3	1.16	1.16

In cohort 2 (2005), candidates taking unit 2432 in session 3 had lower probability of obtaining grade A or above than those taking the unit in session 4 and candidates taking the unit in session 2 had lower probability of obtaining grade C or above than those taking it in the terminal session.

[23] There is no data for 2004 because for the linear assessment in this year, all units had to be taken in the June 2004 session.

[24] Only significant effects are reported.

In cohort 3 (2006), boys had lower probability of obtaining grade A or above in session 3 than in session 4 and girls, on the other hand, had higher probability in session 3 than in session 4. Candidates in this cohort had higher probability of obtaining grade C or above in session 3 than in session 4.

In cohort 4 (2007), boys had lower probability of obtaining grade A or above in session 3 than in session 4 and girls, on the other hand, had higher probability in session 3 than in session 4. Also, for girls only, the probability of obtaining grade A or above in session 2 was higher than in session 4. There were no significant session effects on the probability of obtaining grade C or above.

In cohort 5 (2008), both boys and girls had higher probability of obtaining grade A or above in session 3 than in session 4. Girls had lower probability of obtaining grade A in session 2 than in session 4. Boys had lower probability of obtaining grade C or above in session 2 than in session 4 and girls had higher probability in session 2 than in session 4. Both boys and girls had higher probability of obtaining grade C or above in session 3 than in session 4.

In cohort 6 (2009), candidates had lower probability of obtaining grade A or above in session 3 than in session 4. Girls in this cohort had higher probability of obtaining grade C or above in session 3 than in session 4.

To summarise, girls taking the unit in session 3 obtained better results than girls taking the unit in session 4 once ability was taken into account. Boys in all cohorts, with the exception of cohort 5, did worse in session 3 than in the terminal session. This means that, when following a linear examination route, it is beneficial for girls but not for boys to take unit 2432 early.

Impact of unit re-sits on unit grade

Differences in the unit outcomes between the first attempt and the re-sit were statistically significant, with marks/grades being higher in the second attempt (Table EU12).

Table EU12: Average mark and grade for unit 2432 in the first and second attempts, 2004-2009

		First attempt		Second attempt	
		Mean	SD	Mean	SD
Mark	Cohort 1	48.60	15.54	52.95	18.23
	Cohort 2	48.45	15.79	53.37	17.48
	Cohort 3	47.36	15.97	49.89	16.85
	Cohort 4	46.07	14.55	51.04	15.79
	Cohort 5	45.01	14.74	47.27	15.99
	Cohort 6	46.17	13.84	48.97	14.89
Grade	Cohort 1	3.94	1.76	4.04	2.02
	Cohort 2	3.88	1.77	4.46	2.02
	Cohort 3	3.77	1.81	4.19	1.87
	Cohort 4	3.54	1.79	4.19	1.80
	Cohort 5	3.44	1.77	3.84	1.79
	Cohort 6	3.61	1.64	3.97	1.70

The percentages of re-sits leading to changes in the unit grade are presented in Table EU13. Percentages of candidates failing to achieve a better result with the re-sit were between 57.88% and 44.67%.

Table EU13: Percentages of re-sits leading to changes in unit 2432 grade, 2004-2009

	Original grade better	Re-sit grade better	No change in grade
Cohort 1	17.09	48.14	34.77
Cohort 2	16.91	55.33	27.76
Cohort 3	19.74	46.74	33.62
Cohort 4	17.05	50.86	32.09
Cohort 5	22.37	42.54	35.09
Cohort 6	21.46	42.12	36.42

Table EU14 shows the percentages of candidates changing tiers when re-sitting unit 2432. Again, although percentages are small, there is an evidence of an increase over time in the percentages of GCSE English candidates using the flexibility built in this assessment and changing tiers.

Table EU14: Percentages of candidates who changed tiers when re-sitting unit 2432, 2004-2009

	Foundation to Higher	Higher to Foundation	Total
Cohort 1	3.62	1.51	5.13
Cohort 2	7.14	3.07	10.21
Cohort 3	5.15	5.85	11.00
Cohort 4	2.99	5.91	8.90
Cohort 5	9.27	5.73	15.00
Cohort 6	9.57	6.26	15.83

UNIT 3 – 2433

Entries, assessment routes and unit performance

Unit 2433 is not compulsory. Candidates, in order to be able to certificate for a GCSE in English, must choose between one component from unit 2433 and unit 2434.

The numbers of students taking either the foundation or the higher tier in this unit was very small compared to the numbers taking any other unit (*e.g.* only 7619 entries from candidates in cohort 1 for unit 2433 compared to 72711 entries for unit 2431). For cohorts 1 to 5 the highest percentage of entries was in the terminal session (Table EU15). For cohort 6 the highest percentage was in session 2, followed by session 3. The entries for this unit were more spread throughout the course than for all other units (over 30% of the entries were in session 2 and between 12% and 31% in session 3). As before, the percentages of candidates sitting this unit in session 4 are declining over time.

For each session (if the unit was available in both assessment routes), differences in the units' average grade between the linear and modular assessment routes were significant at the 0.05 level. There were a few exceptions: firstly, for candidates in cohorts 2 and 4 the differences were significant only in session 4 and, secondly, for candidates in cohorts 5 and 6 the differences were significant only in sessions 2 and 4.

Average grades in this unit were not always higher for the linear assessment route (see Table EU16).

Table EU15: GCSE English unit 2433 entries, 2004-2009

		Session 1	Session 2	Session 3	Session 4	All sessions
Cohort 1 (2004)	Entries		2715	1061	3843	7619
	%		**35.63**	**13.93**	**50.44**	
Cohort 2 (2005)	Entries	316	1917	980	2812	6025
	%	**5.24**	**31.82**	**16.27**	**46.67**	
Cohort 3 (2006)	Entries	171	1300	614	2966	5051
	%	**3.39**	**25.74**	**12.16**	**58.72**	
Cohort 4 (2007)	Entries	166	1642	801	1975	4584
	%	**3.62**	**35.82**	**17.47**	**43.08**	
Cohort 5 (2008)	Entries	84	1295	1008	1636	4023
	%	**2.09**	**32.19**	**25.06**	**40.67**	
Cohort 6 (2009)	Entries	1	1738	1194	938	3871
	%	**0.03**	**44.90**	**30.84**	**24.23**	

Table EU16: Average grade in GCSE English unit 2433 by session and assessment route, 2004-2009

	Session	Linear		Modular	
		Mean	SD	Mean	SD
Cohort 1 (2004)	Jan-03	-	-	-	-
	Jun-03	-	-	3.80	1.80
	Jan-04	-	-	4.10	1.65
	Jun-04	4.82	2.05	4.50	1.83
Cohort 2 (2005)	Jan-04	-	-	3.39	1.68
	Jun-04	3.50	2.85	3.81	1.90
	Jan-05	4.33	1.53	4.78	1.77
	Jun-05	5.39	1.89	4.47	1.91
Cohort 3 (2006)	Jan-05	-	-	3.61	1.57
	Jun-05	5.29	1.47	4.41	1.92
	Jan-06	1.54	1.05	4.39	1.89
	Jun-06	4.92	2.05	5.54	1.71
Cohort 4 (2007)	Jan-06	-	-	3.78	1.49
	Jun-06	4.86	1.52	4.52	1.96
	Jan-07	-	-	4.83	1.76
	Jun-07	4.85	2.01	4.28	2.17
Cohort 5 (2008)	Jan-07	-	-	4.39	1.51
	Jun-07	5.38	1.93	4.26	2.11
	Jan-08	-	-	4.58	1.73
	Jun-08	4.72	2.23	4.24	1.77
Cohort 6 (2009)	Jan-08	-	-	5.00*	-
	Jun-08	5.39	2.06	4.22	1.90
	Jan-09	3.33	2.51	4.49	1.76
	Jun-09	4.54	2.21	4.20	2.01

* only one candidate

Unit outcomes by assessment route controlling for students' ability

This section describes the effects of gender and assessment route in unit 2433 outcomes after controlling for students' general attainment (Tables H13-H18 in Appendix H).

The gender and the students' general ability had very similar effects on the probability of obtaining grade A or above or grade C or above as in units 2431 and 2432, that is, the probability was significantly higher for girls than for boys and increased significantly with increasing scores in the general attainment measure.

With regard to the 'Assessment Route' effect, the probability of obtaining grade A or above and the probability of obtaining grade C or above was significantly higher for candidates (both girls and boys) following the modular assessment route than for those following a linear route.

Figures EU5 and EU6 display the predicted probability of a girl and a boy, respectively, obtaining grade A or above in unit 2433 by general attainment score and assessment route. These figures show that the differences in the probabilities of obtaining a grade A or above for the different assessment routes were clearly in favour of the modular assessment route.

Maturational effects

This section looks at differences in unit outcomes by session. The research question is addressed separately for both assessment routes.

For a detailed explanation of how to interpret the results presented in this section's tables, refer to the equivalent section in the 'Specification level' analysis.

Modular assessment

For each cohort, the differences between sessions in the average grade in unit 2433 were computed but no clear pattern as to which session produced the best results was found.

In the following, the significant effects (odds ratios) of session by gender, once student's ability was taken into account, are presented. If the odds ratio is greater than one, then there is a positive effect of the session. For example, if the odds ratio for grade A or above and session 3 were greater than one, then the probability of obtaining grade A or above would be higher in session 3 than in session 4 (baseline category). On the other hand, if the odds ratio is smaller than one, then there is a negative effect of the session. For example, if the odds ratio for grade A or above and session 3 were smaller than one, then the probability of obtaining grade A or above would be lower in session 3 than in session 4 (baseline category).

In 2004 (cohort 1), there were negative significant session effects for sessions 2 and 3 on both grade A or above and grade C or above, with candidates taking the unit in both sessions having lower probability than those taking it in the terminal session.

In 2005 (cohort 2), candidates taken unit 2433 in session 1 had lower probability of obtaining grade A or above than candidates taking the unit in session 4. Also, girls taking this unit in sessions 2 and 3 had lower probability of obtaining grade A or above than girls taking the unit in the terminal session. With regards to grade C, candidates taking the unit in session 3 had higher probability of obtaining grade C or above than candidates taking it in session 4.

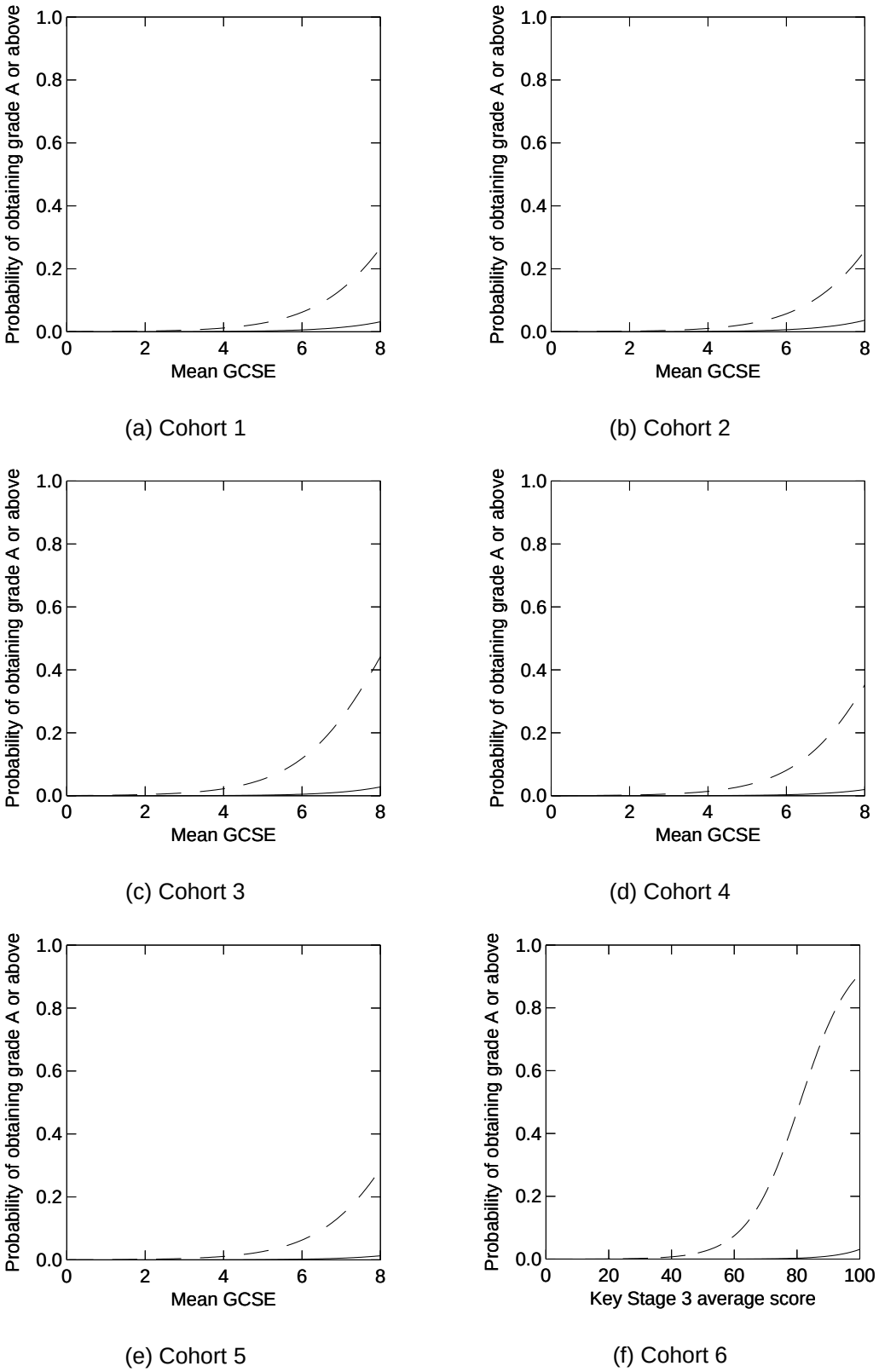


Figure EU5: Predicted probability of a girl obtaining at least grade A in unit 2433 by general attainment (solid line for linear assessment route and dashed line for modular assessment route)

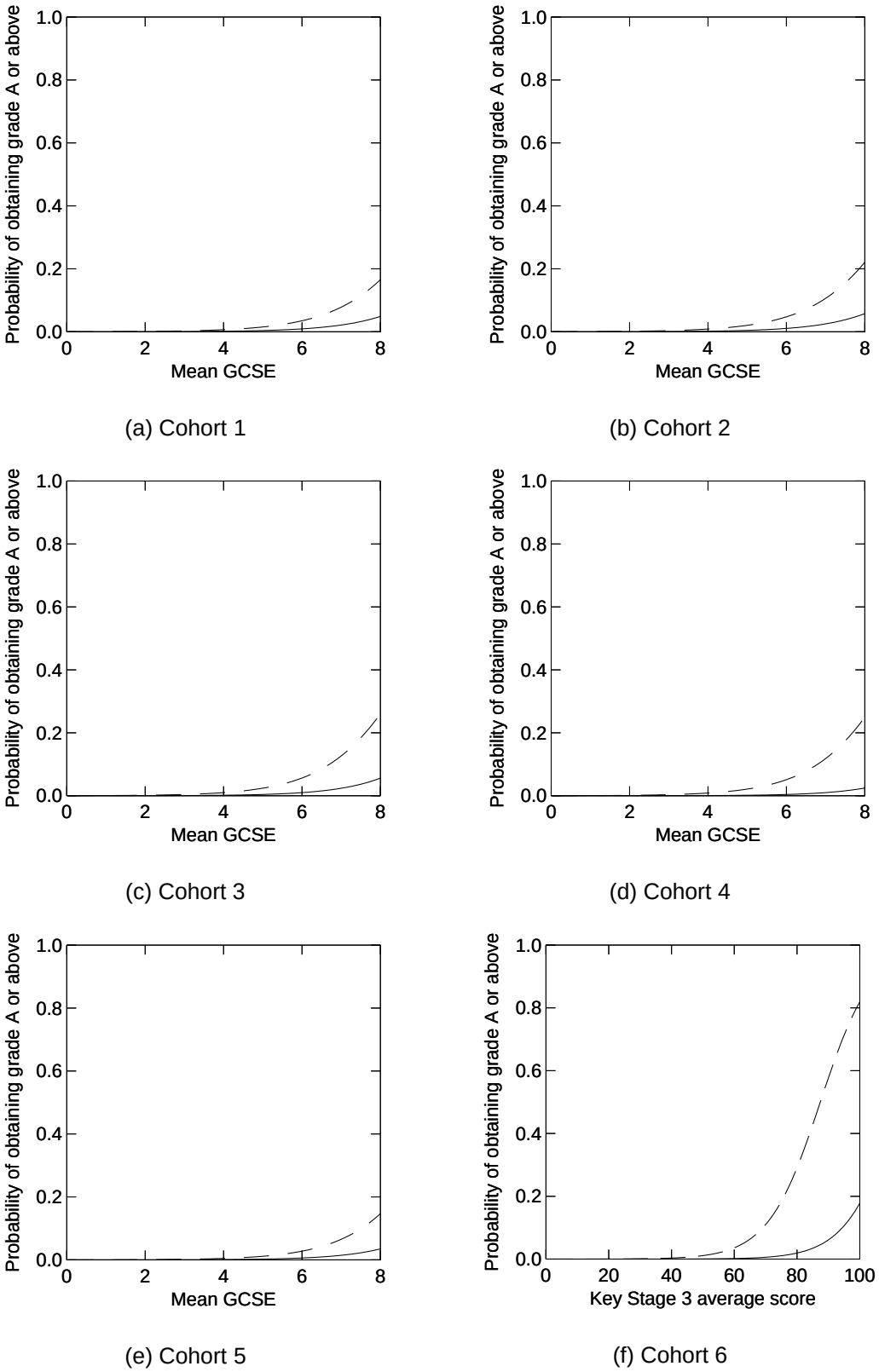


Figure EU6: Predicted probability of a boy obtaining at least grade A in unit 2433 by general attainment (solid line for linear assessment route and dashed line for modular assessment route)

In 2006 (cohort 3), candidates taking unit 2433 in sessions 2 and 3 had lower probability of obtaining grade A or above than those taking it in the terminal session. Candidates taking the unit in session 2 had lower probability of obtaining grade C or above than candidates taking it in session 4.

Table EU17: Effects (odds ratios) of session and gender on the probability of obtaining a grade or above in unit 2433, 2005-2009. Modular assessment route[25]

Cohort (Year)	Variable	A	C
Cohort 1	Gender (G)		1.37
(2004)	Session 2	0.59	0.65
	Session 3	0.37	0.59
	Session 2 (G)		
	Session 3 (G)		
	Mean GCSE	5.15	5.23
Cohort 2	Gender (G)		
(2005)	Session 1	0.10	
	Session 2		
	Session 3		1.54
	Session 1 (G)		
	Session 2 (G)	0.38	
	Session 3 (G)	0.65	
	Mean GCSE	5.35	5.56
Cohort 3	Gender (G)	2.72	3.55
(2006)	Session 1		
	Session 2	0.41	0.56
	Session 3	0.57	
	Session 1 (G)		
	Session 2 (G)	0.19	0.28
	Session 3 (G)		
	Mean GCSE	4.14	5.23
Cohort 4	Gender (G)	2.55	2.38
(2007)	Session 1		
	Session 2		
	Session 3	2.00	1.63
	Session 1 (G)		
	Session 2 (G)		0.66
	Session 3 (G)	0.86	
	Mean GCSE	5.68	5.77
Cohort 5	Gender (G)		1.50
(2008)	Session 2		0.56
	Session 3		
	Session 2 (G)		
	Session 3 (G)		
	Mean GCSE	4.14	4.51
Cohort 6	Gender (G)	3.25	2.56
(2009)	Session 2		2.23
	Session 3		2.36
	Session 2 (G)		
	Session 3 (G)		
	Key Stage 3	1.16	1.14

[25] Only significant effects are reported.

In 2007 (cohort 4), boys had higher probability of obtaining grade A in unit 2433 or above in session 3 than in session 4 and girls, on the other hand, had lower probability in session 3 than in session 4. Girls taking the unit in session 2 had lower probability of obtaining grade C or above than those taking the unit in the final session. Both girls and boys had higher probability of obtaining grade C or above in session 3 than in session 4.

In 2008 (cohort 5), candidates taking the unit in session 2 had lower probability of obtaining grade C or above than candidates taking the unit in session 4. There were no other significant session effects.

In 2009 (cohort 6), candidates taking unit 2433 either in session 2 or session 3 had higher probability of obtaining grade C or above than candidates taking the unit in session 4. There were no other significant session effects.

In general, students following a modular assessment route had lower probability of achieving a grade A or above in unit 2433 in an early session than in the terminal session. This may indicate that students opting for sitting this particular unit at the beginning or midway throughout the course may be at a disadvantage compared to those who opt for sitting the unit at the end.

Linear assessment

Analyses were not appropriate in this section due to the small numbers of candidates following a linear assessment route and taking this unit.

Impact of unit re-sits on unit grade

For each student who took unit 2433 twice, changes in marks and grades between the first and second attempts were computed. The differences between attempts were statistically significant, with marks/grades being higher in the second attempt (about half a grade). Table EU18 shows the average mark and grade in unit 2433 for all six cohorts and both attempts.

Table EU18: Average mark and grade for unit 2433 in the first and second attempts, 2004-2009

		First Attempt		Second Attempt	
		Mean	SD	Mean	SD
Mark	Cohort 1	30.47	7.58	32.94	9.07
	Cohort 2	28.18	9.20	32.38	9.27
	Cohort 3	26.45	8.41	29.48	9.38
	Cohort 4	32.19	7.49	35.75	9.22
	Cohort 5	31.99	8.84	36.21	8.69
	Cohort 6	29.45	9.44	32.98	10.34
Grade	Cohort 1	3.59	1.35	4.08	1.54
	Cohort 2	3.18	1.67	3.98	1.60
	Cohort 3	2.91	1.46	3.42	1.63
	Cohort 4	3.85	1.32	4.46	1.74
	Cohort 5	3.73	1.69	4.56	1.56
	Cohort 6	3.37	1.70	4.05	1.78

Table EU19 shows, for all cohorts, the percentages of re-sits leading to changes in the unit grade. In around 50% of the cases (the lowest percentage corresponds to cohort 1, being 46.02%; the highest percentage corresponds to cohort 5, being 60.99%) the grade was better in the second attempt and therefore the re-sit led to an

improvement in the unit grade. In less than 20% of the cases, the unit grade was better in the first attempt and in the remaining cases the re-sit did not lead to a change in the grade.

Table EU19: Percentages of re-sits leading to changes in unit 2433 grade, 2004-2009

	Original grade better	Re-sit grade better	No change in grade
Cohort 1	16.73	46.02	37.25
Cohort 2	18.03	56.01	25.97
Cohort 3	19.49	48.72	31.79
Cohort 4	15.91	55.56	28.54
Cohort 5	11.35	60.99	27.66
Cohort 6	15.75	55.11	29.11

In modular qualifications students are allowed to 'mix and match' tiers and it is possible to re-sit a unit with a change of tier. In the case of unit 2433, Table EU20 shows the percentages of candidates (among those doing a re-sit) who changed tiers. There does not seem to be any evidence of an increase in the number of candidates changing tiers over time, with the percentages remaining fairly stable from 2005 to 2009.

Table EU20: Percentages of candidates who changed tiers when re-sitting unit 2433, 2004-2009

	Foundation to Higher	Higher to Foundation	Total
Cohort 1	20.32	12.15	32.47
Cohort 2	6.44	9.23	15.67
Cohort 3	1.53	14.36	15.89
Cohort 4	6.82	2.02	8.84
Cohort 5	9.46	5.20	14.66
Cohort 6	10.72	4.36	15.08

UNIT 4 – 2434

Entries, assessment routes and unit performance

The majority of candidates took unit 2434 in the terminal session (Table EU21). However, the percentages of candidates sitting this unit early (sessions 1 to 3) increased significantly from 2004 (7.27%) to 2009 (19.72%).

For all cohorts and for sessions 2, 3 and 4 (if the unit was available in both assessment routes), differences in the unit's average grade between the linear and assessment routes were statistically significant at the 0.05 level. There was an exception: in cohort 2, the differences were significant only in sessions 3 and 4.

Contrary to the patterns found in units 2431 to 2432, and similarly to the patterns in unit 2433, average grades for unit 2434 were not always higher for the linear assessment route than for the modular assessment route. For both routes, session 4 showed the worst results. With regard to the best results, for the linear route those were obtained in session 2; for the modular route the best results were obtained either in session 2 or session 3.

Table EU21: GCSE English unit 2434 entries, 2004-2009

		Session 1	Session 2	Session 3	Session 4	All sessions
Cohort 1 (2004)	Entries			4886	62279	67165
	%			**7.27**	**92.73**	
Cohort 2 (2005)	Entries	12	1389	4739	59696	65836
	%	**0.02**	**2.11**	**7.20**	**90.67**	
Cohort 3 (2006)	Entries	51	1868	4783	55835	62537
	%	**0.08**	**2.99**	**7.65**	**89.28**	
Cohort 4 (2007)	Entries	75	1460	5911	48042	55488
	%	**0.14**	**2.63**	**10.65**	**86.58**	
Cohort 5 (2008)	Entries	62	1685	5908	40690	48345
	%	**0.13**	**3.49**	**12.22**	**84.17**	
Cohort 6 (2009)	Entries	9	2082	6210	33792	42093
	%	**0.02**	**4.95**	**14.75**	**80.28**	

Table EU22: Average grade in GCSE English unit 2434 by session and assessment route, 2004-2009

	Session	Linear		Modular	
		Mean	SD	Mean	SD
Cohort 1 (2004)	Jan-03	-	-	-	-
	Jun-03	-	-	-	-
	Jan-04	-	-	4.64	1.70
	Jun-04	5.16	1.71	4.98	1.62
Cohort 2 (2005)	Jan-04	-	-	5.25	2.18
	Jun-04	5.49	2.07	5.37	1.75
	Jan-05	5.10	1.86	4.79	1.56
	Jun-05	5.22	1.72	5.04	1.69
Cohort 3 (2006)	Jan-05	-	-	4.44	0.94
	Jun-05	6.05	1.55	5.13	1.73
	Jan-06	5.66	1.81	4.95	1.51
	Jun-06	5.33	1.70	5.04	1.62
Cohort 4 (2007)	Jan-06	6.11*	1.45	5.64	1.59
	Jun-06	5.73	1.70	5.15	1.72
	Jan-07	5.62	1.68	5.15	1.56
	Jun-07	5.49	1.66	4.73	1.60
Cohort 5 (2008)	Jan-07	7.20	0.84	6.30	1.43
	Jun-07	5.77	1.48	4.64	1.52
	Jan-08	6.21	1.30	5.25	1.63
	Jun-08	5.48	1.62	4.58	1.55
Cohort 6 (2009)	Jan-08	-	-	7.25*	1.03
	Jun-08	5.65	1.49	4.55	1.70
	Jan-09	5.66	1.38	4.91	1.57
	Jun-09	5.61	1.60	4.81	1.45

* very low number of candidates

Unit outcomes by assessment route controlling for students' ability

This section describes the effects of gender and assessment route in unit 2434 outcomes after controlling for students' general attainment (Tables H19-H24 in Appendix H).

The gender and the students' general ability had very similar effects on the probability of obtaining grade A or above or grade C or above as in units 2431 to 2433, that is, the probability was significantly higher for girls than for boys and increased significantly with increasing scores in the general attainment measure.

With regard to the 'Assessment Route' effect, the probability of obtaining grade A or above was higher for candidates following the linear assessment route in all cohorts (not significantly so in cohort 5). The probability of obtaining grade C or above was significantly higher for candidates following the linear assessment route than for candidates following the modular assessment route in all cohorts.

Figures EU7 and EU8 display the predicted probability of a girl and a boy, respectively, obtaining grade A or above by general attainment and assessment route. These figures show that the differences in the probabilities of obtaining a grade A or above for the different assessment routes were in favour of the linear assessment route.

Maturational effects

This section looks at differences in unit outcomes by session. The research question is addressed separately for both assessment routes.

For a detailed explanation of how to interpret the results presented in this section's tables, refer to the equivalent section in the 'Specification level' analysis.

Modular assessment

In each cohort, the differences between sessions in the average grade in unit 2434 were statistically significant for both girls and boys. Girls performed better in this unit in session 3 and boys obtained better results in early sessions (either session 2 or 3) than in the terminal session.

In the following, the significant effects (odds ratios) of session by gender, once students' ability was taken into account, are presented. If the odds ratio is greater than one, then there is a positive effect of the session. For example, if the odds ratio for grade A or above and session 3 were greater than one, then the probability of obtaining grade A or above would be higher in session 3 than in session 4 (baseline category). On the other hand, if the odds ratio is smaller than one, then there is a negative effect of the session. For example, if the odds ratio for grade A or above and session 3 were smaller than one, then the probability of obtaining grade A or above would be lower in session 3 than in session 4 (baseline category).

In 2004 (cohort 1), candidates taking unit 2434 in session 3 had lower probability of obtaining grade A or above than those taking the unit in session 4. This same effect appeared, as well, for grade C or above.

In 2005 (cohort 2), the probability of obtaining grade C or above was higher for candidates taking the unit in session 2 than for those taking the unit in the terminal session. There were no other significant session effects.

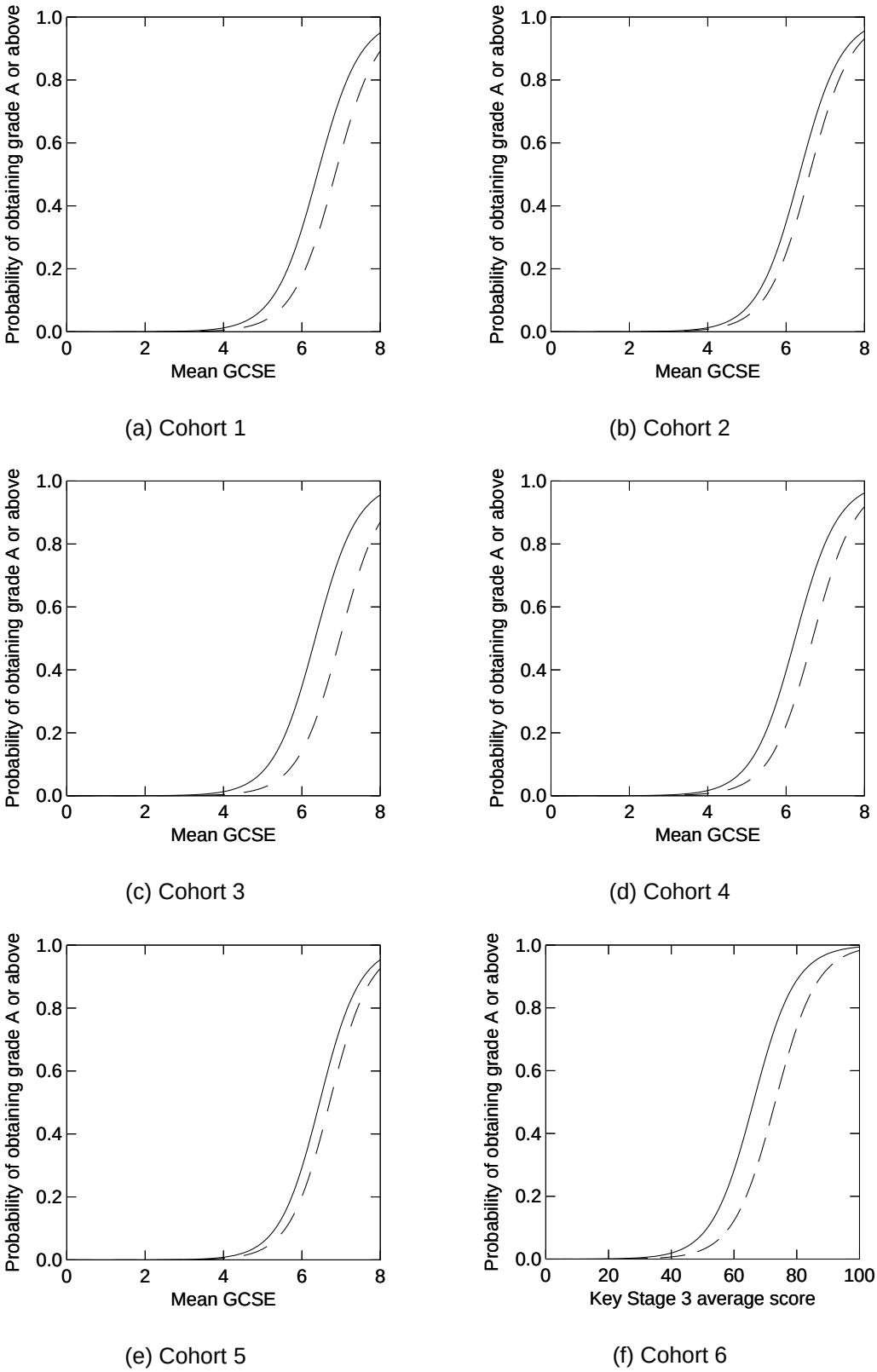


Figure EU7: Predicted probability of a girl obtaining at least grade A in unit 2434 by general attainment (solid line for linear assessment route and dashed line for modular assessment route)

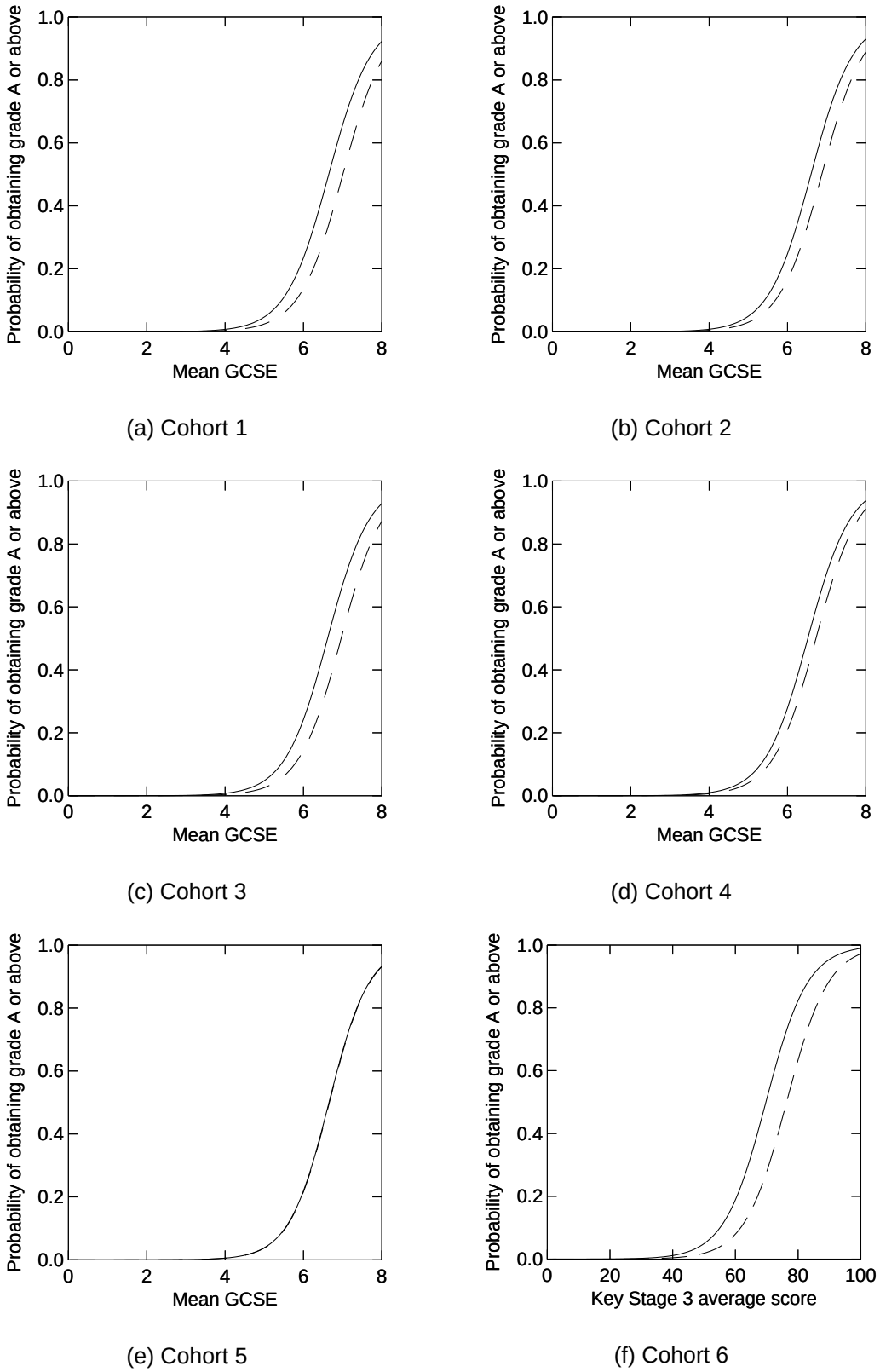


Figure EU8: Predicted probability of a boy obtaining at least grade A in unit 2434 by general attainment (solid line for linear assessment route and dashed line for modular assessment route)

Table EU23: Effects (odds ratios) of session and gender on the probability of obtaining a grade or above in unit 2434, 2005-2009. Modular assessment route[26]

Cohort (Year)	Variable	A	C
Cohort 1 (2004)	Gender (G)	1.78	1.89
	Session 3	0.64	0.75
	Session 3 (G)		0.54
	Mean GCSE	6.42	5.13
Cohort 2 (2005)	Gender (G)	1.99	1.72
	Session 2		1.92
	Session 3		
	Session 2 (G)		
	Session 3 (G)		
	Mean GCSE	6.77	4.67
Cohort 3 (2006)	Gender (G)		2.20
	Session 2		
	Session 3	1.75	
	Session 2 (G)	2.01	0.59
	Session 3 (G)		
	Mean GCSE	5.83	4.40
Cohort 4 (2007)	Gender (G)	1.71	1.55
	Session 1		
	Session 2	3.01	2.32
	Session 3	1.41	1.35
	Session 1 (G)		
	Session 2 (G)	1.23	
	Session 3 (G)		
	Mean GCSE	5.82	4.00
Cohort 5 (2008)	Gender (G)		2.04
	Session 1	11.45	
	Session 2	1.78	
	Session 3	2.16	1.70
	Session 1 (G)		
	Session 2 (G)		
	Session 3 (G)		
	Mean GCSE	7.10	4.41
Cohort 6 (2009)	Gender (G)	2.24	1.88
	Session 2		0.59
	Session 3	1.46	0.74
	Session 2 (G)		
	Session 3 (G)		
	Key Stage 3	1.15	1.11

In 2006 (cohort 3), candidates taking unit 2434 in session 3 had higher probability of obtaining grade A or above than those taking the unit in session 4. Girls taking the unit in session 2 had also higher probability of obtaining grade A or above than those taking it in the terminal session. Finally, girls taking unit 2434 in session 2 had lower probability of obtaining grade C or above than girls taking the unit in session 4.

[26] Only significant effects are reported.

In 2007 (cohort 4), candidates taking the unit in either session 2 or session 3 had higher probability of obtaining grade A or above and higher probability of obtaining grade C or above than those taking the unit in session 4.

In 2008 (cohort 5), candidates taking the unit early (in sessions 1 to 3) had higher probability of obtaining grade A or above than those taking the unit in session 4. Also, the probability of obtaining grade C or above was higher for candidates taking the unit in session 3 than for those taking the unit in the terminal session.

In 2009 (cohort 6), candidates taking the unit in session 3 had higher probability of obtaining grade A or above than those taking it in the terminal unit. Candidates taking unit 2434 in either session 2 or session 3 had lower probability of obtaining grade C or above than those taking the unit in session 4.

In a modular assessment route, the results described above and presented in Table EU23 suggest that GCSE English students could benefit from sitting unit 2434 midway throughout the two-year course.

Linear assessment

In each cohort, the differences between sessions in the average grade in unit 2434 were statistically significant for both girls and boys. Both groups of candidates performed better in this unit in earlier sessions (session 2 or session 3) than in the terminal session.

In the following, the significant effects of session by gender (once students' ability was taken into account) are presented[27].

In 2005 (cohort 2), there was a significant positive effect for session 3 on both grade A or above and grade C or above, meaning that candidates had higher probability of obtaining any of those two grades in session 3 than in session 4. For students in this cohort, there was also a significant negative effect, only for girls, on the probability of obtaining grade C or above in session 2. This means that girls taking the unit in session 2 had lower probability of obtaining grade C than those taking the unit in session 4.

In 2006 (cohort 3), candidates taking this unit in session 2 had lower probability of obtaining grade A than those taking the unit in the terminal session and girls taking this unit in session 3 had higher probability of obtaining grade A or above than those taking the unit in the terminal session. With respect to grade C, girls taking the unit in session 2 and both girls and boys taking the unit in session 3 had a higher probability of obtaining the grade or above than those taking the unit in session 4.

In 2007 (cohort 4), there was a significant negative effect for boys and a positive effect for girls on the probability of obtaining grade A or above in session 3, meaning that boys taking the unit in session 3 had lower probability of obtaining grade A than those taking the unit in the terminal session and girls had higher probability of obtaining grade A or above in session 3 than in session 4. With respect to grade C, both girls and boys had higher probability of obtaining the grade or above in session 3 than in session 4.

[27] There is no data for 2004 because for the linear assessment in this year, all units had to be taken in the June 2004 session.

Table EU24: Effects (odds ratios) of session and gender on the probability of obtaining a grade or above in unit 2434, 2005-2009. Linear assessment route[28]

Cohort (Year)	Variable	A	C
Cohort 2 (2005)	Gender (G)	1.57	2.00
	Session 2		
	Session 3	2.13	2.20
	Session 2 (G)		0.57
	Session 3 (G)		
	Mean GCSE	7.07	5.42
Cohort 3 (2006)	Gender (G)	1.60	1.94
	Session 2	0.70	
	Session 3		1.74
	Session 2 (G)		2.83
	Session 3 (G)	1.70	
	Mean GCSE	7.29	5.47
Cohort 4 (2007)	Gender (G)	1.65	1.77
	Session 2		
	Session 3	0.66	1.71
	Session 2 (G)		
	Session 3 (G)	1.25	3.05
	Mean GCSE	6.93	5.40
Cohort 5 (2008)	Gender (G)	1.39	1.85
	Session 2		1.47
	Session 3	1.73	3.44
	Session 2 (G)	2.29	
	Session 3 (G)		
	Mean GCSE	7.85	5.44
Cohort 6 (2009)	Gender (G)	1.64	1.83
	Session 2		
	Session 3	0.66	1.42
	Session 2 (G)		
	Session 3 (G)	1.01	2.91
	Key Stage 3	1.17	1.16

In 2008 (cohort 5), girls taking unit 2434 in session 2 and both girls and boys taking the unit in session 3 had higher probability of obtaining grade A or above than those taking it in the terminal unit. With respect to grade C, both girls and boys had higher probability of obtaining the grade or above in sessions 2 and 3 than in session 4.

In 2009 (cohort 6), boys taking the unit in session 3 had lower probability of obtaining grade A than boys taking the unit in the terminal session and girls had higher probability of obtaining grade A or above in session 3 than in session 4. With respect to grade C, both girls and boys had higher probability of obtaining the grade or above in session 3 than in session 4.

From the results above, once ability was taken into account, it seems that, when following a linear assessment route, girls could gain a better grade in unit 2434 if they sit the examination early. For boys, it is difficult to draw conclusions as results varied widely by cohort.

[28] Only significant effects are reported.

Impact of unit re-sits on unit grade

For each student who took unit 2434 twice, changes in marks and grades between the first and second attempts were computed. The differences between attempts were statistically significant, with marks/grades being higher in the second attempt (about half a grade). Table EU25 shows the average mark and grade in unit 2434 for all six cohorts and both attempts.

Table EU25: Average mark and grade for unit 2434 in the first and second attempts, 2004-2009

		First Attempt		Second Attempt	
		Mean	SD	Mean	SD
Mark	Cohort 1	35.50	8.02	40.24	7.40
	Cohort 2	30.55	8.05	34.16	7.66
	Cohort 3	32.29	7.86	34.94	7.56
	Cohort 4	32.85	7.60	35.66	6.90
	Cohort 5	33.36	9.25	34.67	8.46
	Cohort 6	33.01	8.52	36.19	7.64
Grade	Cohort 1	4.50	1.34	5.29	1.25
	Cohort 2	3.66	1.28	4.28	1.25
	Cohort 3	3.96	1.30	4.42	1.36
	Cohort 4	4.08	1.23	4.54	1.16
	Cohort 5	4.17	1.50	4.39	1.41
	Cohort 6	4.10	1.39	4.62	1.28

Table EU26 shows, for all cohorts, the percentages of re-sits leading to changes in the unit grade. The percentages of cases when the re-sit grade was better varied widely among cohorts (the lowest percentage corresponds to cohort 5, being 25.91%; the highest percentage was 66.96%, in cohort 1). In very few cases, the unit grade was better in the first attempt. For this unit, in more than 50% of the cases (with the exception of cohort 1, where the percentage dropped to 31.97%) the re-sit did not lead to a change in the grade.

Table EU26: Percentages of re-sits leading to changes in unit 2434 grade, 2004-2009

	Original grade better	Re-sit grade better	No change in grade
Cohort 1	1.07	66.96	31.97
Cohort 2	2.73	47.78	49.49
Cohort 3	2.28	38.07	59.64
Cohort 4	1.49	32.99	65.53
Cohort 5	11.87	25.91	62.23
Cohort 6	1.75	40.21	58.04

UNIT 5 – 2435

Entries, assessment routes and unit performance

For all cohorts, the vast majority of the GCSE English candidates took unit 2435 in the terminal session (Table EU27). Entries for this unit in session 1 were negligible. As for all other units contributing to the GCSE in English, the percentages of

candidates sitting this unit early (sessions 1 to 3) increased significantly from 2004 (4.22%) to 2009 (16.87%).

Table EU27: GCSE English unit 2435 entries, 2004-2009

		Session 1	Session 2	Session 3	Session 4	All sessions
Cohort 1 (2004)	Entries			3023	68582	71605
	%			**4.22**	**95.78**	
Cohort 2 (2005)	Entries	9	1380	3241	65033	69663
	%	**0.01**	**1.98**	**4.65**	**93.35**	
Cohort 3 (2006)	Entries	1	1589	3102	61500	66192
	%	**0.00**	**2.40**	**4.69**	**92.91**	
Cohort 4 (2007)	Entries	28	1257	4172	52906	58363
	%	**0.05**	**2.15**	**7.15**	**90.65**	
Cohort 5 (2008)	Entries	10	1646	4514	44340	50510
	%	**0.02**	**3.26**	**8.94**	**87.78**	
Cohort 6 (2009)	Entries	6	1851	5532	36401	43790
	%	**0.01**	**4.23**	**12.63**	**83.13**	

For all cohorts and sessions 2, 3 and 4 (if the unit was available in both assessment routes), differences in the units' average grade between the linear and assessment routes were statistically significant at the 0.05 level.

Average grades for unit 2435 were higher for the linear assessment route than for the modular assessment route (Table EU28). Students taking this unit and following a linear route obtained the best results in early sessions (in fact, the earlier the unit was taken, the better average results). For the modular route, there was not a pattern in the attainment in the unit, as the session in which the best results were obtained varied by cohort.

Unit outcomes by assessment route controlling for students' ability

This section describes the effects of gender and assessment route in unit 2435 outcomes after controlling for students' general attainment (Tables H25-H30 in Appendix H).

For a given value of the general attainment score and for a specific assessment route, the probability of obtaining any grade in unit 2435 was, in most cases, significantly higher for girls than for boys.

For all cohorts, the probability of obtaining any grade or above in unit 2435 increased significantly with increasing scores in the general attainment measure.

With regard to the 'Assessment Route' effect, the probability of obtaining grade A or above was significantly lower for candidates following the linear assessment route in cohort 1. On the contrary, for candidates in cohort 6, the probability of obtaining grade A or above was significantly higher for candidates following the linear assessment route. For the other four cohorts there were no significant 'Assessment Route' effects on grade A or above. The probability of obtaining grade C or above was significantly lower for candidates following the linear assessment route than for candidates following the modular assessment route in cohorts 1, 3 and 5. For the other cohorts there were no significant effects on grade C or above.

Figures EU9 and EU10 display the predicted probability of a girl and a boy, respectively, obtaining grade A or above by general attainment and assessment route.

Table EU28: Average grade in GCSE English unit 2435 by session and assessment route, 2004-2009

	Session	Linear		Modular	
		Mean	SD	Mean	SD
Cohort 1	Jan-03	-	-	-	-
(2004)	Jun-03	-	-	-	-
	Jan-04	-	-	5.41	1.58
	Jun-04	5.54	1.54	5.32	1.54
Cohort 2	Jan-04	-	-	-	-
(2005)	Jun-04	5.79	1.94	5.08	1.68
	Jan-05	5.67	1.58	5.43	1.54
	Jun-05	5.60	1.58	5.30	1.53
Cohort 3	Jan-05	-	-	-	-
(2006)	Jun-05	6.33	1.25	5.60	1.35
	Jan-06	5.89	1.61	5.54	1.40
	Jun-06	5.71	1.52	5.51	1.47
Cohort 4	Jan-06	6.44*	1.33	6.21	1.32
(2007)	Jun-06	6.19	1.51	5.83	1.54
	Jan-07	5.97	1.52	5.39	1.50
	Jun-07	5.86	1.50	5.52	1.47
Cohort 5	Jan-07	7.40*	0.55	5.40*	3.05
(2008)	Jun-07	6.17	1.30	5.29	1.20
	Jan-08	6.53	1.16	6.62	1.48
	Jun-08	6.04	1.46	5.60	1.44
Cohort 6	Jan-08	-	-	6.60*	1.14
(2009)	Jun-08	6.25	1.29	5.23	1.48
	Jan-09	6.27	1.29	5.48	1.43
	Jun-09	6.17	1.43	5.67	1.38

* very low number of candidates

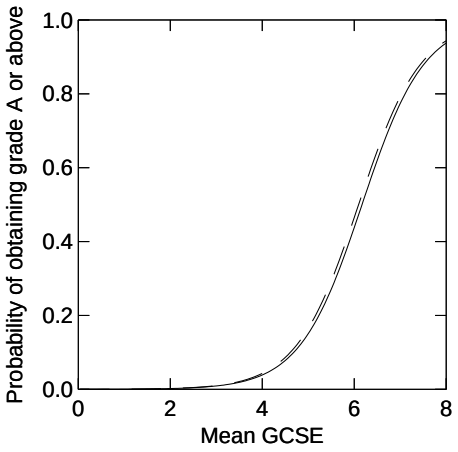
Maturational effects

This section looks at differences in unit outcomes by session. The research question is addressed separately for both assessment routes.

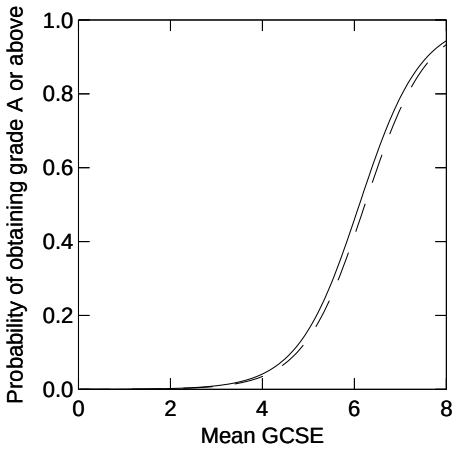
For a detailed explanation of how to interpret the results presented in this section's tables, refer to the equivalent section in the 'Specification level' analysis.

Modular assessment

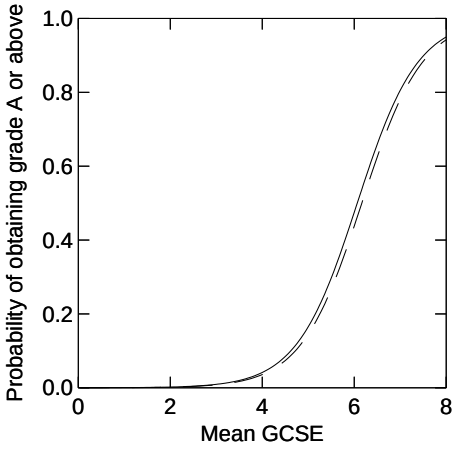
In each cohort, the differences between sessions in the average grade in unit 2435 were statistically significant for both girls and boys. Girls performed better in this unit in session 3 and boys obtained better results in early sessions (either in session 2 or 3) than in the terminal session in cohorts 1 to 3 and better results in the terminal session in cohorts 4 to 6.



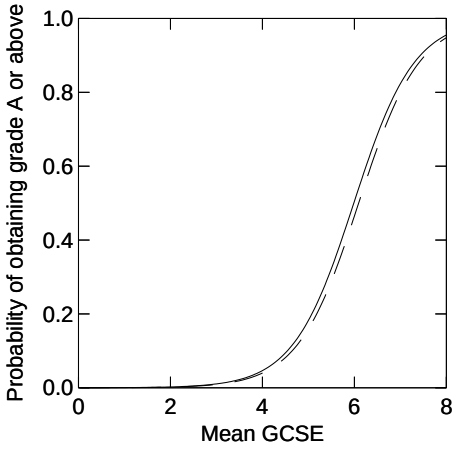
(a) Cohort 1



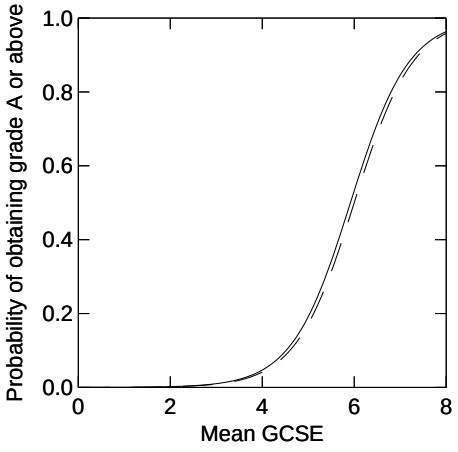
(b) Cohort 2



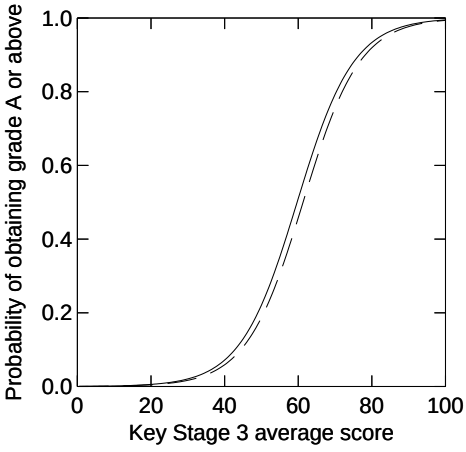
(c) Cohort 3



(d) Cohort 4

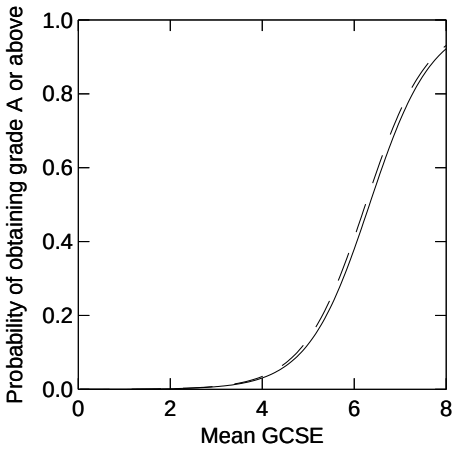


(e) Cohort 5

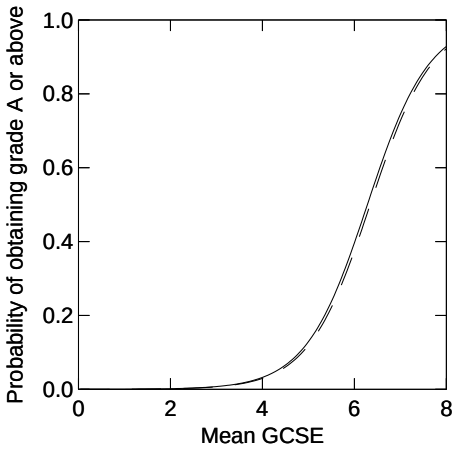


(f) Cohort 6

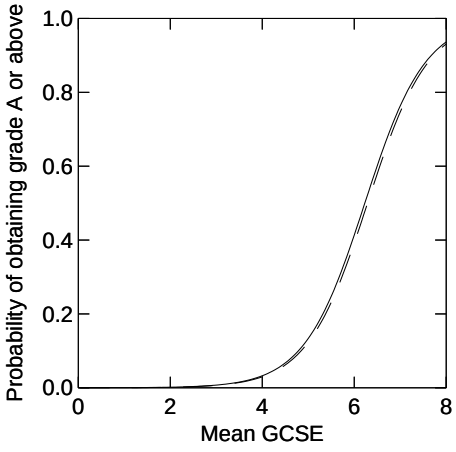
Figure EU9: Predicted probability of a girl obtaining at least grade A in unit 2435 by general attainment (solid line for linear assessment route and dashed line for modular assessment route)



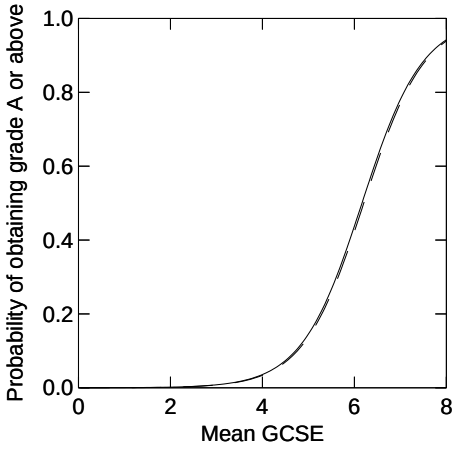
(a) Cohort 1



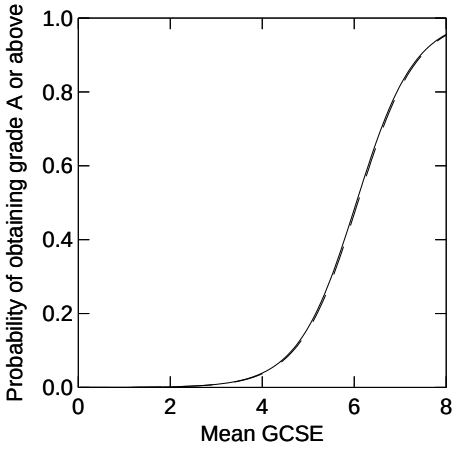
(b) Cohort 2



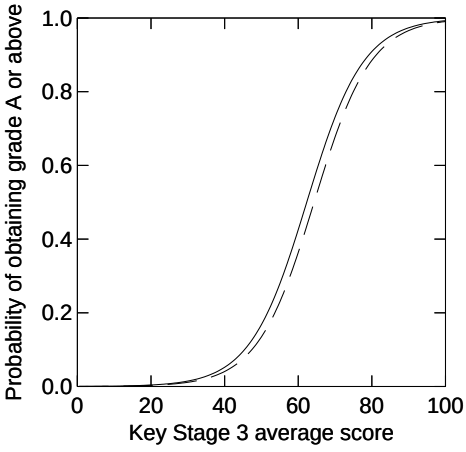
(c) Cohort 3



(d) Cohort 4



(e) Cohort 5



(f) Cohort 6

Figure EU10: Predicted probability of a boy obtaining at least grade A in unit 2435 by general attainment (solid line for linear assessment route and dashed line for modular assessment route)

In the following, the significant effects (odds ratios) of session by gender, once students' ability was taken into account, are presented. If the odds ratio is greater than one, then there is a positive effect of the session. For example, if the odds ratio for grade A or above and session 3 were greater than one, then the probability of obtaining grade A or above would be higher in session 3 than in session 4 (baseline category). On the other hand, if the odds ratio is smaller than one, then there is a negative effect of the session. For example, if the odds ratio for grade A or above and session 3 were smaller than one, then the probability of obtaining grade A or above would be lower in session 3 than in session 4 (baseline category).

Table EU29: Effects (odds ratios) of session and gender on the probability of obtaining a grade or above in unit 2435, 2005-2009. Modular assessment route[29]

Cohort (Year)	Variable	A	C
Cohort 1 (2004)	Gender (G)	1.21	1.67
	Session 3		
	Session 3 (G)		
	Mean GCSE	3.90	3.57
Cohort 2 (2005)	Gender (G)	1.19	1.65
	Session 2	0.68	
	Session 3		0.75
	Session 2 (G)		
	Session 3 (G)		
	Mean GCSE	4.33	3.77
Cohort 3 (2006)	Gender (G)	1.26	1.75
	Session 2		1.64
	Session 3		1.60
	Session 2 (G)	0.48	0.53
	Session 3 (G)		1.09
	Mean GCSE	3.95	3.41
Cohort 4 (2007)	Gender (G)	1.35	1.59
	Session 2	3.66	2.13
	Session 3		
	Session 2 (G)	0.39	
	Session 3 (G)		
	Mean GCSE	3.78	3.22
Cohort 5 (2008)	Gender (G)	1.26	1.90
	Session 2	0.46	
	Session 3	1.31	
	Session 2 (G)		
	Session 3 (G)	0.87	
	Mean GCSE	4.38	3.58
Cohort 6 (2009)	Gender (G)	1.39	1.56
	Session 2	0.54	
	Session 3	1.28	
	Session 2 (G)		
	Session 3 (G)		
	Key Stage 3	1.12	1.13

[29] Only significant effects are reported.

There were no significant session effects in 2004 (cohort 1).

In 2005 (cohort 2), the probability of obtaining grade A or above was lower for candidates taking the unit in session 2 than for those taking the unit in the terminal session. The probability of obtaining grade C or above was lower for candidates taking the unit in session 3 than for those taking the unit in the terminal session.

In 2006 (cohort 3), girls taking unit 2435 in session 3 had lower probability of obtaining grade A or above than those taking the unit in session 4. There was a significant positive effect for boys and a negative effect for girls on the probability of obtaining grade C or above in session 2, meaning that boys taking the unit in session 2 had higher probability of obtaining grade C than those taking the unit in the terminal session and girls had lower probability of obtaining grade C or above in session 2 than in session 4. Finally, the probability of obtaining grade C or above was higher for candidates taking the unit in session 3 than for those taking the unit in the terminal session.

In 2007 (cohort 4), boys taking the unit in session 2 had higher probability of obtaining grade A than boys taking the unit in the terminal session and girls had lower probability of obtaining grade A or above in session 2 than in session 4. Candidates taking the unit in session 2 had higher probability of obtaining grade C or above than those taking the unit in session 4.

In 2008 (cohort 5), candidates taking the unit in session 2 had lower probability of obtaining grade A or above than those taking the unit in session 4. Also, boys taking the unit in session 2 had higher probability of obtaining grade A than boys taking the unit in the terminal session and girls had lower probability of obtaining grade A or above in session 2 than in session 4. There were no significant session effects on grade C or above.

In 2009 (cohort 6), candidates taking the unit in session 2 had a lower probability of obtaining grade A or above than those taking it in the terminal unit. On the contrary, candidates taking unit 2435 in session 3 had higher probability of obtaining grade A or above than those taking the unit in session 4. There were no significant session effects on grade C or above.

In a modular assessment route, the results described above and presented in Table EU29 suggest that there is no clear pattern with respect to the impact of the assessment session in the outcomes of unit 2435.

Linear assessment

In each cohort, the differences between sessions in the average grade in unit 2435 were statistically significant for both girls and boys. Both groups of candidates performed better in this unit in earlier sessions (session 2 or session 3) than in the terminal session.

In the following, the significant effects of session by gender (once student's ability was taken into account) are presented[30].

In 2005 (cohort 2), there was a significant positive effect for session 3 on both grade A or above and grade C or above, meaning that candidates had higher probability of obtaining any of those two grades in session 3 than in session 4. There was also a significant negative effect on the probability of obtaining grade C or above in session

[30] There is no data for 2004 because for the linear assessment in this year, all units had to be taken in the June 2004 session.

2. This means that girls taking the unit in session 2 had lower probability of obtaining grade C than those taking the unit in session 4.

In 2006 (cohort 3), candidates taking this unit in session 3 had higher probability of obtaining grade C than those taking the unit in the terminal session. There were no other significant session effects.

In 2007 (cohort 4), both girls and boys taking unit 2435 in session 2 and girls taking the unit in session 3 had higher probability of obtaining grade A or above than those taking it in the terminal unit. The same effect appeared for grade C or above.

In 2008 (cohort 5), candidates taking unit 2435 in session 3 had higher probability of obtaining grade A or above and higher probability of obtaining grade C or above than those taking it in the terminal unit.

Table EU30: Effects (odds ratios) of session and gender on the probability of obtaining a grade or above in unit 2435, 2005-2009. Linear assessment route[31]

Cohort (Year)	Variable	A	C
Cohort 2	Gender (G)	1.30	1.63
(2005)	Session 2		0.60
	Session 3	2.29	1.96
	Session 2 (G)		
	Session 3 (G)		
	Mean GCSE	4.46	3.80
Cohort 3	Gender (G)	1.29	1.61
(2006)	Session 2		
	Session 3		2.11
	Session 2 (G)		
	Session 3 (G)		
	Mean GCSE	4.68	3.75
Cohort 4	Gender (G)	1.31	1.64
(2007)	Session 2	2.74	1.60
	Session 3		
	Session 2 (G)	1.18	
	Session 3 (G)	1.24	2.58
	Mean GCSE	4.75	3.85
Cohort 5	Gender (G)	1.19	1.60
(2008)	Session 2		
	Session 3	1.50	2.12
	Session 2 (G)		
	Session 3 (G)		
	Mean GCSE	4.92	3.80
Cohort 6	Gender (G)	1.39	1.77
(2009)	Session 2		
	Session 3		1.58
	Session 2 (G)		
	Session 3 (G)		2.86
	Key Stage 3	1.14	1.15

[31] Only significant effects are reported.

In 2009 (cohort 6), there were no significant session effects on grade A or above. However, candidates taking the unit in session 3 had higher probability of obtaining grade C than those taking the unit in the terminal session.

From the results above, once general ability was taken into account, it seems that, when following a linear assessment route, both girls and boys could gain a better grade in unit 2435 if they sit the examination early.

Impact of unit re-sits on unit grade

For each student who took unit 2435 twice, changes in marks and grades between the first and second attempts were computed. The differences between attempts were statistically significant, with marks/grades being higher in the second attempt (less than half a grade in most cases). Table EU31 shows the average mark and grade in unit 2435 for all six cohorts and both attempts.

Table EU31: Average mark and grade for unit 2435 in the first and second attempts, 2004-2009

		First Attempt		Second Attempt	
		Mean	SD	Mean	SD
Mark	Cohort 1	38.37	7.83	41.77	7.97
	Cohort 2	33.88	9.06	37.35	7.58
	Cohort 3	38.35	7.48	40.28	7.12
	Cohort 4	35.74	10.71	38.21	7.42
	Cohort 5	39.03	7.45	41.28	7.05
	Cohort 6	38.75	7.57	40.86	7.49
Grade	Cohort 1	4.95	1.32	5.57	1.37
	Cohort 2	4.25	1.48	4.82	1.25
	Cohort 3	4.94	1.28	5.29	1.22
	Cohort 4	4.60	1.55	4.95	1.25
	Cohort 5	5.09	1.25	5.46	1.18
	Cohort 6	5.06	1.26	5.39	1.25

Table EU32 shows, for all cohorts, the percentages of re-sits leading to changes in the unit grade. The percentages of cases when the re-sit grade was better varied widely among cohorts (the lowest percentage corresponds to cohort 4, being 24.59%; the highest percentage was 50.62%, in cohort 1). In very few cases, the unit grade was better in the first attempt. For this unit, in the majority of cases the re-sit did not lead to a change in the grade.

Table EU32: Percentages of re-sits leading to changes in unit 2435 grade, 2004-2009

	Original grade better	Re-sit grade better	No change in grade
Cohort 1	0.62	50.62	48.77
Cohort 2	8.61	45.45	45.93
Cohort 3	8.29	32.95	58.77
Cohort 4	4.74	24.59	70.67
Cohort 5	2.75	28.14	69.10
Cohort 6	2.46	28.44	69.10

GCSE IN MATHEMATICS

There are three assessment sessions in each year of the two-year GCSE in mathematics C course: January, March and June. For simplicity, the following notation will be used throughout this section of the report:

Session 1: January session in the first year of the course

Session 2: March session in the first year of the course

Session 3: June session in the first year of the course

Session 4: January session in the second year of the course

Session 5: March session in the second year of the course

Session 6: June session in the second year of the course

Students certificating in specification J516 of GCSE mathematics C (graduated assessment with coursework) in January 2009 were not considered in this research. This was due to the fact that January 2009 was the final session in which this specification was available. Candidates should only have been entered for J516 units if they were certificating in January 2009. The vast majority of entries was for J517 units, the modular assessment route without coursework.

Assessment in GCSE mathematics A (J512) was available only in January and June sessions.

In this section, due to the structure of the GCSE in mathematics and the availability of data, results are presented together for the full specification and for each individual unit.

Entries, unit combinations and assessment routes

Table M1 presents the numbers and percentages of candidates who obtained a GCSE in mathematics in the period of study. For each cohort, over 60% of the candidates followed the modular assessment route. However, entries for the modular assessment route dropped from 2008 to 2009 and entries for the linear assessment route increased in the same period.

Table M1: GCSE mathematics entries, 2008-2009

	Mathematics A (Linear)		Mathematics C (Modular) [32]		Total number of candidates
	Candidates	%	Candidates	%	
Cohort 1 (2008)	31603	35.07	58504	64.93	90107
Cohort 2 (2009)	32415	37.57	53853	62.43	86268

The majority of the students that obtained a GCSE in mathematics C (graduated assessment) took the subject in a modular way, that is, they sat units in different sessions instead of taking all examinations at the end of the two years of study. However, there were some students that followed a linear route and took all the necessary units for certification in the terminal session (0.34% and 0.71% of the candidates in cohorts 1 and 2, respectively). Around 88% of these students entered for the foundation tier.

[32] In 2008, the entries for the modular assessment route correspond to the J516 specification. Entries in 2009 correspond to the J517 specification.

Only students that follow a modular route in the GCSE mathematics C (graduated assessment) will be considered from this point onwards. Their outcomes will be compared to those of students who entered the GCSE mathematics A (linear assessment).

Tables M2 and M3 show the entries for each unit in each assessment session. Note that all units were not available in all sessions. For the availability of units, refer to the subject specification (OCR, 2006b; OCR, 2007).

The pattern of entries was different for each unit. In general, for all units, with the exception of unit M10, less than 20% of entries took place in the terminal session. This shows that candidates are making use of the flexible assessment by getting units out of the way rather than taking them in a narrow window at the end of the two-year course.

Table M2: GCSE mathematics C (Graduated Assessment with coursework) – units and entries, 2008

Unit	Session						Total entry
	January 2007	March 2007	June 2007	January 2008	March 2008	June 2008	
M1	1442		273	427		139	2281
M2	1466	323	1357	764	508	253	4671
M3	3178	466	1816	1466	1476	564	8966
M4	4248	573	3482	1843	2386	1012	13544
M5	8570	1321	5028	2866	3974	1597	23356
M6	11023	2108	9937	5587	6375	3770	38800
M7	9883	1992	12251	5953	10377	6030	46486
M8	7565	1403	10385	4909	10973	4659	39894
M9			8206	3729	8713	3568	24216
M10					8281	4244	12525
Terminal Paper (Foundation)						27699	27699
Terminal Paper (Higher)						30869	30869
Coursework (Centre marked)						43706	43706
Coursework (OCR set and marked)						14769	14769

Table M3: GCSE mathematics C (Graduated Assessment without coursework) – units and entries, 2009

Unit	Session						Total entry
	January 2008	March 2008	June 2008	January 2009	March 2009	June 2009	
M1	1273		294	414		114	2095
M2	1225	378	1174	762	506	256	4301
M3	2658	334	1517	1070	1235	544	7358
M4	3721	472	3180	1669	1805	913	11760
M5	7346	889	4599	2783	3281	1305	20203
M6	9915	1799	8499	5650	5294	3899	35056
M7	9445	1776	11408	6526	8954	6376	44485
M8	7906	1492	10791	6253	9238	4716	40396
M9			8681	5262	8028	4868	26839
M10					8964	5162	14126
Terminal Paper (Foundation)						24119	24119
Terminal Paper (Higher)						29722	29722

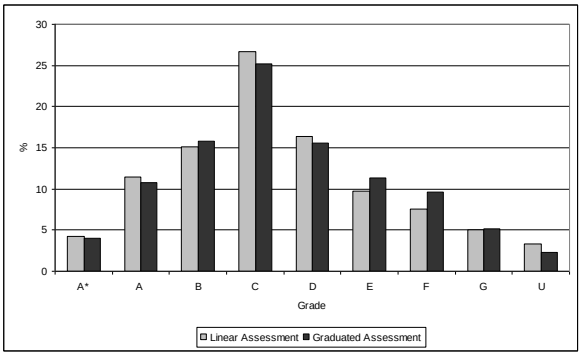
There were 6489 different unit combinations that led to an overall grade in GCSE mathematics C (graduated assessment) in June 2008 and 5431 combinations in June 2009.

The most popular combination in cohort 1 was taken only by approximately 6% of the students. This combination was: unit M8 in session 1, unit M9 in session 3, unit M10 in session 5 and the terminal paper (higher tier) and the coursework (centre marked) in session 6. The most popular combination in cohort 2 (same as above but no coursework) was taken only by approximately 8% of the students. In both cohorts, there were more than 3000 different combinations that were taken by only one candidate. Tables I1 and I2 in Appendix I display a list of the unit combinations taken by more than 200 candidates.

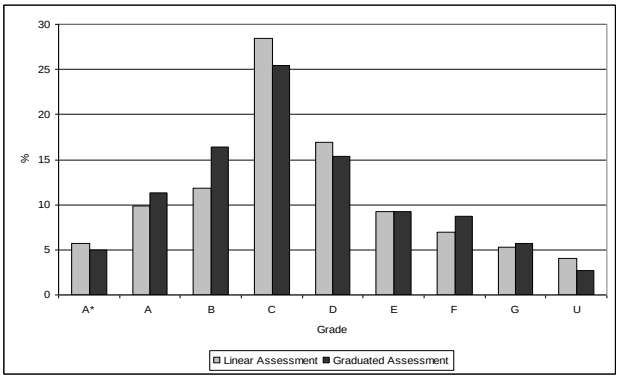
Overall performance in GCSE mathematics

The percentages of good grades (A*-C) in this subject remained fairly constant in the period of study (56.37% in 2008 and 57.33% in 2009). The percentages of candidates obtaining each individual grade were also very similar in both years. Grade distributions by cohort are shown in Tables I3 and I4 in Appendix I.

Figure M1 shows the grade distributions in GCSE mathematics by assessment route. The percentages of students obtaining grade A*, grade A (only in 2008), and grades C-D were higher for those candidates who followed the linear assessment route. On the other hand, the percentages of students obtaining grades B and E-G were lower among those who followed the linear route.



(a) Cohort 1



(b) Cohort 2

Figure M1: Grade distributions in GCSE mathematics. Linear vs. Modular assessment route, 2008-2009

Table M4 shows the average grade in GCSE mathematics for each assessment route. Statistically significant differences at the 0.05 level were found in the average grade between the students who followed a linear assessment route and those who followed a modular assessment route. In 2008, candidates following a linear route obtained, on average, higher grades in this subject than those following a modular route. On the contrary, in 2009, candidates following a linear route obtained, on average, lower grades.

Table M4: Average grade in GCSE mathematics by assessment route, 2008-2009

	Linear		Modular	
	Mean	SD	Mean	SD
Cohort 1	4.55	1.92	4.49	1.89
Cohort 2	4.50	1.97	4.57	1.94

GCSE mathematics outcomes by assessment route controlling for students' ability

In this section, the question ***"****Are there differences in outcomes between the group of students who followed a linear assessment route and the group who followed a modular assessment route once concurrent/prior attainment has been taken into account?"* is answered.

The mean GCSE score was used as a measure of general attainment (proxy for ability) for students in cohort 1. For students in cohort 2, the average of the Key Stage 3 scores was used instead.

Table M5 shows that students in cohort 1 who followed a linear assessment route had higher general attainment scores than those who followed a modular route. The differences were found to be statistically significant. On the contrary, students in cohort 2 following a linear assessment route had slightly lower general attainment scores. The differences were also statistically significant.

Table M5: General attainment scores[33]. Linear vs. Modular assessment route, 2008-2009

	Linear		Modular	
	Mean	SD	Mean	SD
Cohort 1	4.68	1.68	4.57	1.59
Cohort 2	50.59	11.32	51.70	10.82

In order to find out if there were differences in the grades between the two assessment routes once general attainment (either mean GCSE or Key Stage 3 scores) had been taken into account, logistic regression was used. In particular, the overall grade obtained in GCSE mathematics was modelled as a function of the gender and the general attainment of the student and whether the assessment was linear or modular. An interaction term between gender and the assessment route was also included. For more details about the logistic regression technique used in this section see Appendix G.

Tables M6 and M7 present the regression parameters and the odds ratios for each of the grades in the two cohorts. All significant effects are highlighted in bold type.

[33] The mean GCSE score ranges from 0 to 8 (cohort 1) and the Key Stage 3 score from 1 to 100 (cohort 2).

Table M6: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Cohort 1 (2008)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**-0.81**	**0.45**	**-0.95**	**0.39**	**3.72**	**41.41**	**0.29**	**0.52**
At least grade A	**-0.86**	**0.42**	**-0.52**	**0.59**	**3.15**	**23.25**	0.01	0.60
At least grade B	**-0.77**	**0.46**	**-0.36**	**0.69**	**2.92**	**18.50**	**-0.13**	**0.61**
At least grade C	**-0.71**	**0.49**	**0.04**	**1.04**	**2.57**	**13.06**	-0.06	0.98
At least grade D	**-0.69**	**0.50**	**0.35**	**1.42**	**2.60**	**13.43**	-0.10	1.29
At least grade E	**-0.51**	**0.60**	**0.26**	**1.29**	**2.42**	**11.28**	-0.13	1.14
At least grade F	**-0.40**	**0.67**	**-0.17**	**0.84**	**2.17**	**8.77**	-0.05	0.80
At least grade G	**-0.29**	**0.75**	**-0.50**	**0.61**	**1.94**	**6.95**	0.11	0.68

Table M7: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Cohort 2 (2009)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**-0.52**	**0.60**	**-0.14**	**0.87**	**0.25**	**1.29**	-0.08	0.81
At least grade A	**-0.36**	**0.70**	**-0.23**	**0.80**	**0.20**	**1.22**	**-0.18**	**0.66**
At least grade B	**-0.24**	**0.79**	**-0.40**	**0.67**	**0.17**	**1.18**	**-0.21**	**0.54**
At least grade C	**-0.28**	**0.76**	**-0.08**	**0.93**	**0.15**	**1.16**	**-0.10**	**0.84**
At least grade D	**-0.34**	**0.72**	**0.12**	**1.13**	**0.17**	**1.19**	-0.08	1.04
At least grade E	**-0.37**	**0.69**	**0.12**	**1.13**	**0.18**	**1.20**	-0.07	1.05
At least grade F	**-0.52**	**0.60**	**-0.32**	**0.73**	**0.18**	**1.20**	0.05	0.77
At least grade G	**-0.31**	**0.74**	**-0.88**	**0.42**	**0.15**	**1.17**	-0.12	0.37

For both cohorts and all grades, there were negative gender effects, which indicate that for a particular assessment route and a given general attainment score, the probability of obtaining at least any given grade or above was significantly lower for girls than for boys.

There were positive significant 'General attainment' effects for all grades in both cohorts, indicating that the probability of obtaining a given grade or above in GCSE mathematics increased significantly with increasing scores in the attainment measure.

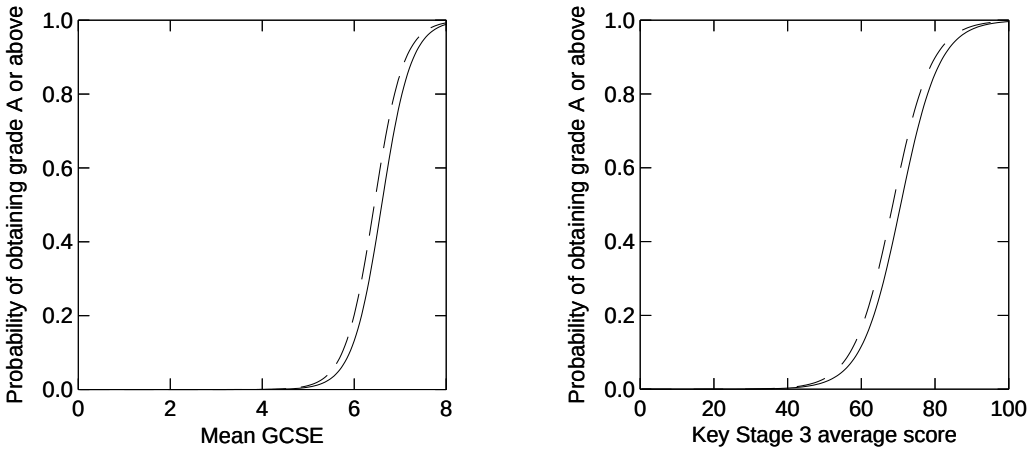
A negative significant 'Assessment Route' effect means that, for a given general attainment score, the probability of obtaining at least a given grade is significantly lower for a student following the linear assessment route than for a student following the modular route. Tables M6 and M7 show that the probability of obtaining grade A*, grade A or above and grade B or above was significantly lower for candidates following a linear assessment route than for candidates following a modular one. A positive significant 'Assessment Route' effect means that, for a given general attainment score, the probability of obtaining at least a given grade or above is significantly lower for a student following the modular assessment route than for a student following the linear one. This was the case for grades D or above and E or above.

In 2008, there were two significant 'Gender by Assessment Route' effects. Firstly, and only for girls, the probability of obtaining grade A* was higher if a linear route was taken. Secondly, the 'Assessment Route' effect on the probability of obtaining grade B or above (probability significantly lower for candidates following a linear assessment route than for candidates following a modular one) was stronger for girls than for boys.

In 2009, the 'Assessment Route' effect on the probability of obtaining grade A or above, grade B or above or grade C or above (that is, the probability of obtaining any of those grades being significantly lower for candidates following a linear assessment route than for candidates following a modular one) was stronger for girls than for boys.

Figure M2 displays the predicted probability of a girl obtaining grade A or above by general attainment score and assessment route. Figure M3 displays the same probability for a boy. These figures show that the difference in the probabilities of obtaining grade A or above between the linear and the modular assessment routes was in favour of the modular route.

This section has shown, therefore, that there is some evidence of candidates getting higher grades when they follow a modular assessment route instead of a linear one, once general attainment has been taken into account.

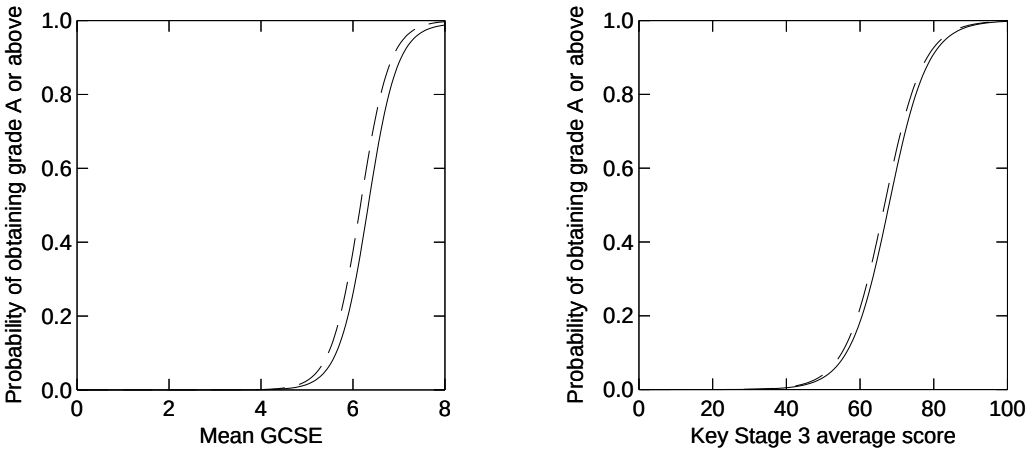


(a) Cohort 1 (b) Cohort 2

Figure M2: Predicted probability of a girl obtaining at least grade A in GCSE mathematics by general attainment (solid line for linear assessment route and dashed line for modular assessment route)

Maturational effects

In this section, the issue of maturation is addressed. It has been claimed that students who are encouraged to be assessed on units early in their course are potentially disadvantaged by their relative immaturity, if not their narrower experience of the subject. Therefore, candidates may not be expected to perform as well in the early sittings as they would later on in the course. Information about when the individual units were taken and the marks achieved were used to shed some light on this issue.



(a) Cohort 1

(b) Cohort 2

Figure M3: Predicted probability of a boy obtaining at least grade A in GCSE mathematics by general attainment (solid line for linear assessment route and dashed line for modular assessment route)

For each unit, the marks achieved in any two difference sessions were compared. If the difference between the marks was positive, then taking the unit in the earlier session was an advantage. On the other hand, if the difference was negative, taking the unit later in the two-year course was advantageous.

Figures M4 and M5 show the differences in marks between assessment sessions for all GCSE mathematics C units. Significant differences are highlighted in a darker colour. For all units, the graphs show that the average marks were higher in early sessions than in later sessions. Therefore, for candidates taking GCSE mathematics C, rather than being disadvantaged by assessment early in the course, the opposite might be true.

Figures M6 and M7 show the differences in marks between assessment sessions for all GCSE mathematics C units by gender. As before, early assessment seemed to be an advantage for both girls and boys.

This analysis shows that although candidates taking units early in the two-year course might not have had the experience of the full course and might have been at different levels of age and maturity, they were not disadvantaged.

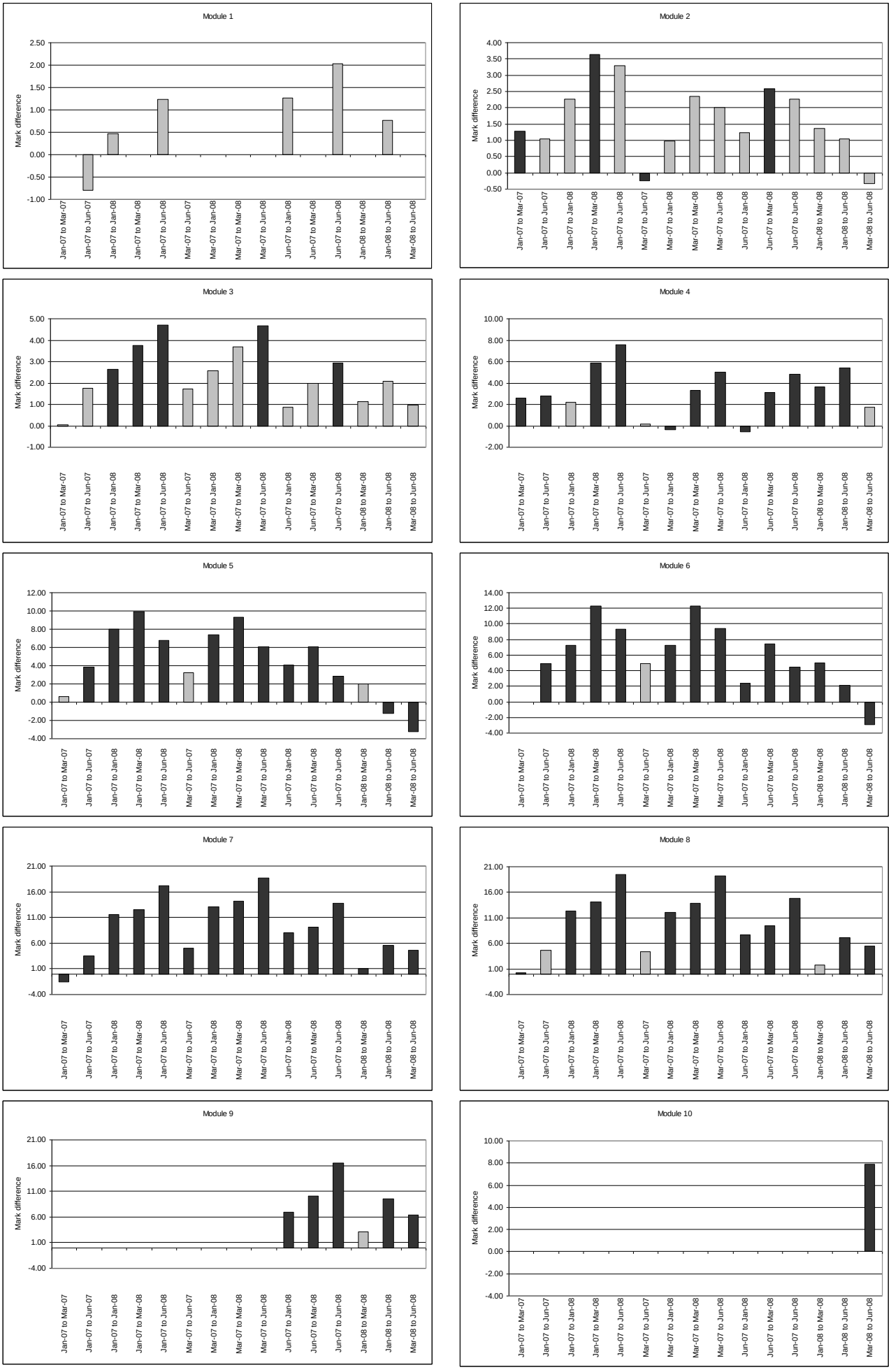


Figure M4: Mark difference between assessment sessions. GCSE mathematics C, all units, cohort 1 (2008). Significant differences are highlighted in a darker colour

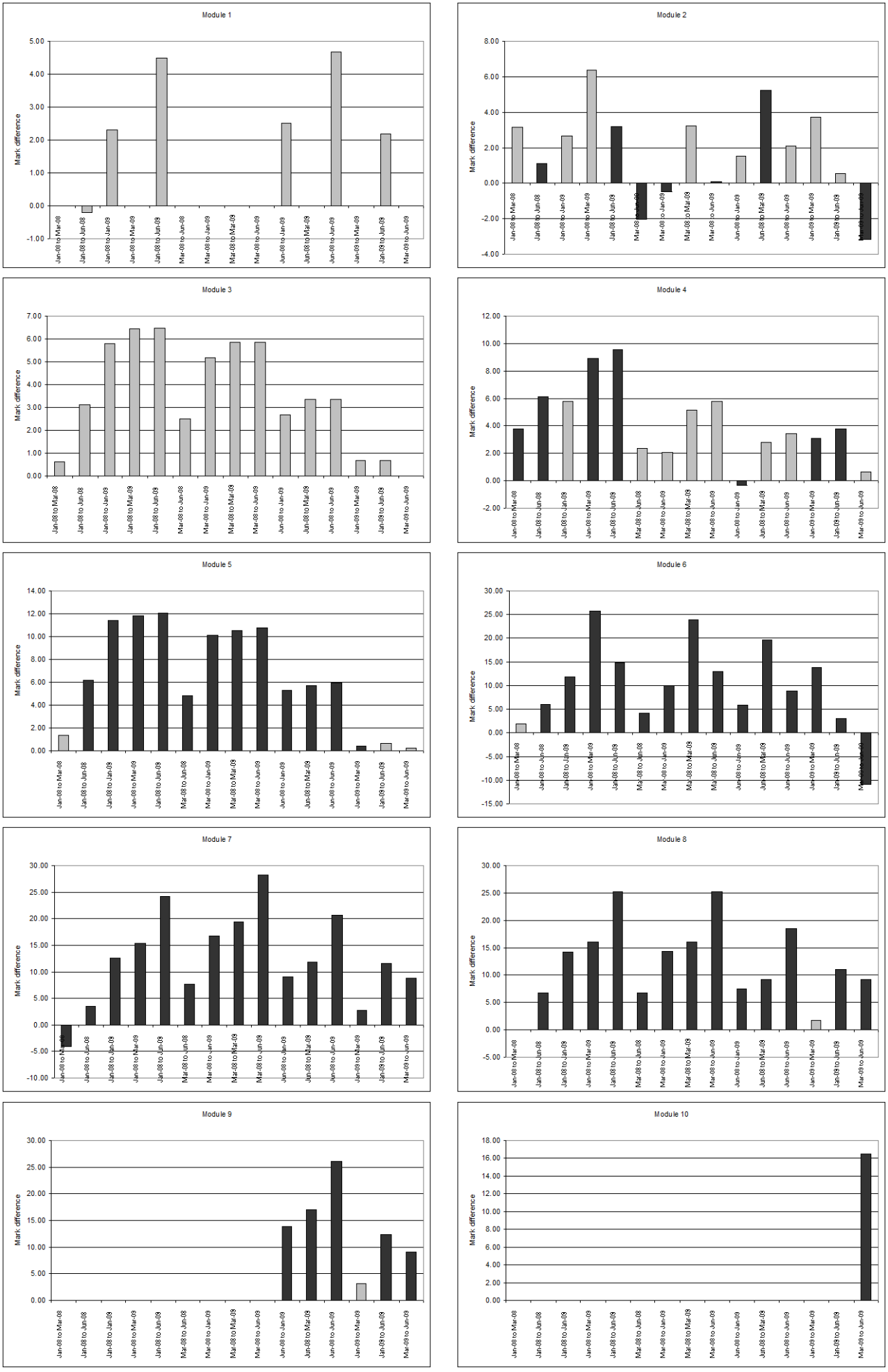


Figure M5: Mark difference between assessment sessions. GCSE mathematics C, all units, cohort 2 (2009). Significant differences are highlighted in a darker colour

Figure M6: Mark difference between assessment sessions by gender. GCSE mathematics C, all units, cohort 1 (2008). Significant differences are highlighted in a darker colour

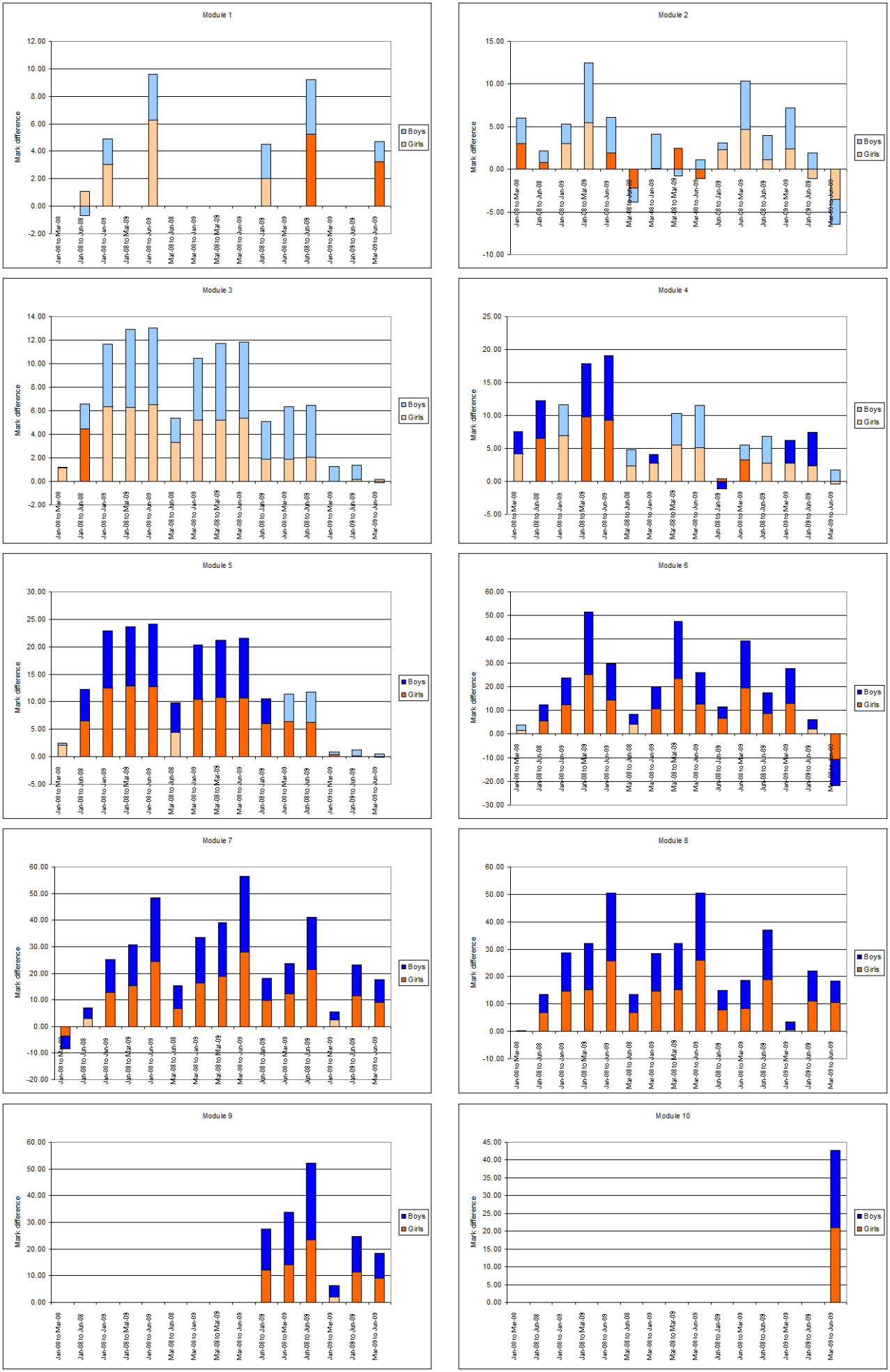


Figure M7: Mark difference between assessment sessions by gender. GCSE mathematics C, all units, cohort 2 (2009). Significant differences are highlighted in a darker colour

Impact of unit re-sits on unit and overall outcomes

The aim of this section is to investigate the re-sitting patterns and the impact of unit re-sits on the overall and unit outcomes. Therefore, only results from the modular assessment route (GCSE mathematics C) are considered here.

In section 3.11.2 of the OCR Admin Guide (OCR, 2008), it is stated that 'Where a candidate is entered for a GCSE unit but is absent, this is not counted as one attempt'. Therefore, for the analyses carried out in this section, units where the candidates were absent will not be considered.

In 2008 there were 19332 (31.32%) students who sat one unit twice, 8321 (13.48%) students who sat two units twice and 983 (1.59%) students who sat three or more units twice. Just over half of the students (53.61%) did not re-sit any unit.

In 2009 there were 17089 (31.73%) students who sat one unit twice, 9752 (18.11%) students who sat two units twice and 1178 (2.19%) students who sat three or more units twice. Just below half of the students (47.97%) did not re-sit any unit.

There is evidence of an increase over time in the percentage of students with re-sits in two or more units (about a 5 percentage points increase). Also, the percentage of students who took at least one re-sit increased about 6 percentage points in the period of study.

Table M8 displays the number of students re-sitting each GCSE mathematics unit. The percentages in some units were relatively high. For example, around 20% of the entries for unit M7 in 2009 were re-sits. However, each unit was taken only once for the majority of the candidates.

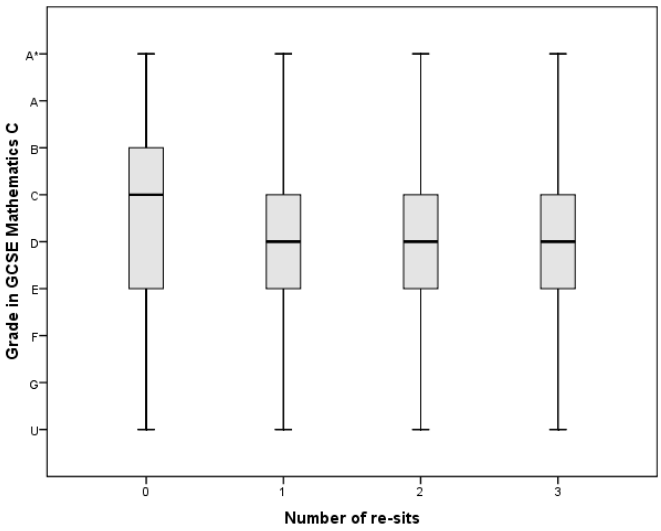
Table M8 also shows that there is evidence of an increasing percentage of students re-taking each individual unit over time. The largest percentage point increase was in units M8 and M9 (about 3 percentages points from 2008 to 2009).

Table M8: Number of re-sits per unit[34] in GCSE mathematics C, 2008-2009

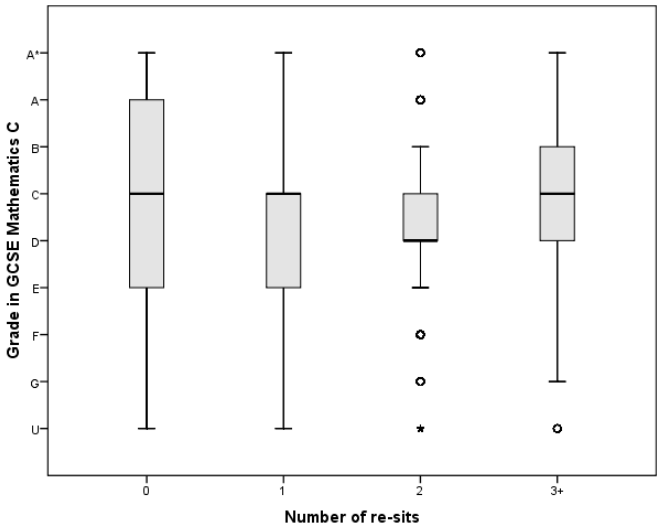
Unit	Number of re-sits			
	Cohort 1		Cohort 2	
	Number	%	Number	%
M1	211	0.36	229	0.43
M2	593	1.01	652	1.21
M3	980	1.68	882	1.64
M4	1811	3.10	1688	3.13
M5	3405	5.82	3225	5.99
M6	8464	14.47	8322	15.45
M7	10107	17.28	10653	19.78
M8	7203	12.31	8070	14.99
M9	3554	6.07	4737	8.80
M10	908	1.55	1556	2.89

Figure M8 displays the overall grade in GCSE mathematics C for students with re-sits in 0, 1, 2 or 3+ units.

[34] Only units M1 to M10 could have been sat in more than two sessions.



(a) Cohort 1



(b) Cohort 2

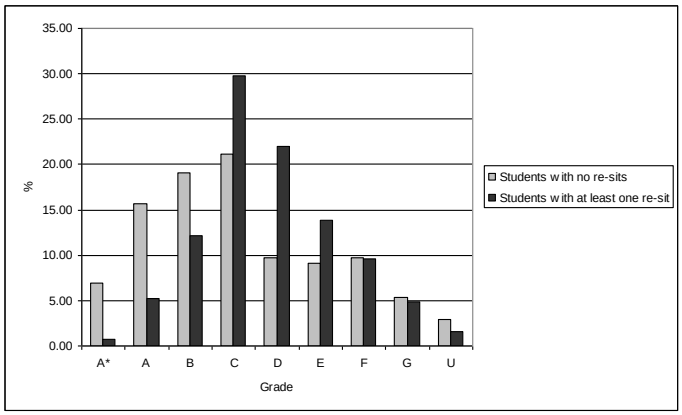
Figure M8: Grade in GCSE mathematics C for students re-sitting 0, 1, 2 or 3+ units, 2008-2009

The differences in the overall grade between students with no re-sits and those with them (independently of the number) were statistically significant at the 0.05 level. The average grade in GCSE mathematics was higher for the students with no re-sits. However, there were no statistically significant differences in the overall grade between students re-sitting 1, 2, or 3+ units.

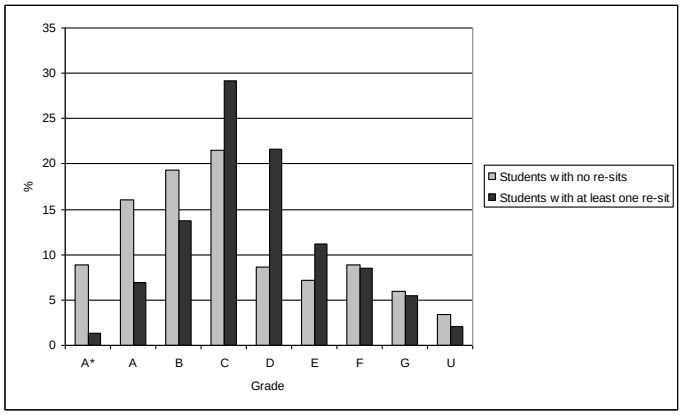
Figure M9 shows the overall grade distribution in GCSE mathematics for candidates who re-sat at least one unit and those who did not. For candidates in both cohorts, the grade distributions for the two groups mentioned above were quite different. The percentages of students with grades A*-B were higher among the students who did not take any re-sits. The percentages of students obtaining grades C-E were higher among the students that took at least one unit twice. This figure shows that, in general, the students that took re-sits were weaker in GCSE mathematics than those who did not.

Tables I5 and I6 in Appendix I show the grade distribution of each of the units for students with and without re-sits. Both tables show that in each of the units, as for the

overall grade in GCSE mathematics, students that took re-sits were weaker than those who did not.



(a) Cohort 1



(b) Cohort 2

Figure M9: Grade distribution in GCSE mathematics C for students with and without re-sits, 2008-2009

To investigate the impact of re-sits in the overall grade in GCSE mathematics C logistic regression was used. The overall grade in GCSE mathematics C was modelled as a function of the gender and the general attainment of the student and the total number of units re-sat. Tables M9 and M10 present the regression parameters and the odds ratios for all grades for both cohorts of students. Significant effects are highlighted in bold type.

There were negative significant effects for gender, which indicate that, for a given number of units re-sat and a given general attainment score, the probability of obtaining at least a given grade was higher for boys than for girls. This was the case for all the grades.

For all cohorts and for all grades there were positive significant 'General attainment' effects, meaning that the probability of obtaining a grade or above in GCSE mathematics C increased significantly with increasing scores in the attainment measure.

A positive significant 'Number of units re-sat' effect indicates that, for a given general attainment score, the probability of obtaining at least a given grade significantly increases when the number of units re-sat increases. For example, Table M10 shows that the probability of obtaining grade E or above for a student taking one unit twice in 2009 was higher than the probability of a student taking all units only once. There were positive significant effects for grade D or above to grade G or above.

Table M9: Regression parameters and odds ratios for gender, number of units re-sat and general attainment. Cohort 1 (2008)

Grade	Gender (F)		Number of units re-sat		General attainment	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**-0.80**	**0.45**	**-0.68**	**0.51**	**3.61**	**37.13**
At least grade A	**-0.85**	**0.43**	**-0.51**	**0.60**	**3.05**	**21.20**
At least grade B	**-0.75**	**0.47**	**-0.51**	**0.60**	**2.83**	**17.01**
At least grade C	**-0.72**	**0.49**	**-0.24**	**0.79**	**2.62**	**13.78**
At least grade D	**-0.71**	**0.49**	**0.24**	**1.27**	**2.64**	**13.99**
At least grade E	**-0.52**	**0.60**	**0.32**	**1.38**	**2.42**	**11.24**
At least grade F	**-0.39**	**0.67**	**0.11**	**1.12**	**2.15**	**8.55**
At least grade G	**-0.29**	**0.75**	**0.13**	**1.14**	**1.96**	**7.10**

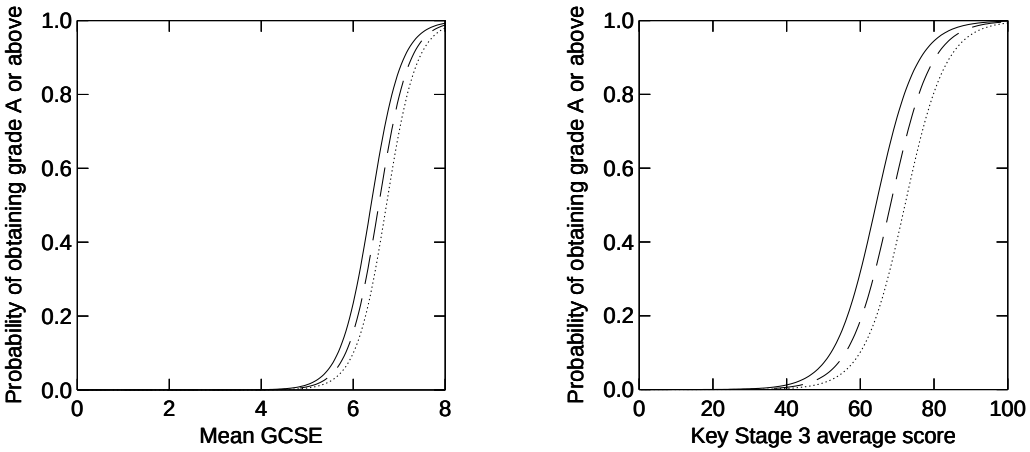
Table M10: Regression parameters and odds ratios for gender, number of units re-sat and general attainment. Cohort 2 (2009)

Grade	Gender (F)		Number of units re-sat		General attainment	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**-0.51**	**0.60**	**-1.11**	**0.33**	**0.23**	**1.26**
At least grade A	**-0.34**	**0.71**	**-0.71**	**0.49**	**0.18**	**1.20**
At least grade B	**-0.22**	**0.80**	**-0.59**	**0.55**	**0.15**	**1.17**
At least grade C	**-0.28**	**0.76**	**-0.32**	**0.73**	**0.15**	**1.16**
At least grade D	**-0.35**	**0.70**	**0.16**	**1.17**	**0.18**	**1.20**
At least grade E	**-0.40**	**0.67**	**0.42**	**1.52**	**0.20**	**1.22**
At least grade F	**-0.55**	**0.57**	**0.40**	**1.49**	**0.20**	**1.22**
At least grade G	**-0.33**	**0.72**	**0.48**	**1.62**	**0.16**	**1.17**

On the other hand, there was a negative 'Number of units re-sat' effect for grade A*, at least grade A and at least grade B, indicating that for a given mean GCSE score, the probability of obtaining those grades significantly decreased if more modules are re-sat. For example, in 2008, the probability of obtaining a grade A or above for a student averaging grade A at GCSE and who did not re-sit any modules was 0.93 whereas the same probability for a student who re-sat one or two modules once was 0.90 and 0.84, respectively.

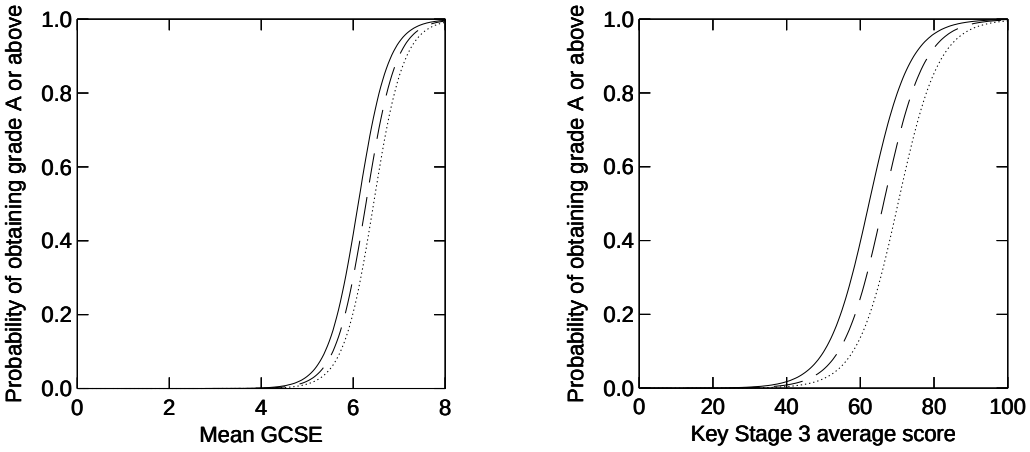
Figure M10 displays the predicted probability of obtaining at least grade A by general attainment for a girl re-sitting none, one or two units. Figure M11 displays the same probability for a boy. Both figures show that in both cohorts, the probability of obtaining grade A or above decreased if more units were re-sat. The differences between the curves, though small, were bigger in the later cohort, meaning that for candidates in cohort 2 the effect of the number of units re-sat was stronger (a fact also reflected by the regression coefficients displayed in Tables M9 and M10).

Figure M12 displays the predicted probability of obtaining at least grade E by general attainment for a girl re-sitting none, one or two units. Figure M13 displays the same probability for a boy. These figures show the opposite effect to the one mentioned for grade A or above: the probability of obtaining grade E or above increased with an increasing number of units re-sat.



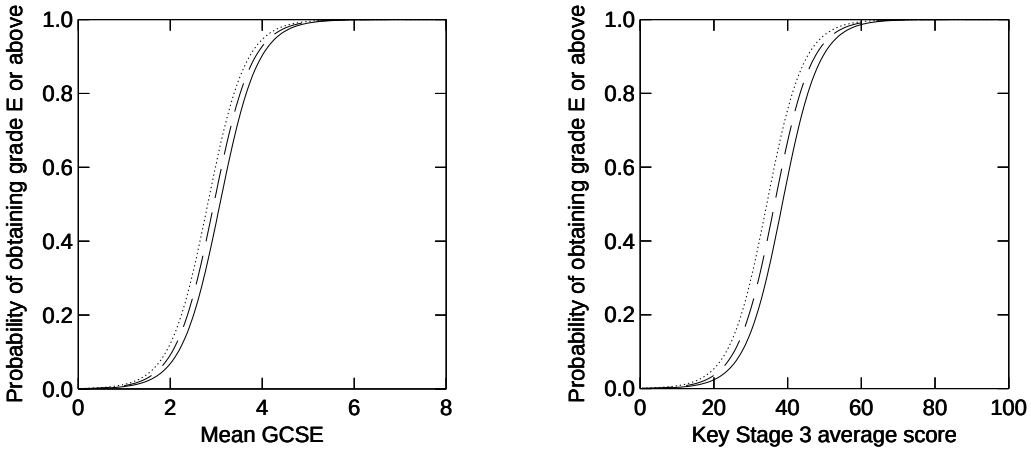
(a) Cohort 1 (b) Cohort 2

Figure M10: Predicted probability of a girl obtaining at least grade A in GCSE mathematics C by general attainment (solid line for 'no re-sits', dashed line for 'one unit re-sat' and dotted line for 'two units re-sat')



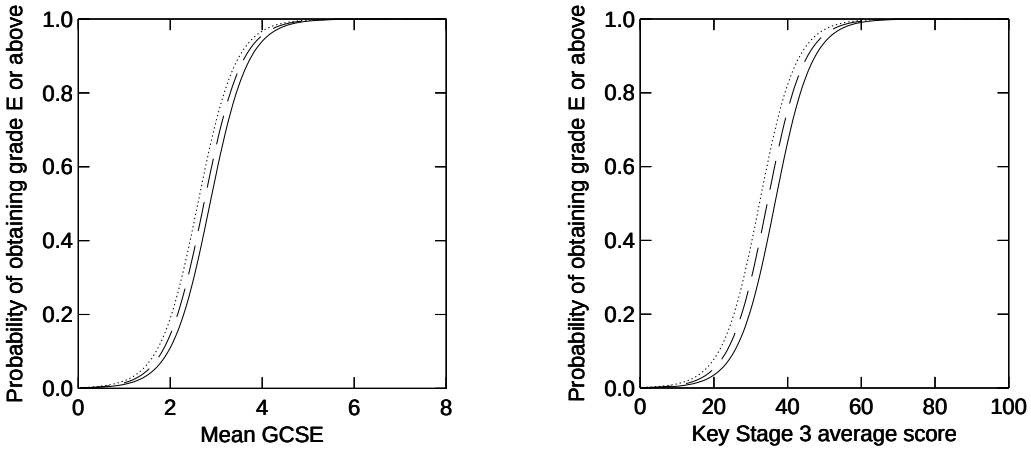
(a) Cohort 1 (b) Cohort 2

Figure M11: Predicted probability of a boy obtaining at least grade A in GCSE mathematics C by general attainment (solid line for 'no re-sits', dashed line for 'one unit re-sat' and dotted line for 'two units re-sat')



(a) Cohort 1 (b) Cohort 2

Figure M12: Predicted probability of a girl obtaining at least grade E in GCSE mathematics C by general attainment (solid line for 'no re-sits', dashed line for 'one unit re-sat' and dotted line for 'two units re-sat')



(a) Cohort 1 (b) Cohort 2

Figure M13: Predicted probability of a boy obtaining at least grade E in GCSE mathematics C by general attainment (solid line for 'no re-sits', dashed line for 'one unit re-sat' and dotted line for 'two units re-sat')

For each student who had taken a unit twice, the change in marks between the first and second attempts was computed. For all ten units, the marks obtained in the second attempt (re-sit) were significantly higher than in the first attempt (2 to 10 UMS marks higher). Tables M11 and M12 show the average mark in each attempt for candidates in cohorts 1 and 2 respectively.

Table M11: Average mark for each unit in the first and second attempt[35], cohort 1 (2008)

Unit	First attempt		Second attempt		Difference
	Mean	SD	Mean	SD	
M1	18.81	6.23	22.80	7.49	-3.99
M2	21.66	7.20	24.66	6.72	-3.00
M3	26.17	8.55	28.42	8.14	-2.25
M4	31.07	8.95	33.69	8.53	-2.62
M5	35.54	10.37	38.90	10.38	-3.36
M6	48.54	11.53	52.51	11.46	-3.97
M7	55.98	16.25	60.16	17.08	-4.18
M8	63.13	18.04	69.59	17.93	-6.46
M9	76.86	21.26	81.17	20.83	-4.31
M10	85.26	26.35	87.47	25.83	-2.21

Table M12: Average mark for each unit in the first and second attempt[35], cohort 2 (2009)

Unit	First attempt		Second attempt		Difference
	Mean	SD	Mean	SD	
M1	31.63	11.22	37.51	11.70	-5.88
M2	36.53	11.34	40.77	12.04	-4.24
M3	43.33	14.97	48.96	14.11	-5.63
M4	53.10	15.45	58.63	13.62	-5.53
M5	59.89	16.83	67.61	15.50	-7.72
M6	82.42	19.57	91.18	19.48	-8.76
M7	99.57	23.22	107.86	22.42	-8.29
M8	115.18	26.73	124.46	23.67	-9.28
M9	133.73	33.02	141.75	29.84	-8.02
M10	147.83	37.81	149.13	43.77	-1.30

Although the second attempt provides the candidates with a better mark (on average), this does not often lead to an improvement on the unit grade. Tables M13 and M14 display, for each cohort and for each unit, the percentages of re-sits leading to a change in the unit grade.

In between 30% and 50% of the cases the re-sit led to an improvement in the unit's grade. In less than 10% of the cases the grade in the unit was better in the first attempt and in the remaining cases the re-sit made no difference in the grade.

[35] The maximum raw mark for each unit is 50. However, in this report, the marks for each of the unit tests are reported on a Uniform Mark Scale.

Table M13: Percentages of re-sits leading to changes in unit grades, cohort 1 (2008)

Unit	Original grade is better	Re-sit grade is better	No change
M1	3.79	36.02	60.19
M2	8.94	38.79	52.28
M3	9.29	29.29	61.43
M4	11.37	35.23	53.40
M5	5.26	39.15	55.59
M6	5.19	43.53	51.29
M7	8.04	41.46	50.50
M8	4.53	40.62	54.85
M9	5.60	39.45	54.95
M10	9.25	31.39	59.36

Table M14: Percentages of re-sits leading to changes in unit grades, cohort 2 (2009)

Unit	Original grade is better	Re-sit grade is better	No change
M1	3.49	38.86	57.64
M2	9.66	37.27	50.07
M3	7.14	32.99	59.86
M4	7.94	38.74	53.32
M5	4.74	43.41	51.84
M6	3.26	52.73	44.02
M7	5.81	46.68	47.51
M8	5.86	43.56	50.58
M9	6.12	45.35	48.53
M10	8.74	35.48	55.78

Tables M15 and M16 display the percentages of students that re-sat GCSE mathematics C units by type of school. The differences in the re-sitting patterns by centre type are small. However, the tables show that the percentage of students taking no re-sits is slightly higher in the independent sector. Percentages of candidates re-sitting units once in each centre type were similar. Independent schools had the highest proportion of candidates re-sitting three or more units.

Table M15: Number and percentage of students with re-sits in GCSE mathematics C by type of school, cohort 1 (2008)

Number of	Independent		State	
units re-sat	Frequency	Percent	Frequency	Percent
0	877	53.31	29280	52.45
1	480	29.18	17920	32.10
2	215	13.07	7765	13.91
3+	73	4.44	855	1.54

Table M16: Number and percentage of students with re-sits in GCSE mathematics C by type of school, cohort 2 (2009)

Number of units re-sat	Independent		State	
	Frequency	Percent	Frequency	Percent
0	704	51.20	24398	47.43
1	393	28.58	16506	32.09
2	226	16.44	9438	18.35
3+	52	3.78	1095	2.13

QUALITATIVE ASPECTS OF MODULARISATION

This section reports on the findings from the qualitative strand on the effects of modularisation research. All interview recordings were transcribed. Content analyses were undertaken in which comments illustrating different perspectives were identified and synthesised, in order to address the research questions. Participants' general views on modularisation are discussed first, and then findings for each research question are discussed in turn.

Students' and teachers' general attitudes towards modularisation

Students of modular mathematics

Irrespective of their school's adopted assessment system, students of mathematics were generally in favour of modular assessment. In their interviews, students of modular mathematics appreciated the feedback and the sense of readiness the modules provided for them:

Student 1: It's better to have more tests throughout the year, than just one at the end. Then you knew what you have done, what you can do, what you can't do and as the year goes by you can improve...
Student 2: So you know what you can do in your final exam.
Student 1: yea… ready yourself.

Students of linear mathematics

Linear mathematics students, being familiar with the modular systems adopted by other subjects, gave different responses when asked if they prefer the linear to the modular route depending on their ability; higher ability students (those learning in the so-called 'higher-set' class) reported favouring frequent testing, as it reduces exam pressure and makes exam preparation easier. However, students in the 'lower-set' class thought having more exams would mean more stress and workload, and reported preferring internal (mock) exams to modular exams because of their lower importance (see discussion).

Students of English

Students of English, who were already participating in a unitised system, did not express their general attitudes towards modular assessment; however, as discussed below, similarly to modular mathematics students, they also appreciated several characteristics of modular assessment, *e.g.* frequent feedback, the opportunity to re-sit examinations, motivation.

Teacher of modular mathematics

The teacher of modular mathematics had similar attitudes to those of his students' by commenting that '*Modular courses are more suitable to the needs of our learners.*

Our students prefer the graduated approach to mathematics and enjoy the 4-5 months of learning followed by a formal examination. The fact that it is modular has meant we can track and tailor if necessary the course to the specific need of our students. The course strengthens the faculty's approach to AfL.'

Teachers of English

The Head of English reported benefits not only for his students, but for himself as a teacher as well. He reported being more motivated as a teacher and appreciated the clarity modules provide for the focus of teaching and that the fixed dates of examinations provide easier planning and a clear-cut end to assessment (unlike coursework, which is constantly reviewed). This teacher reported that modular assessment suits students who would otherwise fail to revise their work sufficiently prior to a linear assessment, and that this route relieves teachers of the stress of having to re-motivate and revisit previous topics:

Head of English: The benefits [are] the fixed dates of the exam, because you can timetable for working towards them, you can allocate the length of time for it and then on that day the assessment is done.
Researcher: Do you find that you are more motivated by having the exams in your teaching?
HE: Yes.
Researcher: Do you think [modular assessment] is something that makes you more focused in your teaching?
HE: Yes, it provides clarity, yes.

HE: We were talking earlier generally about children's perception of workload, and that's influenced by what level they are at. They're not necessarily going be doing the revision. Now, if you've got all the exams at one point in the course you have to rely on the fact that subjects that are taught earlier in the year are going to be revised by the pupils later on, otherwise the knowledge is just going to diminish further away from the teaching unit you get…So modularised exams, where there you are going to get an exam date and consequently a timetable, it would fit children who are less likely to spend the time later on independent learning and revision. That would reduce the stress for the teachers, in that you know that what you do in the classroom is going to have the effect of what comes out in the exam, rather than what you have to do again later in the year in terms of re-motivating and re-addressing a topic that was covered significantly earlier.

Another teacher of unitised English reported that modular assessment fails to give teachers and students much flexibility over when to sit examinations during the year:

English teacher: I don't think we give much flexibility to the students at all, not much room to manoeuvre. We tell them what to do and that is what's expected of them… There is a certain amount of flexibility I suppose in that we do. Look, if a student isn't clearly ready to sit the exam in January, then we will wait until June and then generally they sit the whole exam in one go, rather then taking separate modules.

Teacher of linear mathematics

The teacher of the linear mathematics course, however, did not feel revisiting topics and re-motivating students before the end-of-year examination to be daunting or de-motivating. On the contrary, she was concerned about modular students having to revisit material from long-forgotten modules before the final examination, and she felt that the linear route allows her to deliver the content more effectively and in a more enjoyable, mixed structure:

Linear mathematics teacher: I'm not completely determined as to what I am doing based on the exams. I am there to deliver the contents... The only thing that would

worry me with the modular system is … [students] don't look at it again and so I know a lot of students do that in December of Year 10. If they decide to go on to do A level and they haven't looked at material for a year and a half, I think that is a definite disadvantage. I know I like that I can consistently work through all the topics…. I honestly usually enjoy that time. I structure the lessons…I do a number of algebra lesson and shape lesson and then a data lesson and I kind of circulate through doing revision on all the different topics and it's ok. I don't mind doing that.

According to this teacher, the only disadvantage of the linear course was that too much depended on the performance on one particular day: '*It's all based on one day, so if the kid has a bad day, it's a lot of pressure on one exam to have their entire grade determined by that. But I don't feel that [having] more exams is the useful thing*'.

To summarise, students of modular subjects are motivated by frequent testing, and appreciate both the opportunity of re-sitting module exams, and the feedback they are receiving. Modular assessment was thought to provide a 'sense of readiness' for students. Some students of linear mathematics, being familiar with the modular curriculum in other subjects, expressed their wish to study mathematics in the modular route, as they felt it reduces exam stress and makes preparation for the assessment easier; however, students of lower mathematical abilities were concerned about the additional stress and workload levels involved in more frequent testing.

Overall, teachers generally prefer the system they are currently working in. Teachers in the modular assessment system appreciate the better planning opportunity around the exams, the clarity of the focus of their teaching requirements and that modular assessment contributes to their approach to Assessment for Learning. They also appreciate the reduced stress of teaching in terms of not having to re-motivate students at the end of the year. They feel modular assessment suits children who are not readily motivated otherwise to study and revise throughout the year. However, one teacher admitted having less flexibility than expected in timetabling modular exams throughout the year. The teacher in the linear route appreciated that she has more space and control to deliver the content effectively; furthermore, she did not find revisiting topics and re-motivating students before the end-of-year examination a burden.

Research question 1. Does ongoing feedback (both positive and negative) motivate students? Does negative feedback de-motivate students?

Overall, students in the modular routes of mathematics and English appreciated seeing the grade and receiving feedback after module exams; they felt that they received feedback soon enough after they had sat the exam. They found it useful and motivating to be informed about their recent performance and also about how much improvement they could expect in their terminal paper. Students of both subjects and across the ability range reported feeling motivated by negative feedback (which was worse than what they had been expecting), and all interviewed reported that the results prompted them to do better on the next module and on the terminal papers.

English

Independently of their ability (as measured by the lower or higher 'sets' students had been studying in), students of English found frequent feedback (both negative and positive) motivating:

Lower set students:

Researcher: Are you feeling more or less motivated, now you know the grades, to study?
Student 3: I feel more like, so I wanna get there. I just get what I need to get, I feel like I really wanna do it.
Student 4: I am feeling more [motivated] because I know I need to do more work. I know I didn't do enough last time, so I know I need to do more to get the grade I want.
Researcher: What can you say about your performance based on these grades?
Student 4: That I could do better. Because I want to do better. I feel that I could.
Student 5: It makes you want to work a bit harder because you think to yourself, that I have messed up a bit here and I need to 'pull my finger out' and get it up to where it should be.

Higher set students:

Researcher: Are you feeling more or less motivated, now you know the grades, to study?
Student 6: I'm kind of more motivated, because I obviously need to be, for the university I want to go to, so I'm gonna have to revise to get a B. Whereas before I didn't really bother.

Modular mathematics

Both students of modular mathematics mentioned that seeing the grade report motivated them to achieve a better grade in the final examinations, and admitted that the approaching final exam also spurred them into doing more revision and preparation. Additionally, their comment that modular assessment helps keep them on track with their studies resonates with the claim made by OCR:

Student 2: I felt that [the grade report] was beneficial to have because it does again motivate some people. So it is good to have it. …all the grades tell me …that what I got now is to the best of my ability so just keep push myself further and further… I think I could have done a lot better. … All the modules eventually keep helping you and pushing you saying how far your knowledge can go towards certain subjects, so having one like in separate months can tell you whether you did enough revision, enough preparation, whether you could have done a bit more or a bit less or taking stress off yourself…. Because if you're constantly having the modules but not having any results then you have to focus on the modules … all at once. …So you know that I'm competent in this one so I'll move on to the next one.

Student 1: … if I push myself a little bit more I can get that extra push and get a better grade…It tells me that I'm on track.

For modular mathematics students, the most important advantage of receiving a grade report was the feedback they received from their teachers, who discussed common mistakes with the whole class and made students reflect on their responses. This was expressed by students as learning about 'strengths and weaknesses' and then working on the weaker spots:

Student 2: If I didn't have a grade then obviously I wouldn't know what my strengths and weaknesses are so I couldn't tell if I'm good or I'm bad... So having a grade there helps you realise what mistakes you made and helps you focus more energy and time into the weaknesses so you get high grades.

The psychological benefits of feedback were present even when students received worse grades than what they had expected:

Student 2: After I had done the module and find out my full exam, like what I've probably got, then if I done bad then it motivates me to push my self further.
Researcher: Even if you get worse grades than what you expected?
Student 1: Yeah.
Student 2: Say you have done worse than you expect, for me, it motivates me to revise more, push myself further and ask for more help.
Student 1: Yea, locate your weak point and just [work on them] until they're strong.
Student 2: The only problem is that after you look at the exam, you find out that you did worse than expected; it kind of gives you a bit of a depression.
Researcher: How do you turn this into motivation?
Student 2: Well by knowing that after you go through the actually questions, to see how obvious the answers could be, it motivates you to push yourself and try harder next time. The pressure actually gives you the motivation to push yourself further.
Student 1: Yeah.
Student 2: For me, if I feel I didn't do too well on the exam, it kind of motivates me to push myself further and try and have another shot at it, so I could probably get the best possible marks to my ability.

Research question 2. Does ongoing feedback help students to identify learning needs?

Students were not only asked whether the feedback they received motivated or guided them in their learning, but also about what other sources of feedback they received (*e.g.* from teachers, parents, peers), and what feedback form or content they would find useful. As discussed earlier, receiving feedback (both positive and negative) was perceived to be very useful and motivating by all students, and even negative feedback had the power to motivate pupils to overcome challenges. However, the interviews revealed that students had difficulties interpreting their grades in terms of their learning needs.

Students expressed their wish to receive more detailed and personalised feedback, along with the grades. Although students do receive their marked papers, these arrive too late after the examination to be practical or useful; as one teacher of English put it:

> *I think having a detailed breakdown of marks on assessment objectives would be a useful tool for us to discuss with the students their strengths and weaknesses. I think it comes down to time as well, and the time they get it back we are going to be well into teaching the literature or revising.*

In this sense, giving feedback only in the form of grade reports falls short of fulfilling the role of informing students' learning needs and advising or shaping their learning strategies.

Students' comments suggest that it was easier for mathematics students to identify the strengths and weaknesses of their performance than it was for students of English; this is probably because mathematics modules are more distinct and concise than English units in terms of the contents covered and the skills needed. As a result, mathematics students were more satisfied with their grade reports and gained more information from them than students of English. The latter received feedback from their class teacher, who either read out the list of grades in class and went through some example mistakes, or talked to each student separately, discussing their grades and plans for re-sitting some of the units.

English

Receiving feedback was welcome by all interviewed, however, as in the questionnaire responses, all of them thought that had they received detailed and personalised suggestions in the grade reports, the feedback process would have been more valid and useful. In the interviews that took place shortly after the grade reports were issued, all students reported being satisfied with the amount of feedback they had received from their teacher. However, they reported missing the opportunity of going through their own marked papers or receiving suggestions about the areas they needed to improve on - some did not need prompts to mention that seeing their original, marked scripts was an established and appreciated practice in other subjects.

Researcher: Do you know your mistakes on the paper?
Student 6: Not really, it might be 'cause I didn't use enough quotations, or I went on too much about one point, instead of carrying on about different points.
Researcher: So you don't actually know what your mistakes were?
Student 6: No, not really.
Researcher: Do you think that it would be useful to know them?
Student 6: Yes, so then I could improve so I wouldn't make them again… it would help me to understand where I went wrong and what I could do to improve the grade.

Student 5: We often said to [the teacher] that I wanted [the script] back. It always does come back, because in other subjects they do. And then we normally get given them and we can go through them, but these ones ain't come back yet, so we are just waiting.
Researcher: Would you like to see it when it's back?
Student 5: Yea, 'cause then you could go through it and you could see where you've gone wrong. And you could see what you're good at and what you're not…if you had your papers back we could have gone through them and the marks and what we need to improve on, that's the only thing that would help us the most. …Just someone going through it with you, teaching you what you need to improve on, 'cause that's the main thing that will help you really.

Researcher: Do you know what your mistakes were and what your strengths are?
Student 3: No, we had the number of marks we got of 60 or whatever. In both papers I got similar, I think I got 50 in one or something like that, so it's quite close.
Researcher: Does it tell you what mistakes are made?
Student 3: No, it just says what marks you got.
Researcher: Do you think it would be useful to know what mistakes were made?
Student 3: Yea. So when you go to do the next exam, you know whether to do it or not.

Researcher: Do you think you are better equipped now to avoid the mistakes in your next test?
Student 4: Not at the moment, I haven't been through [my paper] so I don't know what I need to work on.
Researcher: Did you receive any other kind of feedback from your teacher?
Student 4: No.
Researcher: Would you like to?
Student 4: Not really.
Researcher: Is it enough for you?
Student 4: Yes.

As a result of the lack of detailed and specific feedback, it is not surprising that although students felt motivated by grade reports, they had vague or no plans for preparing for their end-of-year examination. When prompted, students could not give an account of the plans they would adopt to remedy their insufficient learning styles;

during the interviews it was quite difficult to tease out the details of a new study plan they would be following in order to achieve higher grades on the next examination. This was true for all four interviewed students of English, irrespective of their previous grades or which tier they were targeting in their final examinations. Only one student said he did not plan to do any work after school, and he trusted his work during school hours to yield enough preparation for him to improve on his grades; all other students were ready to invest more time and effort into preparation for their en-of-year examination. One student attributed her poor performance to nerves, and expressed her hope that she would be more confident during her next examination; this might also explain why she did not feel it necessary to change her learning strategies.

Researcher: Do you have an action plan of what you need to concentrate on, what your strengths or weaknesses are?
Student 6: Not at the moment, but I'm gonna ask if I could [do] that with my teacher and [whether] he can help me.

Researcher: Do you have a specific plan on what to do when you go home or are sitting in class?
Student 5: No, just improve on it in class …I just think in school time, that after the bell's gone, then it's personal time to do what you want to do at home. I know that they offer [booster classes] to help you and if you needed the help, then I suppose it's a good thing to come back but I don't think that I need that help much really, so I haven't got much to improve on, it's just a few little bits on one of the papers really.

Researcher: Did receiving the grades prompt you to think about what to do next until your June examinations?
Student 3: Yeah it made me think, I only need a couple of marks, maybe try and do something a bit more, like revise a bit more at home or something like that.
Researcher: Have you got any other plans, plan of study, change of strategy on how you learn or how much you learn?
Student 3: No, not really, I think I'm doing a lot as it is, a lot in and out of class.

Researcher: Have you thought about what the reason is behind this performance?
Student 4: I was nervous.
Researcher: During the exam?
Student 4: Yes.
Researcher: Do you think you'll be less nervous in June?
Student 4: In a way, I think I won't because I will have learnt more by then. Will have more confidence.
Researcher: Did receiving the grades prompt you to think about what to do until your final exam?
Student 4: Revise a lot and work on the bad parts.
Researcher: How do you know which the bad parts were?
Student 4: I don't yet. Not yet.
Researcher: Did actually seeing the grades help you in planning at all?
Student 4: Yes I think I know I'm gonna work and revise a lot.
Researcher: You don't have a specific topic to think about or a specific problem to work on?
Student 4: No. just…carry on revising.
Researcher: Have you got any other plans?
Student 4: No.
Researcher: Any other changes in how you're going to do the revising?
Student 4: No. just…go over it more.
Researcher: So your learning strategy hasn't changed because of the grades?
Student 4: No.

Modular mathematics

Modular mathematics students did not agree on whether receiving modular feedback prompted them to change their learning and revision plans until their final papers; they concluded that the existing feedback was useful, and doing more revision (or any) will improve their marks on the final examination:

Student 1: It prompts me to think, revise. If I can get a high C when I don't revise I can just imagine what I can get if I do revise.

Suggestions from students on improving feedback

English

Although they value the information they gain from grade reports and from their teachers, students of English would generally find it useful to receive detailed and personal suggestions on what their weaknesses and strengths were on the previous examination papers. This would equip them with more information on how to change their focus of learning and strategies of exam preparation.

Researcher: If you could have decided what kind of feedback you would receive on the January exams, what would be more useful for you?
Student 6: Probably why I didn't get the marks and not like get a list of marks, saying that you got this many marks but you could have got that and then explaining what I did wrong.
Researcher: What kind of form would it take, would it be like a comments page or sitting down with someone going through your paper?
Student 6: A comments page, if you don't understand it you could go through it with someone and ask.

Researcher: Do you think that this grade report you got is a useful tool for planning your future steps?
Student 4: I think it was useful.
Researcher: Could it be made more useful somehow?
Student 4: There could be more suggestions in them.
Researcher: Suggestions on what?
Student 4: On work. What I need to work more on.

Researcher: Do you think that this grade report is a useful tool for you in planning your future plans until the June examination? Is it informative enough?
Student 3: No, they could give you like a few suggestions, on where you went wrong and what not to do.
Researcher: Would a different form of feedback be more useful for you?
Student 3: Not really, 'cause [the teacher] went all the way through it, maybe if we got some suggestions back, maybe, which would be the only way.

To summarise, students of unitised English, independently of their abilities, reported that although receiving feedback on modular exams is very useful and even negative feedback can motivate students, they were not receiving sufficient details about their performance and not being offered alternative ways of preparing for the next exams. Their learning needs were not identified or addressed, and this hindered them in changing their apparently insufficient learning styles (shown to be lacking by the poor grades they received) or adopting exam preparation strategies which could help them improve their grades on their next examination.

Mathematics

Although modular mathematics students praised the frequent feedback they received in the modular structure in general, they would also have preferred to receive more personalised and detailed feedback on which areas they needed to improve on:

Student 1: I think [the grade report] was useful but I would have thought it was more useful if the teacher went like individually, because some of people's weaknesses weren't actually shown…'cause like most people might have got that question right, whereas other persons might have got that wrong but the teacher hasn't really gone over it that well.

Student 2: [An ideal grade report would be] telling you what you need to focus on, what you don't need to focus on if you're already well at it. And tells you what you need to put more energy and time in so you are better prepared for the final exam.

Research question 3. Does modular assessment remove the pressure of an all-or-nothing exam?

Students' workload levels were mapped using self-report workload charts and in-depth interview questions during the academic year. For students of modularised mathematics and English, the period mapped by their first workload measurements include their modular examinations, which took place in January for English and in March for mathematics.

Mapping the workloads of students in the different assessment systems allows a comparison of the nature and the extent of the demands placed on students in each assessment route. Figure QW1 illustrates very clearly that students of Year 11 in the linear mathematics route, with no external examinations between September 2008 and March 2009, reported a slowly rising pattern of workload from 'low' to 'medium' levels. The curve is strictly monotonic: there are no sharp drops or sudden peaks; according to this, the workload in the linear assessment system in mathematics shows a steady rise, but stays well within the easily manageable regions. The workload profile of students in the modular route, however, shows a different picture: the range stretches from 'low' workload in early September into the 'very high' regions in January (which is unexpected and unexplained), showing a second peak in the 'high workload' zone around early March, at the time of the first modular examination. This means that for five months out of seven, modular mathematics students on average experienced higher workloads than linear mathematics students did; also their workload was not evenly distributed, nor was it rising steadily, resulting in a more stressful experience than that of students in the linear route.

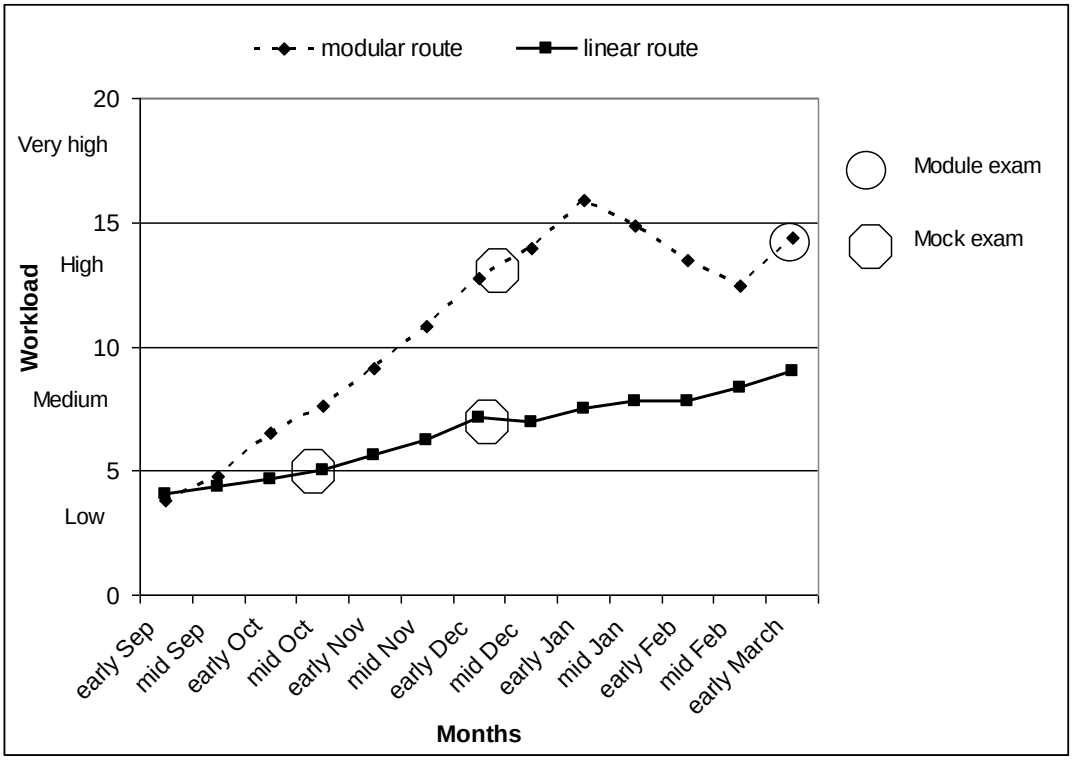


Figure QW1: Mean workload for students of linear and modular mathematics

Statistical analyses have identified significant differences between the two routes in terms of workload for most of the time period between September and March; in all cases of a significant difference in means, modular students reported much higher workload levels than linear students did (Table QW1).

These findings were also underlined by the interviews of students of mathematics in the linear and modular routes; these also revealed the finer shades of their workload levels during this period. Students were asked about the amount and the nature of the stress they experienced before and during the examinations, in order to gain an in-depth understanding of the characteristics of their exam pressure, in addition to their workload profiles mapped by the self-report charts.

Table QW1: Mean workload levels for linear and modular students of mathematics between September and March

Month	Route	N	Mean (SD)	t (d.f.)	p
Early September	Linear	39	4.05 (2.78)	0.42(58.96)	0.68
	Modular	22	3.82 (1.59)		
Mid-September	Linear	39	4.35 (2.78)	-0.75(58.60)	0.46
	Modular	22	4.77 (1.69)		
Early October	Linear	39	4.67 (2.92)	-2.63(59.00)	0.01
	Modular	22	6.50 (1.95)		
Mid-October	Linear	39	5.00 (2.95)	-3.62(59.00)	0.00
	Modular	22	7.64 (2.24)		
Early November	Linear	39	5.60 (3.28)	-4.43(59.00)	0.00
	Modular	22	9.14 (2.38)		
Mid-November	Linear	39	6.23 (3.61)	-6.24(58.83)	0.00
	Modular	22	10.82 (2.13)		
Early December	Linear	39	7.15 (4.15)	-6.46(58.31)	0.00
	Modular	22	12.73 (2.59)		
Mid-December	Linear	39	6.97 (4.47)	-7.62(58.71)	0.00
	Modular	22	13.95 (2.68)		
Early January	Linear	39	7.51 (4.51)	-7.38(59.00)	0.00
	Modular	22	15.86 (3.72)		
Mid-January	Linear	39	7.81 (4.60)	-6.22(59.00)	0.00
	Modular	22	14.86 (3.54)		
Early February	Linear	39	7.77 (4.63)	-5.98(58.68)	0.00
	Modular	22	13.45 (2.79)		
Mid-February	Linear	39	8.33 (4.75)	-4.35(59.00)	0.00
	Modular	22	12.45 (2.65)		
Early March	Linear	39	8.97 (5.34)	-6.15(56.35)	0.00
	Modular	22	15.09 (2.34)		

Modular mathematics

In agreement with the general findings of the workload charts, the two students of modular mathematics reported that their levels of stress tended to build up before the exams; they also added that their end-of-year exams were quite stressful even in the modular route:

Student 2: When we start the revision, then it seems very simple but as the exam gets closer, it just tends to build up more stress.
Student 1: Especially when you get to the end of the year and then you got like mathematics revision, English revision, science, everything, then it all builds up and it's just too much…it's just too hard.

This mounting pressure was also reported by modular students' workload charts (see Figure QW1), showing that their workload peaked around the time of their modular exams in March; however, the amount of pressure varied depending on their study habits and personalities:

Student 1: As it gets to like, mid year, trying to do the workload, as we get to the tests and stuff, it goes up really high, revising. As it gets to the end of the year, like to December and we are looking forward to Christmas, its starts going downhill and as the tests come back, our learning goes back up. I get very lazy, I got to revise really, really hard when it comes to a test, so my highest point is 15/16 [out of 20 - very high workload].

Student 2: When it starts off in the year, it slowly starts to build its way up, so you may say it starts off with a 4 [low workload]*, it slowly starts to ease its way up, lets us get used to workload, and again when it comes to around about December we do tend to sit back, relax a bit more so it starts to go down. After December we start preparing for the exams that we have, so it starts to go a lot higher. Say the highest point is probably an 11 or a 12* [out of 20 - high workload]*.*

Having done a significant amount of revision before the examination gave modular mathematics students confidence, however, they still tended to panic during the examination. The source of this pressure is partly of a social nature, placed on students by teachers and parents who emphasise the importance of GCSE results:

Student 2: You feel confident actually: 'yeah, I've definitely revised for this…'.
Student 1: Yeah, but when you open up the test and nothing's on there what you revised…
Student 2: Like nothing you really expect, everything you expect to be on there, mostly isn't…Yeah, it's surprising what is going to be on there…you just tend to panic.
Student 1: Yeah, you tend to panic and then you get a mental block and then you start thinking about all the mocks and stuff.
Student 2: Everything you revised, you just tend to forget for a brief time. It's all pressure, that's being put on you, like how important the exam is, how much people say you need to know this.

Although sitting a modular exam has not been found to alleviate any of the workload experienced during the modular or the final examination, students did mention that the possibility to re-sit a module exam does relieve some of the stress of the modular exams:

Student 1: If I couldn't re-sit them, I would most probably work myself silly, trying to get as good as I can get.
Researcher: Would you work a lot harder?
Student 1: Yeah, a lot harder… I kind of panic, feeling like if you can't get this one right, you've no way of getting your marks back up.
Student 2: If I knew that I couldn't re-sit them, I [would] probably push myself straight to the limits and I don't think that would be really good, 'cause you're kind of overloading yourself, it's too much. It's all about stress and panic.

Linear mathematics

Linear mathematics students, who did not sit an exam during the academic year, were also interviewed in March. This allowed the comparison of workload in the different routes. Higher ability students of the linear mathematics course reported experiencing much less stress and workload in March than students in the modular course. These students were already familiar with modular assessment in other subjects; when prompted, they reported they would favour having modular exams in mathematics as well, because they could spread the workload more evenly and it would alleviate the exam stress. This is contrary to what was reported by students already involved in the modular assessment of mathematics and also by the statistical analysis of workload in the two modes; however, it reflects that students in the linear assessment system share the positive expectations of OCR regarding the benefits of modular assessment on students' workloads:

Student 7: [My workload] was very even, because we have been getting the same sort of amount of homework, like the coursework, it's pretty even - medium.
Student 8: Mine peaked a little bit more because I thought we were getting a little bit more homework now and we haven't been doing any exams or tests as we are just learning it. We started to do practice tests; it's just peaked a bit.

Researcher: How do you feel about an exam looming in the future - are you motivated or de-motivated? Are you stressed?
Student 7: A bit stressed, but it kind of motivates me to do it, to do more revision, obviously to get an A grade.
Student 8: I get more stressed, I think the more stressed I get, the more motivated I get because if I got stress on my mind I do more … I get quite laid back some times and I don't do anything. But then, when I get then stress kicking in, then I become motivated to do the work.
Researcher: Has the stress kicked in now?
Student 8: It's started to
Student 7: Kind of, I don't really get stressed about exams as long as I know I do the revision. That's why I make sure I do it, because then I'm not stressing for it.
Researcher: Do you think there is going to be a lot of stress in the future months?
Student 7: I reckon it could be, but it depends on how you handle it, If you do the revision and stuff you will be alright. But it's pretty stressful getting it all done.

Researcher: Would you like having more exams during the year as well as the end-of-year exam?
Student 7: Yea that's better.
Student 8: Like a modular one.
Researcher: Yes.
Student 7: Yes that'd be better…takes pressure off your mind.
Student 8: That's what we've got in science. It works better for me because it's all fresh there and you can just prepare and revise for certain topics and then I know I've perfected for one exam.
Researcher: Doesn't it make you more stressful though, having exams coming up all the time?
Student 7: No I think it's alright, because you know what a certain topic is to revise for, so you're not cramming as much in.

Students in the lower ability group of the linear mathematics system reported being already motivated by the upcoming end-of-year examination. Interestingly, contrary to their peers in the higher ability group, lower ability students would not prefer modular assessment over their current linear system, as they find modular exams in other subjects too stressful and demanding in terms of revision requirements; this is in line with the general findings on workload.

Researcher: Are you motivated to study, knowing that there is an exam coming up?
Both: Yeah.
Researcher: How stressed are you now about your exams?
Student 10: I'm pretty stressed lately. A couple of weeks ago, I started to realise that I haven't got much time left.
Student 9: It's hard because you have all the other classes as well, that you have to revise for so it's really hard.

Researcher: In science you have modular exams, while in mathematics you just have one exam at the end of the course. Which one is more stressful or more helpful for your learning?
Student 10: I think the mathematics one is easier as you just have the one instead of having loads to revise for.
Student 9: I think it is stressful or sometimes it is helpful. It's stressful because you want to get the best grades you can, so you feel like you have to revise and you have other exams, so you have to revise like loads.

Researcher: If there was a poll in the school and you could vote either having the modular exam in January and March and then June or keeping this [linear] system, which one would you go for?

Both: I would keep it.

However, students did appreciate ongoing feedback provided by internal assessment (*e.g.* mock exams) and prefer keeping the current system as mocks do not count towards their grades, and fulfil a formative, rather than summative role in their learning; therefore, these do not place extra pressure on them:

Researcher: Do you sit mock exams?
Student 10: Yeah, we do quite a few.
Student 9: Yeah, we have done quite a few in every subject.
Researcher: Is it useful to have a mock exam?
Student 10: Yeah, it shows you what the real exam will be like so it's easier when you know what its gonna be like.
Student 9: They treat mock exams like a real exam, you're taught like [it's] a real exam.
Researcher: I am a bit confused because you are saying that you don't want to have modular exams, like you have in science, but you are also saying that having mock exams is very useful.
Student 10: Yeah.
Researcher: What is the difference between a modular exam and a mock exam that makes a mock exam more helpful?
Student 10: Mock exams prepare you for your real exam as well, shows you what its gonna be like…[mocks are] not as stressful.
Student 9: They were a bit, but not as stressful as the real exams would have been. 'Cause the mock is not like a real exam, it is a real exam, but not like a proper exam that basically decides your life. Mock exams don't.
Student 10: I think the same really, the real exam's like your whole life, the mock exams are not really; it does count, it helps you with exams. But it doesn't really matter as much or is as stressful.

English

The workload levels of students of unitised English taking the linear or modular routes are summarised in Figure QW2 for the period between September and January of Year 11, when students sat one or more English GCSE unit examinations. The workload patterns for the two routes do not differ significantly; t-tests have not indicated any statistically significant differences in the routes' workload at any time between September and January. This suggests that the workload of studying for GCSE English does not change significantly with modularisation.

It is apparent that generally, students' workload varied considerably during the course of the year, ranging from 'low workload' at the beginning of the academic year to 'very high workload' in January, when students sat their GCSE unit examinations.

The interviews revealed that the amount of exam stress experienced by students of unitised English varied with the individual student:

Student 6: I was quite confident about [the unit exam] because I had been given a predictive grade about my coursework and [the teacher] spoke to me about the predictive grade I'd get in the exams, so I was quite confident about that
Student 5: I wasn't stressed at all really. I just thought you go in there and do your best, what you get is what you get you can always got time to work harder on it and improve on it later on.

Some students of English found the January unit exams more stressful; however, this was due mainly because it coincided with other examinations and their coursework assignments, which also added to their overall workload:

Student 3: I think it was quite a lot of stress. 'Cause like some teachers would be like 'oh, could you stay behind for this lesson?' You gotta have coursework in for every subject as well, it's quite hard to keep up with it all, especially preparing for exams and stuff as well.

Student 4: There's too much to do at the same time because you got all loads of different coursework and exams to think about, I think they should be done at separate times. I'd rather have them all apart.

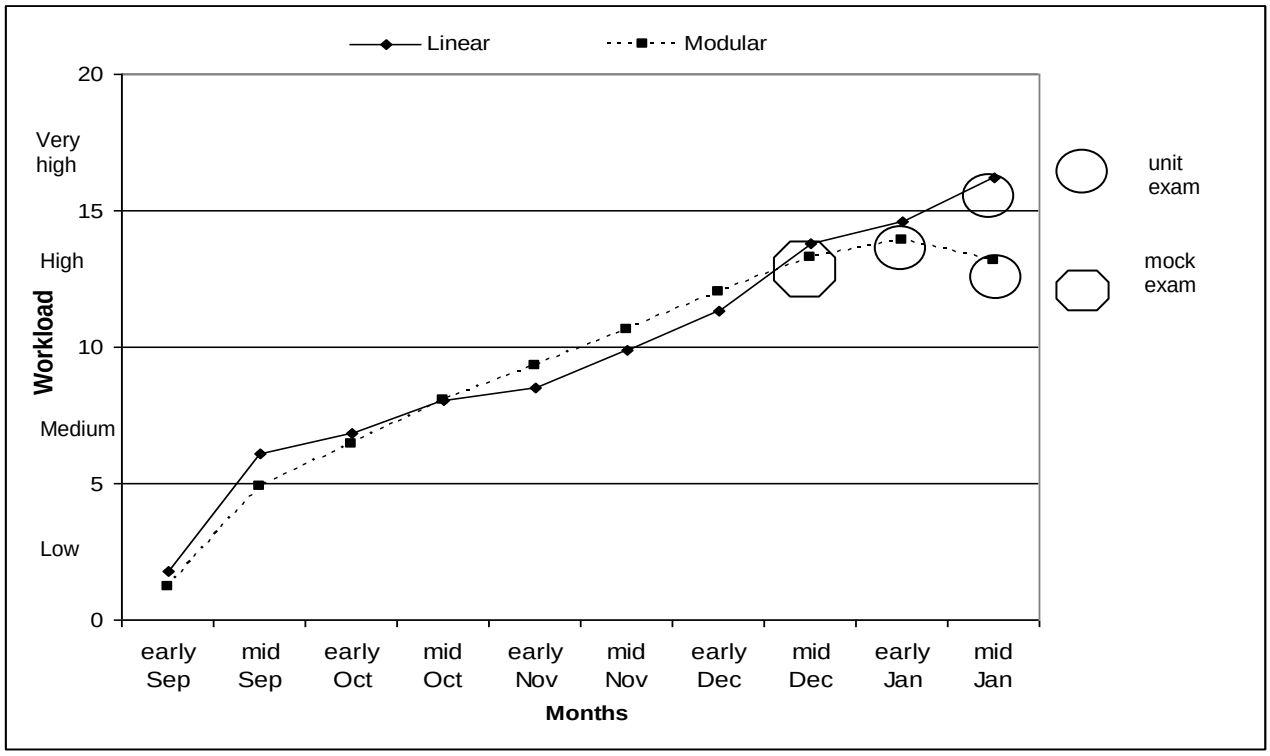


Figure QW2: Mean workload charts between September 2008 and January 2009 for linear and modular students of English

Similarly to mathematics students, students in the unitised English assessment system also appreciated the opportunity to re-sit units, as it takes away some of the pressure. Interestingly, had there been no opportunity to re-take the exam, only the higher set student would have kept her preparation routine unchanged. Lower set students agreed that re-sit opportunities relieve some of the exam pressure, and admit that they would have worked more had there been only one chance for them to pass their examinations:

Researcher: Do you think that the option to re-sit this exam influenced your attitude toward the exam?
Student 5: Yeah, it don't worry you as much, if you think you're going to do badly, you know you've got time to improve on it, if it is going to come back as bad as you think. So you haven't really gotta worry…'cause if you only have one chance of it, you would be really, really worried.
Student 6: It takes the pressure away a bit, 'cause you know if you don't do well in that one you have got a chance to improve and do it again.
Student 3: Yeah it sort of took a bit of pressure off because you know if you don't pass it you've always got another attempt.
Student 4: And you've got a little bit longer time to practice again, so you got more time to think it through and remember.

Researcher: Would you have done anything differently if there wasn't a re-sit opportunity?
Student 5: Yeah, worked a bit harder…
Student 4: I think people would have stayed more after school and breaks and lunches because they would be more worried…like, 'I definitely got to pass this is my only chance'
Student 3: Yes there would be more wanting to get it done.
Student 6: I don't think I'd have done anything different.
Researcher: You think you did everything that you could?
Student 6: Yes.

To summarise, data from the surveys and from the interviews with students of mathematics reveals that the amount of students' work in the two assessment routes are quite different for most of the academic year: students in the modular route experience long periods of statistically significantly higher workload than linear students. Also, the pattern of workload in the modular route is uneven, with peaks around mock exams and modular exams; this suggests that sitting modular mathematics exams does not in itself alleviate the workload of either modular or the end-of-year examinations. However, the possibility to re-sit modular examinations, has been mentioned as helpful in alleviating some of the examination stress experienced during modular exams, as it gives some students confidence about what to expect on their next exams. Furthermore, students in the modular route reported that the social pressure to achieve a good grade places significant stress on them during both the modular and the end-of-year examinations. Linear mathematics students gave different opinions about modular assessment, mostly based on their ability – more able students would welcome more external assessments during the school year, while lower ability students are wary of the consequences in terms of exam stress and additional workload involved in modular exams, and they expressed their preference towards internal examinations.

Students following the linear or modular routes in GCSE English showed very similar patterns of workload throughout the academic year. The amount of examination stress varied with each interviewed individual student. Similarly to students of modular mathematics, students of modular English also appreciated the re-sit opportunities for alleviating some of the stress.

Gender and perceived workload

Data was also analysed in order to investigate the effect of students' gender on perceived workload.

English

When the two routes were analysed separately for effects of gender, no significant gender differences were found in either of the two routes in terms of students' workloads. When all students' workloads were analysed independently of the route, it was found that for students of English, boys experienced slightly but statistically significantly higher average overall workload than girls ($U = 332$, $p = 0.04$) (see Table QW2 and Figure QW3 for descriptive statistics).

Table QW2: Average overall workload experienced by boys and girls of English between September 2008 and January 2009

Gender	N	Minimum	Maximum	Mean	S.D.
Boys	31	0.00	15.32	9.4	2.97
Girls	31	0.00	14.45	8.43	3.06

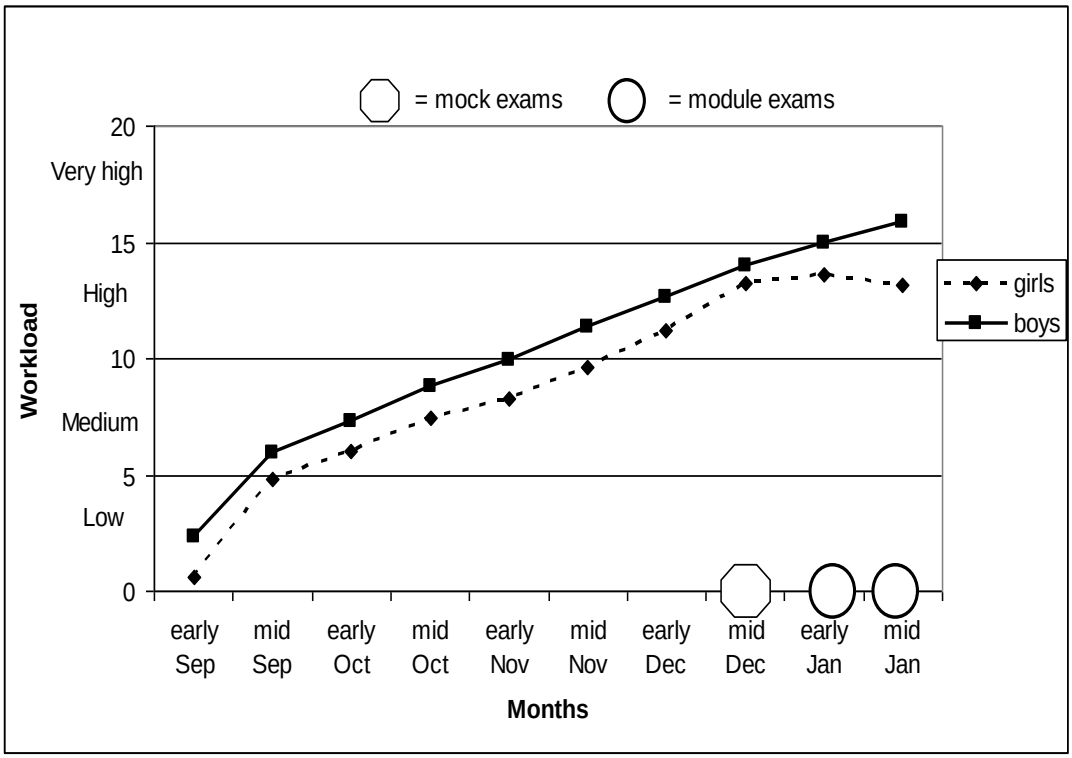


Figure QW3: Mean perceived workload of girls and boys studying English between September 2008 and January 2009

Linear mathematics

In the case of students studying mathematics in the linear route, contrary to the observed pattern in English, the average overall workload did not differ significantly for the two genders ($t(37) = -0.14$, $p = 0.89$) (see Table QW3 and Figure QW4).

Table QW3. Average workload experienced by girls and boys studying linear mathematics between September 2008 and March 2009

Gender	N	Minimum	Maximum	Mean	S.D.
Boys	17	0.00	10.15	6.40	3.40
Girls	22	0.00	12.15	6.57	3.71

Modular mathematics

For mathematics students of the modularised route, however, a slight but significant difference can be found between the two genders (see Figure QW5). Boys and girls showed similar workload patterns until January ($t(20) = 1.10$, $p = 0.28$); at that point, however, girls showed a slight but significant rise in workload compared to boys ($t(18.49)=-2.31$, $p = 0.03$). Descriptive statistics are shown in Table QW4.

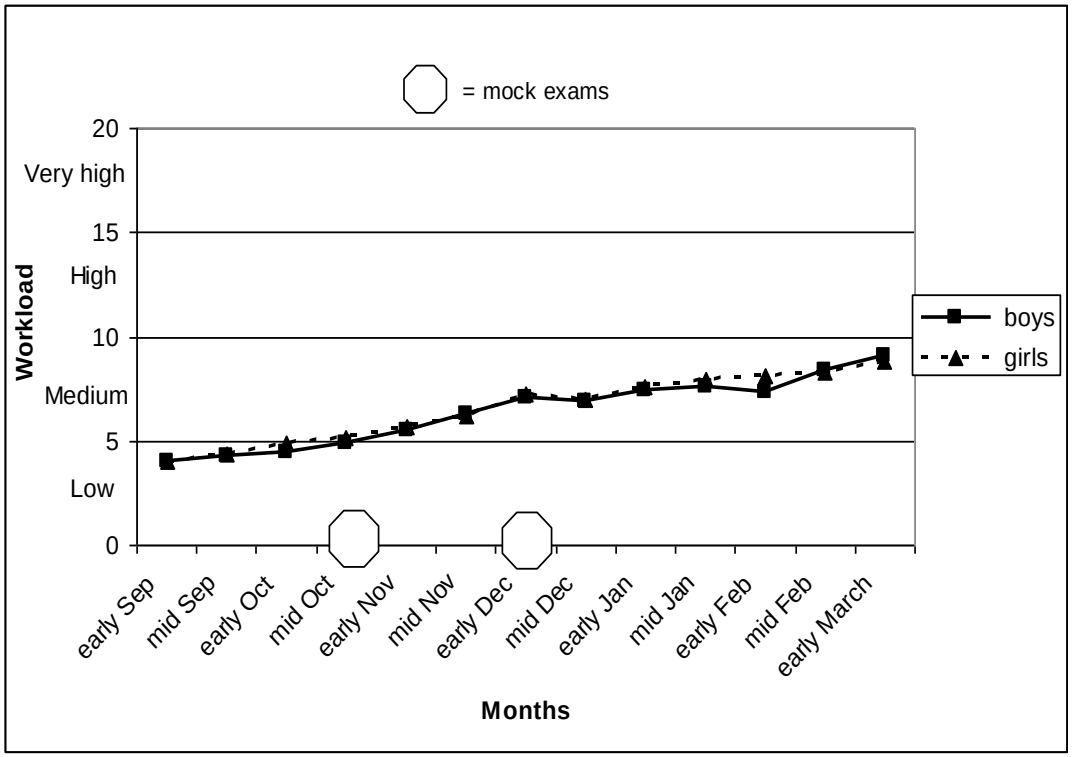


Figure QW4: Workload experienced by girls and boys studying linear mathematics between September 2008 and March 2009

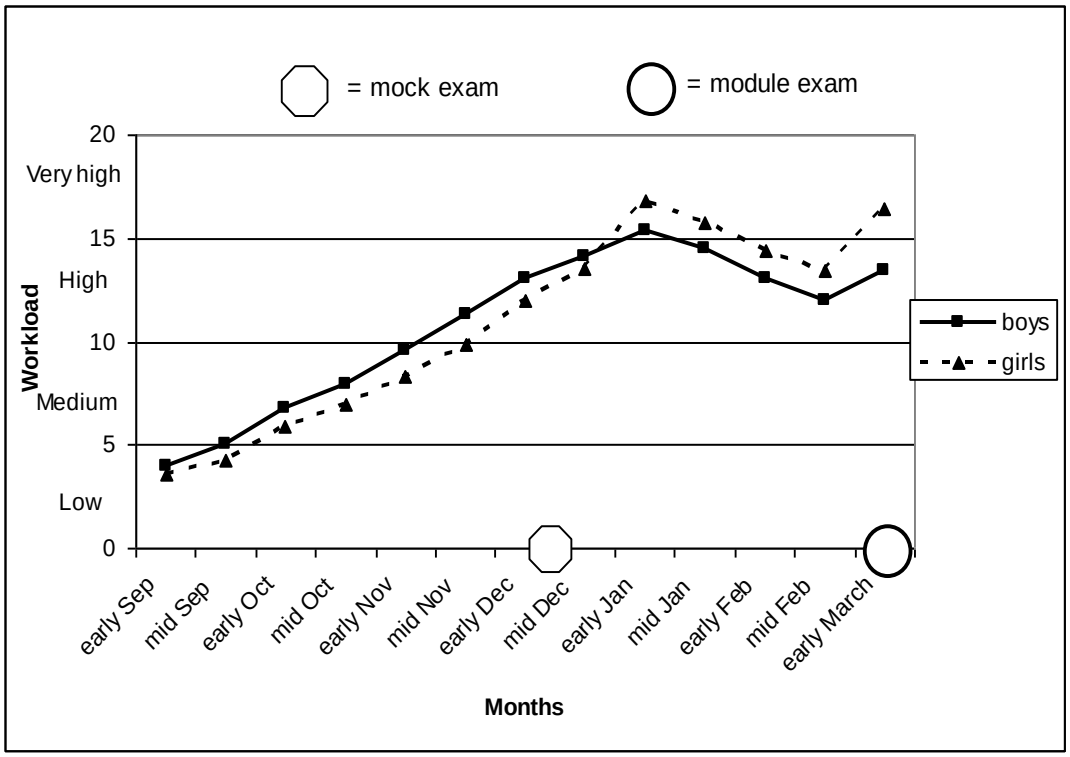


Figure QW5: Mean perceived workload experienced by girls and boys studying modular mathematics between September 2008 and March 2009

Table QW4. Average workload between experienced by girls and boys studying modular mathematics between September 2008 and March 2009

Gender	N	Minimum	Maximum	Mean	S.D.
Boys	15	7.80	18.00	13.67	2.61
Girls	7	14.40	17.00	15.37	0.80

To summarise, our data shows that gender may also be a factor related to students' workload, but this relationship varies with the subject and with the type of assessment. For students of English, boys experienced slightly but statistically significantly higher average overall workload than girls. In the case of students studying linear mathematics, the average overall workload did not differ significantly for the two genders. For students of modularised mathematics, however, a slight but significant difference was found between the two genders between January and March, when girls showed a slight but significant rise in workload compared to boys.

Research question 4: What are the characteristics of modular students' test-taking motivation?

Unfortunately, due to the very low rate of responses after the June examinations, no comparisons could to be drawn between linear and modular mathematics students regarding their final examinations. In the case of students of English, as some students certificated in January while others merely sat a modular examination, a comparison of their motivation levels would lead to misleading conclusions or artefacts. Therefore, only analyses on the motivation of students of modular mathematics and all students of English were carried out.

Modular mathematics

Table QM1 and Figure QM1 summarise the data on the characteristics of motivation of students sitting their modular mathematics examination in March.

Table QM1: Students motivation scores on the Intrinsic Motivation Inventory (IMI) survey after their module exam in mathematics

IMI scale	N	Mean	Minimum	Maximum	S.D.
Value/usefulness	21	5.46	2.86	7.00	1.30
Effort	21	5.09	4.00	6.80	0.83
Pressure	21	5.05	1.80	6.80	1.15
Competence	21	3.60	2.33	5.17	0.74
Choice	21	3.24	1.00	5.14	1.31
Enjoyment	21	2.48	1.43	4.43	0.80

The *value/usefulness* scale was designed to measure how much students internalise and self-regulate their activities regarding the examination in question. Students' high scores indicate that they perceived their modular exam to be quite valuable, and they internalise its aims and objectives. On average, students gave the highest scores on this scale of the motivation survey.

The next most highly rated scale on average was *pressure*; this indicates that students felt a considerable amount of stress and pressure to be placed on them while sitting the module exam in mathematics. This finding is in line with interviews: experiencing high pressure from parents was mentioned by students, as discussed before.

In line with the findings on *value/usefulness* and *pressure*, *perceived effort* is the scale with the third highest average ratings. Students felt they exerted quite a lot of effort during sitting the examination, and this might be due to their heightened perception of value and usefulness of the examination, and suggests that the high levels of pressure did result in high levels of effort on their part. The *effort* scale is a negative predictor for intrinsic motivation; a high rating is therefore a strong indicator of motivation with a more extrinsic nature, rather than intrinsic.

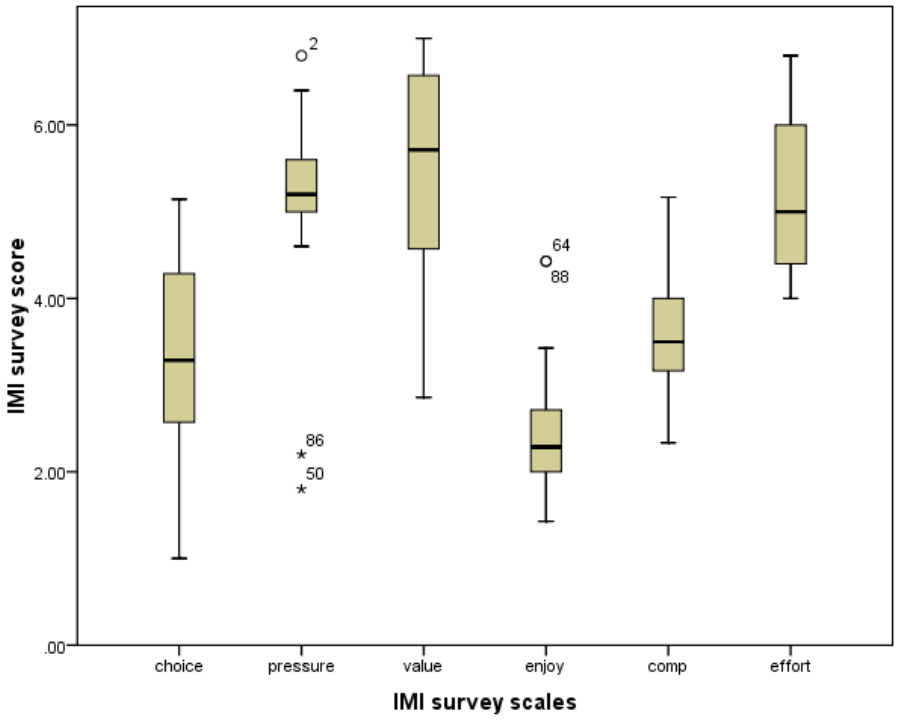


Figure QM1: Students' motivation scores on the IMI survey after their module exam in mathematics[36]

Competence, choice and enjoyment

Apart from the *value/usefulness* factor, all of the 'positive' characteristics of exam motivation were rated lower than *pressure* and *effort*; this signals that students experienced extrinsic, rather than intrinsic motivation to sit the examination. Students reported very little perceived competence; they did not feel they had a choice in sitting the exam, and they gave the lowest ratings to the enjoyment scale. These all indicate that students do not really 'own' the examination, and that instead of being internally motivated, they perceive it as an externally imposed, compulsory task.

Gender differences in motivation for modular mathematics students

No statistically significant gender differences were found on any of the motivation scales (see Table QM2 and Figure QM2). However, a tendency was found on the *competence* scale which showed that girls reported slightly lower sense of competence regarding their modular mathematics examination. As the scale of *competence* is regarded as a factor contributing to students' intrinsic motivation, it seems that girls were slightly less motivated intrinsically than boys; however, this needs to be interpreted within the context of the finding that all students reported quite low scores on scales measuring intrinsic motivation, as discussed above.

[36] Separate data points represent outliers.

Table QM2: Group differences between boys and girls on their IMI survey scales after the modular mathematics examination

Motivation scale	Boys			Girls			t-test statistics		
	N	Mean	S.D.	N	Mean	S.D.	t-value	df	p
Competence	15	3.80	0.74	6	3.11	0.52	2.07	19	**0.05**
Choice	15	3.25	1.36	6	3.24	1.28	0.01	19	0.99
Effort	15	5.00	0.87	6	5.30	0.77	-0.74	19	0.47
Enjoyment	15	2.63	0.89	6	2.12	0.38	1.34	19	0.20
Pressure	15	4.89	1.31	6	5.43	0.53	-0.97	19	0.35
Value/usefulness	15	5.38	1.37	6	5.64	1.19	-0.41	19	0.69

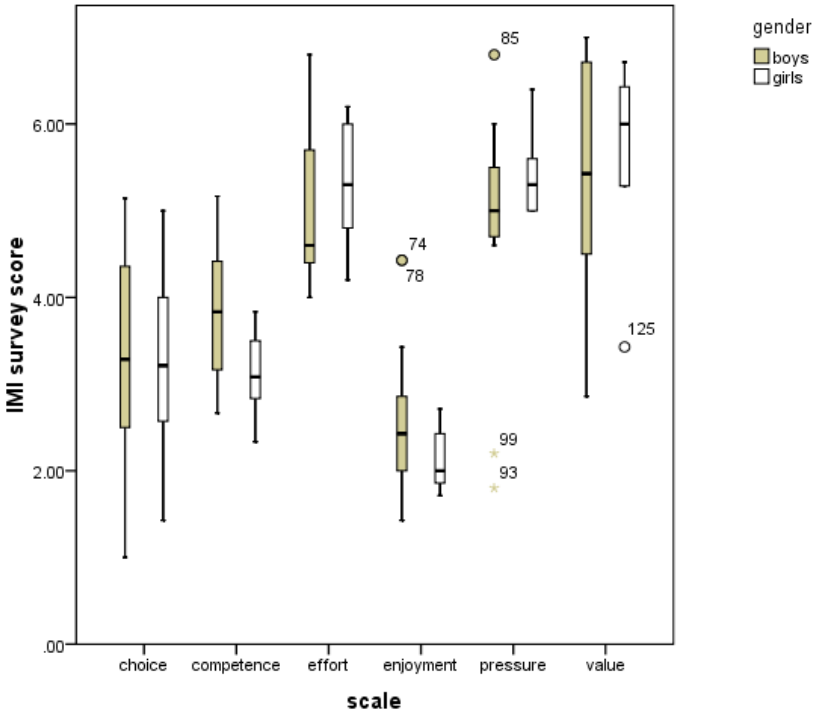


Figure QM2: Girls' and boys' motivation scores on the IMI survey scales in the modular mathematics route[37]

English

Students of English sat two unit examinations in January: unit 2431 on '*Non-fiction, Media and Information*', and unit 2432 on '*Cultures, Analysis and Argument'* (see the Methodology section). Students gave high scores for both units on effort and value, which implies that students appreciate the usefulness of the examination and make appropriate effort to do well on them. The amount of pressure was not as high as it was observed for mathematics students; however, the positive factors indicating intrinsic motivation (enjoyment, competence and choice) were rated similarly lowly by students of English for both units (see Figures QM3 and QM4).

[37] Separate data points represent outliers.

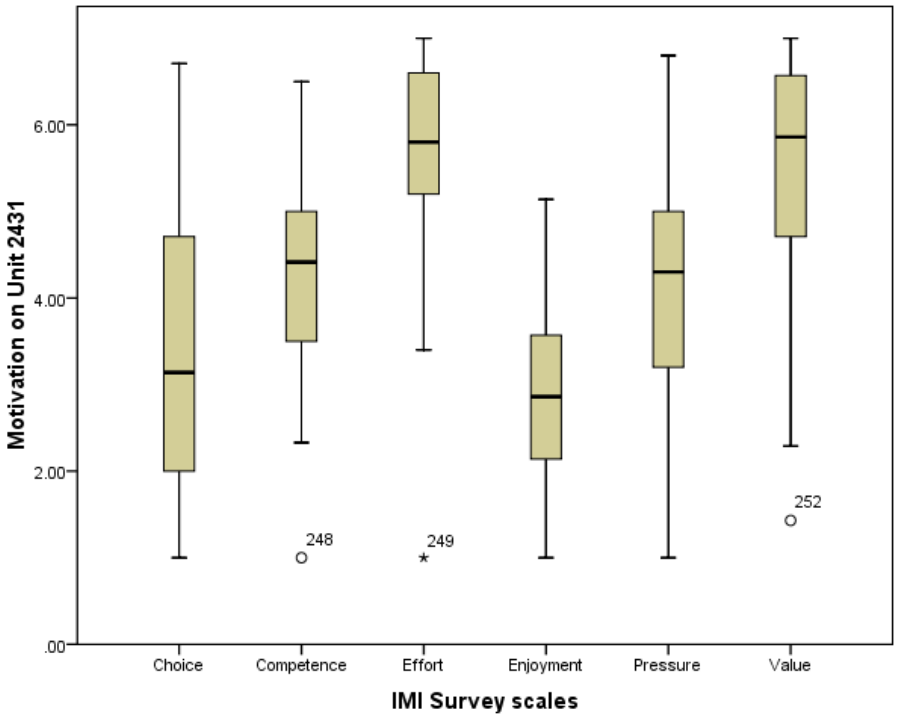


Figure QM3: English students' motivation scores on the IMI survey scales for unit 2431[38]

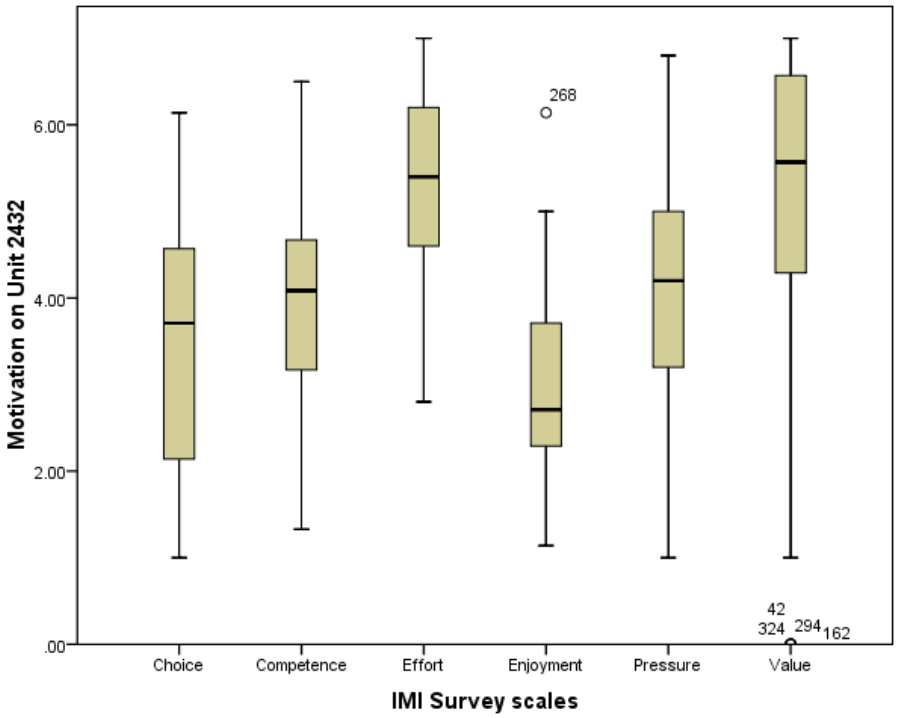


Figure QM4: English students' motivation scores on the IMI motivation scales for unit 2432[38]

[38] Separate data points represent outliers.

Gender differences in motivation for English students

No gender differences were found for students' motivation for unit 2431 on any of the scales; however, girls showed a small but statistically significant rise in pressure on unit 2432 (Table QM3).

Table QM3: English students' motivation on the two units by gender

	Motivation	Mean Boys	Mean Girls	N Boys	N Girls	S.D. Boys	S.D. Girls	t-value	df	p
Unit 2431	Choice	3.36	3.33	31	31	1.38	1.64	0.07	60	0.94
	Competence	4.26	4.36	31	31	1.19	1.07	-0.36	60	0.72
	Effort	5.54	5.99	31	31	1.11	1.07	-1.63	60	0.11
	Enjoyment	2.99	2.87	31	31	1.01	0.95	0.51	60	0.61
	Pressure	3.90	4.35	31	31	1.24	1.39	-1.35	60	0.18
	Value	5.36	5.78	31	31	1.29	1.22	-1.30	60	0.20
Unit 2432	Choice	3.57	3.33	31	31	1.53	1.41	0.64	60	0.52
	Competence	3.92	4.07	31	31	1.37	1.06	-0.47	60	0.64
	Effort	5.19	5.46	31	31	1.15	1.13	-0.94	60	0.35
	Enjoyment	2.95	2.88	31	31	1.21	0.95	0.25	60	0.80
	Pressure	3.83	4.43	31	31	1.33	1.32	-1.80	60	0.08
	Value	4.94	5.28	31	31	2.08	1.70	-0.70	60	0.49

When the two units were compared in terms of the motivation for all students, statistically significantly higher scores were found for unit 2431 on *perceived competence*, *value/usefulness* and *perceived effort* motivation subscales (see Table QM4). This means that students generally experienced more intrinsic motivation regarding unit 2431 examination, and that they attributed higher value to this exam, as well as exerted more effort to accomplish their goals than they did regarding their unit 2432 examination. They also felt more competent during the unit 2431 examination than on unit 2432. Interestingly, this did not influence their perception of enjoyment of the exam, the amount of pressure they felt they were placed under, or the amount of perceived choice they had when sitting the exam. This implies that module or unit examinations in the same subject do not carry the same weight in students' eyes, and that students may value one above another.

Table QM4: Differences of English students' motivation between their unit 2431 and unit 2432 examinations

IMI scales	Unit	Mean	S.D.	N	Diff.	S.D.	t	df	p
Competence	1	4.31	1.12	62	0.32	1.03	2.42	61	**0.02**
	2	4.00	1.22						
Value	1	5.57	1.27	62	0.46	1.41	2.60	61	**0.01**
	2	5.11	1.89						
Effort	1	5.77	1.10	62	0.44	1.03	3.35	61	**0.00**
	2	5.33	1.14						
Enjoyment	1	2.93	0.97	62	0.02	0.69	0.22	61	0.83
	2	2.92	1.08						
Pressure	1	4.13	1.33	62	0.00	0.72	0.00	61	1.00
	2	4.13	1.35						
Choice	1	3.35	1.50	62	-0.10	1.06	-0.72	61	0.47
	2	3.45	1.46						

A closer investigation reveals that the heightened score of the *value/usefulness* and *competence* scales observed on unit 2431 can be attributed to female students only; male students did not differentiate between the units. However, both genders reported exerting significantly more effort on unit 2431 than on unit 2432 (see Table QM5). This reveals that boys and girls perceive units or modules within the same subject differently.

Table QM5: Differences of English students' motivation between their unit 2431 and unit 2432 examinations and gender

Scale	Unit	Gender	Mean	S.D.	N	Diff.	S.D.	t	df	p
Competence	2431	Boys	4.26	1.19						
	2432	Boys	3.92	1.37	31	0.34	1.29	1.46	30	0.16
	2431	Girls	4.37	1.07						
	2432	Girls	4.07	1.06	31	0.30	0.70	2.35	30	**0.03**
Value	2431	Boys	5.36	1.30						
	2432	Boys	4.94	2.08	31	0.42	1.50	1.57	30	0.13
	2431	Girls	5.78	1.22						
	2432	Girls	5.28	1.70	31	0.50	1.33	2.11	30	**0.04**
Effort	2431	Boys	5.54	1.11						
	2432	Boys	5.19	1.15	31	0.35	0.81	2.39	30	**0.02**
	2431	Girls	5.99	1.07						
	2432	Girls	5.46	1.13	31	0.53	1.22	2.42	30	**0.02**
Enjoyment	2431	Boys	3.00	1.01						
	2432	Boys	2.95	1.21	31	0.05	0.84	0.32	30	0.75
	2431	Girls	2.87	0.95						
	2432	Girls	2.88	0.95	31	-0.01	0.51	-0.11	30	0.91
Pressure	2431	Boys	3.90	1.24						
	2432	Boys	3.83	1.33	31	0.08	0.86	0.50	30	0.62
	2431	Girls	4.35	1.39						
	2432	Girls	4.43	1.32	31	-0.08	0.54	-0.79	30	0.43
Choice	2431	Boys	3.36	1.38						
	2432	Boys	3.57	1.53	31	-0.20	1.23	-0.92	30	0.36
	2431	Girls	3.34	1.64						
	2432	Girls	3.33	1.41	31	0.01	0.86	0.06	30	0.95

To summarise, data on the characteristics of motivation of students sitting their modular mathematics examination in March show the following patterns: students' high scores indicate that students perceived their modular exam to be quite valuable, and they are motivated to do well on it. However, results from the scales indicated that students do not really 'own' the examination, and that instead of being internally motivated, they perceive it as an externally imposed, compulsory task. Students felt a considerable amount of stress and pressure to be placed on them while sitting the module exam in mathematics. Experiencing high pressure from parents was also mentioned by students in their interviews. Students felt they exerted quite a lot of effort whilst sitting the examination, and this might be due to their heightened perception of value and usefulness of the examination, and suggests that the high levels of pressure did result in high levels of effort on their part. Also, students reported very little perceived competence. Furthermore, they did not feel they had a choice in sitting the exam, and they gave the lowest ratings to the enjoyment scale.

Data from students of English suggests that unit examinations are not all of equal importance for the students, who in some aspects experienced higher motivation regarding unit 2431 than unit 2432 examination. Also, students were found to experience different levels of motivation on the two examinations, depending on their gender.

Research question 5. How does modularisation influence teachers' perceived workload and attitudes?

Mathematics

Teachers of mathematics of both routes completed self-report workload charts twice during the year: once early March (after the modular examination in the appropriate route) and once at the end of the year, just before the final GCSE examination. As the interviews focussed only on one teacher in the each school, the methodology conforms to the design of case studies, and the findings should be considered accordingly; the results cannot represent all teachers in either of the two assessment systems.

Both teachers of mathematics had responsibilities for other, more senior administrative duties at their schools, one of them working as Assistant Head Teacher, the other as the Subject Leader for Key Stages 4 and 5 and also as Faculty Learning Mentor. Therefore, although in their interviews they were asked to focus on their teaching workloads, it is inevitable that their perceptions of their workloads in hindsight would be influenced by these other duties. However, arguably their workloads are still comparable, as both of them were preoccupied with extra administrative duties at the same time.

As Figure QTW1 indicates, the perceived workload of the linear mathematics teacher exceeded that of the teacher in the modular system for most of the school year; however, the two workload patterns are quite similar between April and June. The four peaks within the linear route are due to preparing students for two mock exams, evaluating their performance and giving feedback to them afterwards; the peak around March indicates a period when under-achieving students are identified and their support is being planned by the teacher. The end-of-year peak represents the final run-up before the GCSE examination. This teacher reported these peaks to be well within the zone of 'very high workload' levels, and described her work chart as the following:

We have an examination period coming up toward each half term, so kind of middle of October. December was the mock exams and then obviously you got their exams then, so … Leading up to the exam it is going to increase obviously with revision, we have a bit of a dip but then when we get up to the revision for that, it goes higher again. Now as the consequences to the mock exam we have a lot of reports to fill in and getting the students organised and looking at the targets and that kind of stuff... You probably have a bit of a lull now [in March]*, but then it goes, it's already started to work right up again looking at under-achieving girls and trying to sort the kids' targets*…

The teacher working in the modular system mentioned the following busy periods: December, the time of mock exams; March, the period leading up to the modular examination; and June, when the final papers are sat at the end of the school year. Although his perceived workload was in the region of 'very high workload' at the end of the year (similarly to that of his colleague in the linear mode), he reported experiencing much lower levels of workload during the year, and in a more monotonically rising curve than his colleague in the linear system: his workload never entered the zone of 'very high' levels until the very last month.

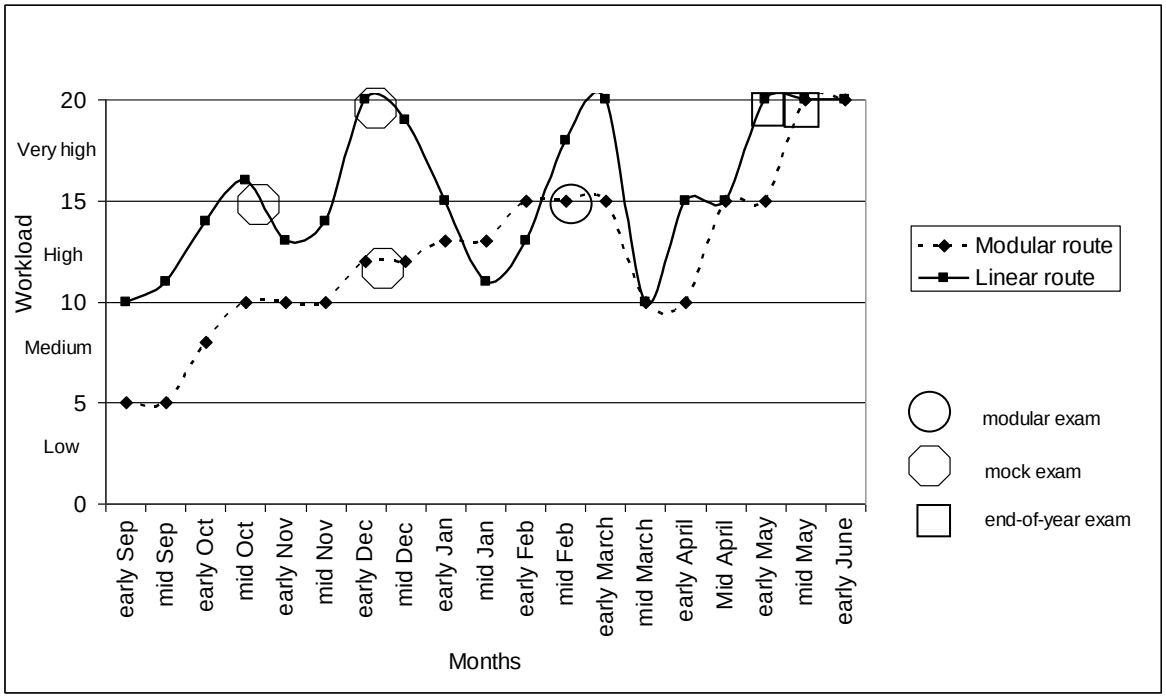


Figure QTW1: Comparison of mathematics teachers' workload in the linear and modular routes

To summarise, data suggests that the linear system resulted in a less monotonically rising perceived workload curve for the participating teacher, with very busy periods alternating with much calmer times, while the modular assessment provided a more evenly spread workload for teachers than the linear route, and overall showed a more evenly rising workload throughout the year. Interestingly, the opposite pattern was found to be true for students' workload levels, as described earlier.

English

Regarding English teachers' workload, only limited data was available on their workload levels, as the subjects failed to return the second round of surveys measuring workload between January and June. Also, as both teachers were teaching both linear and modular students, their workload patterns represent more individual workload profiles, rather than workload attributable to the route of the curriculum or the assessment (see Figure QTW2).

From the available data, it seems that English teachers' workload levels were monotonically rising between September and December. The highest levels reached the zone of 'very high workload' first in the middle of December, when teachers were marking mock exams and preparing students for the GCSE unit examinations which took place throughout January. After this point, however, the workload levels of the teachers diverged; for one of them, workload dropped to September levels, while the other teacher experienced a short lull followed by a significant rise into the zone of highest workload. The latter felt that the unitised assessment system did place more workload on them than a linear route would:

Researcher: Do you think there is more stress involved in the unitised version for you?
Class teacher: Yes, I think perhaps there is sometimes because it's a lot of peaks throughout the year. But it all comes in at the end still, because of the way we have taught it here. It's all in units, but all the units come together in one foul swoop. You are doing coursework, course moderation, exam preparation all at the same time so perhaps we do make our lives a little bit difficult for ourselves.

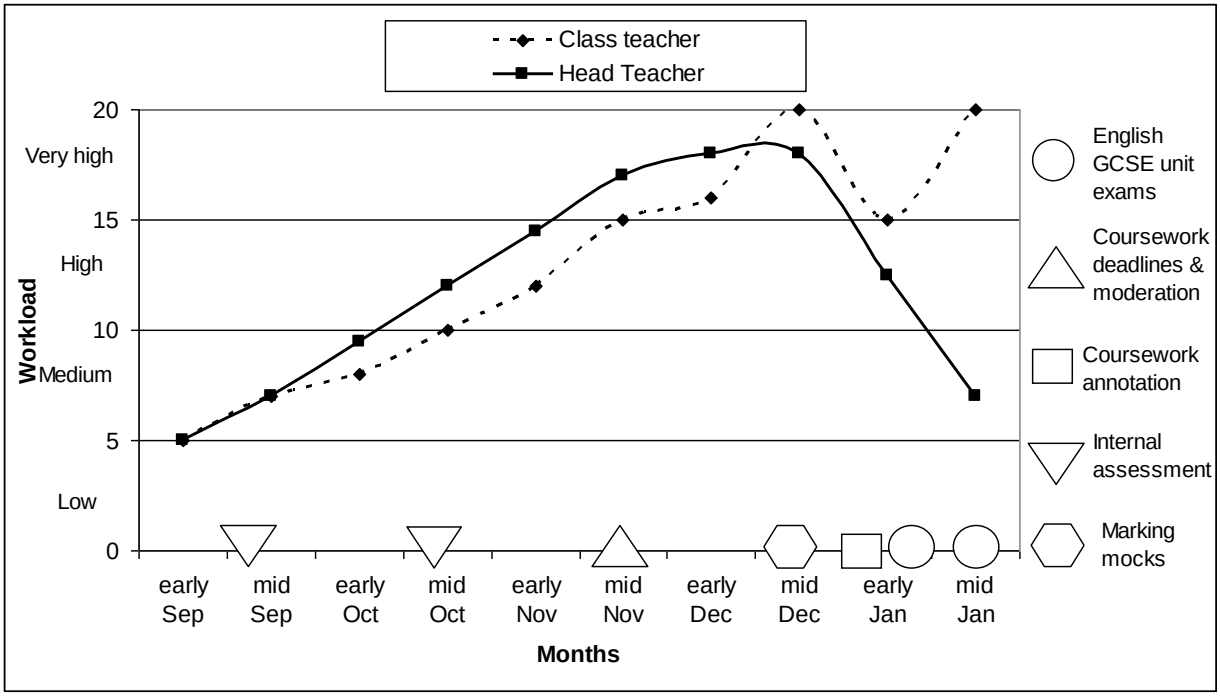


Figure QTW2: Workload of teachers of English between September and January

To summarise, teachers' perceived workload levels appear to be not only dependent on the individual, but also on the subject and its assessment route, with the linear assessment system apparently placing higher levels of workload on the teachers in a more uneven distribution during the year.

Data indicates that there are significant individual differences in the amount of workload experienced among teachers, even within the same school. However, it

seems that teachers of English experienced a more monotonic curve of workload rises and drops than teachers of mathematics in either assessment routes.

Research question 6. Staying on track: do students in differing assessment routes show different levels of familiarity with their end-of-year examination during the year?

One of the claims regarding the advantages of modularisation of GCSEs is that a unitised approach makes it easier for students to stay on track regarding their studies. This implies that, in order to be able to monitor their progress throughout the year and to compare it with the goal of successful certification, students in the modular assessment route should be more familiar with the requirements of their examinations. However, some teachers were concerned that students are easily confused by their modular examinations, especially as they are also sitting mock exams. One teacher of English expressed this concern as follows:

> *There is a lot of confusion with our pupils over the exams. They get confused over what's in the exams and what counts as coursework; the fact that we do two GCSEs confuses them. We always get students attempting questions on text that we haven't taught, and if that's the level of comprehension they have got over the nature of the exam, where they are even struggling to identify the right text to answer the question on, can you imagine the structure with the complexity of the two GCSEs where you have pieces of coursework that cross over into the two subjects? We have a text that is done for language and for literature but they are a separate unit. I have kids bringing me practice exam questions that we have done in class saying 'I have finished my coursework'; and they turn up for the exam and ask me if it's a mock or a real exam and they are really uncertain...so that's where all of the stress comes from.*

Both modular and linear mathematics students' knowledge of their GCSE examinations was tested empirically in this study by a small quiz, asking about very specific details about their end-of-year examination. The quiz was embedded in their questionnaires and administered in March (see Appendix D). All information had been available for students on the public OCR websites and from teachers.

After checking the distribution of the data, independent samples t-tests showed that modular mathematics students did, indeed, know more about their end-of-year examinations than linear mathematics students ($U = 273$, $p = 0.04$) (Table QF1). This suggests that modularisation does indeed help students in staying on track with their studies.

As Table QF2 shows, there was a great amount of variation among linear students in the percentage of the questions they could answer correctly, whereas all modular students could answer at least 38% of the questions.

Table QF1: Percentage of students in both routes who could answer all questions correctly regarding their end-of-year examinations

Mathematics students' assessment system	N	Mean percentage of correctly answered questions regarding end-of-year exam (S.D.)
Modular	19	39.85% (4.55)
Linear	43	29.36% (24.65)

When analysed in relation to students' reported workloads, the data revealed that students of linear mathematics who answered more than 50% of the examination-related questions correctly reported statistically significantly higher workloads in early and mid February, and also early March, compared to those who completed less than 50% of the quiz correctly (see Table QF3 and Figure QF1).

The finding that more informed students experience higher workloads might be explained by various personality factors. It might be that students who are more familiar with the details of the final examination during the year are more conscientious, hard working or motivated than the rest. Unfortunately, as very few students returned their second motivation questionnaires after the final examination, these hypotheses could not be empirically tested.

As there was very little variability among students in the modular route, with only two students answering more than 50% of the questions correctly, a comparison based on statistical analysis was not possible to carry out. However, Figure QF2 shows that the three students who could answer more than 40% of the questions regarding the final exam experienced somewhat less workload between January and March than those who could answer less than 40%. This finding is contrary to that of students in the linear assessment route, as discussed previously.

Table QF2: Variability of linear and modular mathematics students' knowledge of the final exam

	Number of students	Correctly answered
Modular students	16	38.10%
	1	42.86%
	2	52.38%
Linear students	11	0.00%
	1	6.25%
	2	12.50%
	3	15.62%
	2	18.75%
	1	21.88%
	1	25.00%
	1	28.12%
	3	31.25%
	1	34.38%
	2	37.50%
	3	43.75%
	3	50.00%
	3	56.25%
	5	68.75%
	1	75.00%

Table QF3: Relationship between knowledge of examination and perceived workloads among linear mathematics students

Months	Knowledge of final exam (% on quiz)	N	Mean (S.D.)	t(df)	p
Early February	More than 50%	12	9.75 (2.89)	2.24 (34.20)	**0.03**
	Less than 50%	27	6.89 (5.02)		
Mid February	More than 50%	12	10.42 (3.09)	2.27 (33.23)	**0.03**
	Less than 50%	27	7.41 (5.11)		
Early March	More than 50%	12	11.92 (3.61)	2.44 (37.00)	**0.02**
	Less than 50%	27	7.67 (5.51)		

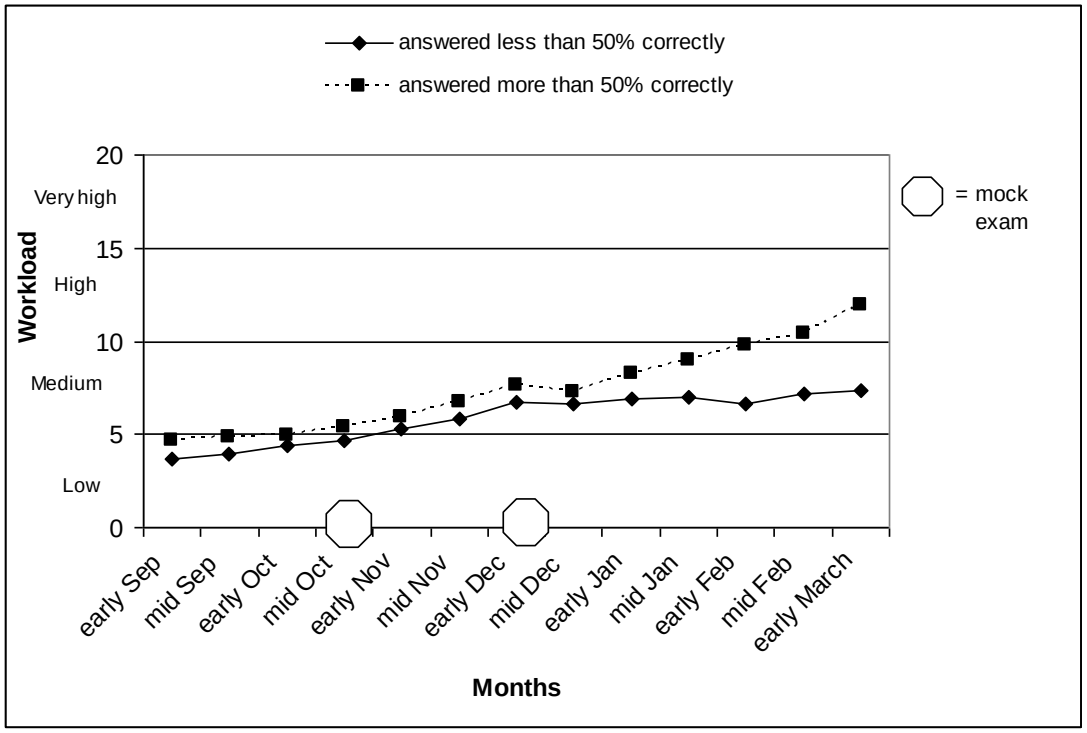


Figure QF1: Mean perceived workloads of linear mathematics students answering more or fewer than 50% of questions correctly regarding their final examinations

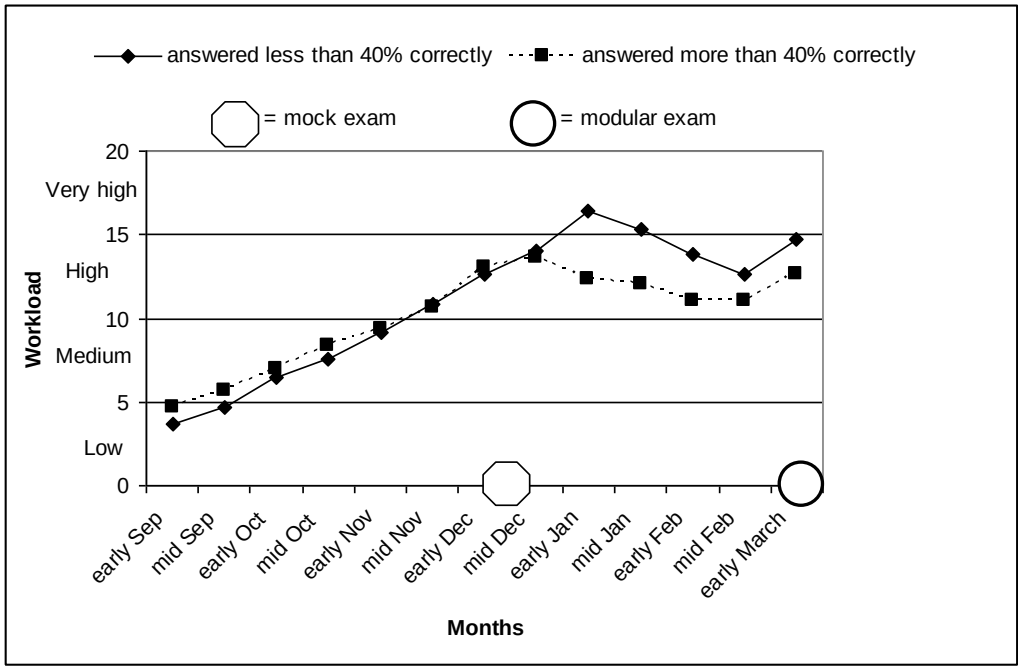


Figure QF2: Mean perceived workload of modular mathematics students answering more or fewer than 40% of questions correctly regarding their final examinations

To summarise, modular mathematics students knew more about their end-of-year examinations than linear mathematics students did. There was a great amount of variation among linear students in the percentage of the questions they could answer correctly, whereas all modular students could answer at least 38% of the questions. Students of linear mathematics who correctly answered more than 50% of the examination-related questions reported statistically significantly higher workloads between early February and early March, compared to those who completed fewer than 50% of the quiz correctly. The finding that more informed students experience higher workloads might be explained by various personality factors.

DISCUSSION AND IMPLICATIONS

STATISTICAL ASPECTS OF MODULARISATION

Since 2009 almost all GCSE syllabuses are modular in structure, with pupils being able to spread the exam units over the two-year course. There have been some claims as to the new qualifications being easier to pass than those with only end-of-course exams. This reform mirrors that of the A-level which became modular in 2000 and pass marks soared when the first exams were taken. This led some critics to argue that the new A-levels were less demanding and had become easier to pass or to achieve a higher grade in.

If the new modular GCSE courses were less demanding than the linear courses, as it is being stated, one would expect modular candidates to get better results. However, there may be reasons for differences in results which are not to do with the easiness or difficulty of modular syllabuses: for example, modular candidates might be different in some ways from linear candidates, *e.g.* in terms of their ability.

Whether or not results from the linear and modular approaches are different, there are several aspects of modularisation that need to be investigated. This research has addressed some of the key issues relating to curriculum flexibility, short-term assessment goals, maturity, regular feedback to students, re-sits and increasing motivation. The statistical strand of this project investigated: 1) if there were differences in outcomes between the students taking a modular or a linear assessment route, once their ability was taken into account; 2) if students were at a disadvantage due to entering for an examination before being ready (maturational effects); 3) the degree to which opportunities to retake units influenced outcomes.

The key conclusions of the analyses are discussed in detail below.

Entries and assessment route

The pattern of entries in the two subjects analysed in this research, namely English and mathematics, shows that modular syllabuses work differently in different subjects.

The majority of the candidates who studied for a GCSE in English certificated in the terminal session, with the percentage of candidates certificating in early sessions increasing significantly in the period of study. Higher percentages of candidates entering for a GCSE in English followed a linear assessment route rather than a modular assessment route. Despite the obvious differences in entry sizes, entries for the modular assessment route were on the increase and entries for the linear route were decreasing in the period of study. In contrast, the majority of the candidates studying for a GCSE in mathematics preferred a modular assessment route to a linear assessment route. However, entries for the modular assessment route dropped from 2008 to 2009 and entries for the linear assessment route increased in the same period.

Patterns of entries differed by unit. In all GCSE English units except in unit 2433, the majority of candidates took the examination in the terminal session. However, the percentages of candidates sitting units in early sessions had been increasing over time. It could have been the case that the more able students were stretched by completing some modules at an early stage and then progressed to other work. However, if the students in a school had a wide range of ability it might have not been possible to allow the most able to move ahead of the rest. The entries for unit 2433 were well spread throughout the course. In GCSE mathematics, for all units,

with the exception of unit M10, less than 20% of the entries were for the terminal session. This shows that in mathematics, candidates made use of the flexible assessment by getting units out of the way rather than taking them in a narrow window at the end of the two-year course. In particular, the mathematics students interviewed in this research reported that they welcomed external examinations during the school year.

Previous research into modular examinations (*e.g.* Ofsted, 1999), showed that modular syllabuses operate most successfully in mathematics and are less suited to English, where the assessment can interrupt the teaching of themes that run across more than one module. In this research, the proportions of candidates who took all their module examinations in one session suggest that modular assessment is thought less appropriate for English than for mathematics. The results from the qualitative strand confirm that the students of mathematics were generally in favour of modular assessment and the students of English appreciated some characteristics of the modular assessment but they did not express a strong preference towards modularisation.

Modules can vary enormously in terms of their structure and content. In some cases modular syllabuses are such that they demand little change in the way the schools approach the teaching. In other cases modular syllabuses can be innovative and be very different to already existing syllabuses and practice. This research shows that the introduction of the modular syllabus in GCSE English did not lead to many changes in the way the subject was taught, studied and assessed, as it mostly continued to be addressed as if it were linear in design. Factors such as maturity or parallel teaching across modules in English might have led many students to choose to sit all their modules terminally.

The degree of flexibility in the number and timing of the modular examinations was illustrated in this research by the large number of unit combinations that led to a GCSE in each subject. This proves that modular syllabuses are seen as a method of giving students a degree of choice in syllabus content and assessment session. However, the most frequent combinations of modules may be more likely to reflect the teaching resources available within a centre or the schools' preferences as opposed to any other factors. The reasons why schools offer modular syllabuses in certain subjects or prefer the linear approach in others warrants further study as modular courses are becoming increasingly popular.

It should be noted that due to the 'newness' of the modular schemes at GCSE, the pattern of entries may be reflecting some experimentation on the part of the teachers in deciding the points in the course when their students should sit the examinations. Also, it is possible that different patterns of entry may emerge as the modular schemes mature and teachers and candidates become more confident in making decisions regarding the most appropriate time to sit module examinations.

The flexibility built into the unitised GCSEs allows candidates to enter units at a different tier. The analyses in this report show that there is evidence of a slight increase over time in the percentage of students mixing tiers, in particular in GCSE English. Among the students who mixed tiers, the percentages were higher when a modular assessment route was followed.

When implementing a new assessment route in a school it should be borne in mind that modular examinations are of shorter duration than linear examinations but there are more of them. This makes the examination process more costly, potentially more disruptive to school routines and has the effect in many subjects of prescribing more directly how and when the content is taught (Ofsted, 1999). Also, modular routes, if poorly designed, can lead to organisational complexity which adversely affects other parts of the curriculum, and to unfeasible sized groups and under-used staff.

Linear assessment vs. modular assessment

Contrary to anecdotal evidence which suggests that with modular syllabuses it is easier to attain higher grades, modular routes in GCSE English led, on average, to lower grades than linear routes. In contrast, in GCSE mathematics, candidates following a modular route obtained, on average, higher grades.

It should be noted that the fact that candidates may obtain higher grades from a modular scheme, does not necessarily mean that standards have dropped (Gray, 2001). It could be the case, for example, that with setting targets throughout the course, having ongoing feedback and allowing a certain amount of re-taking within the course, candidates are learning more.

The quality of the entry in each of the assessment routes was different. For GCSE English and for one of the GCSE mathematics cohorts candidates following a linear assessment route had, on average, higher prior/concurrent attainment than candidates following a modular route. For the other mathematics cohort, candidates following a linear assessment route had slightly lower prior/concurrent attainment scores. This might be due to the fact that lower ability students do not welcome many external exams during the school year due to the additional workload involved and they prefer an end-of-year examination. High ability students, on the other hand, welcome modular examinations. This fact has been confirmed by the mathematics students interviewed in the qualitative strand of this research. It was important then to take into account students' ability when talking about the performance in each of the assessment routes.

The probability of obtaining good grades (A*-B) in GCSE English was significantly higher for candidates following a linear assessment route than for candidates following a modular one once their prior/concurrent attainment was controlled for. On the contrary, for GCSE mathematics, the probability of obtaining good grades was significantly higher for candidates following a modular assessment route than for candidates following a linear one and the effect was stronger for girls.

Independent of the assessment route and the prior/concurrent attainment, the probability of obtaining a given grade or above in GCSE English was higher for girls than for boys. In contrast, for GCSE mathematics, the probability of obtaining a given grade or above was higher for boys than for girls. The probability of obtaining a given grade or above in both subjects significantly increased with increasing scores in the attainment measure.

Maturational effects

According to previous research, candidates cannot be expected to perform as well in early sittings as they would later on in the course (Clarke, 1996; Taverner and Wright, 1997). Students might be at a disadvantage if they are entered for an examination before being ready as they might not have the experience of the two-year course and might be at different levels of age and maturity. Therefore, there can be powerful arguments for linear assessments as certain skills may develop progressively through several modules.

This research showed that, in GCSE English, students opting for certificating at the beginning or midway throughout the course were at a disadvantage compared to those who opted for certificating at the end. Girls were at a greater disadvantage than boys. The gender effect was in line with previous research which showed that boys were more likely to take advantage of modular examinations than girls (McClune, 2001). On the other hand, girls following a linear assessment route and certificating

early in the two year course had higher probability of achieving a given grade or above than those who certificated late. In English, subject maturity, which is thought to improve performance, is thought to be important and the modular route is, therefore, a more difficult one. This finding is supported by previous research (*e.g.* SCAA, 1996).

For GCSE English, maturational effects differed by unit. In the modular assessment route, candidates sitting early any of the three externally assessed units (by written examination) did not perform as well as those sitting them later. Analyses by gender did not reveal differences between boys and girls. In the linear assessment route, girls, who are generally considered to mature earlier than boys, seemed more likely than boys to benefit from taking the examination early in any of the three externally assessed units. Boys, on the other hand, seem more likely to benefit from taking the examination in the later part of the course. However, early assessment seemed to be an advantage for both girls and boys in the coursework units in both the linear and the modular routes. Students might have wanted to carry out their coursework assignments early in the course to relieve the workload towards the end of the year and they worked hard to do so.

In GCSE mathematics, average marks were higher in early sessions than in later sessions. Therefore, for both girls and boys taking GCSE mathematics, early assessment was an advantage.

Patterns and impact of re-sits

In both GCSE English and GCSE mathematics the research showed an increase over time in the percentage of students re-sitting at least one unit. Also, the percentage of students re-sitting two or more units increased in the period of study. Students (and maybe teachers) were using the opportunity to re-sit modules, which the new unitised specifications offer, to try to influence the final overall grade. However, some schools have the view that the number of re-sits should be limited since they are expensive, cause timetabling problems and many students do not make sufficient progress to warrant them. The attitudes of the students interviewed in the qualitative strand of this research support the increasing popularity of re-sits, as they highly appreciated the opportunity to re-sit modules.

The percentages of re-sits in each of the GCSE English units were relatively small, indicating that each unit was only taken once by the majority of the candidates. In contrast, in GCSE mathematics the percentages of re-sits in some units were relatively high. In both subjects, there was evidence of an increasing percentage of students re-taking each individual unit over time.

In general, students who took re-sits were weaker than those who did not.

The probability of obtaining good grades (A*-B) in either English or mathematics at GCSE level significantly decreased if more modules were re-taken. For example, in 2008, the probability of obtaining a grade A or above in English for a student averaging grade A at GCSE and who did not re-sit any modules was 0.75 whereas the same probability for a student who re-sat one or two modules once was 0.66 and 0.57, respectively.

By contrast, there was evidence that confirmed the claims that some students, in particular weaker ones, benefit from being able to re-sit units. It can be argued, therefore, that allowing a certain amount of re-sits within the course, candidates could be learning more. It could also be argued that weaker candidates, through their re-sits, are more proficient at the topics covered earlier in the course than they would be had the examination been taken terminally.

Looking at the changes in marks/grades between the first and second attempts of a unit, the benefits of re-sitting seem clear. Across all units, the majority of candidates did better on their second attempt at a unit than they had on their first. It should be borne in mind, however, that the knowledge that a re-sit was available may have lessened a candidates' resolve to do their best at the first attempt. Students of modular syllabuses interviewed in the qualitative strand of this research mentioned that the possibility to re-sit a module relieved some of the stress and pressure of the modular exams and admitted that they would have worked more had there been only one chance for them to pass their examinations.

Although the second attempt provided the candidates with a better mark this does not often lead to an improvement on the unit grade. However, the fact that a relatively high percentage of students improved their marks/grades after a re-sit taken later in the course may suggest that some students were entered for unit examinations before they were ready. Teachers, therefore, will need to make sure that their students are ready when deciding the points in the course when they should sit the examination.

Further research on re-sitting patterns and the impact of unit re-sits on the overall and unit grades should be carried out. In particular, re-sits could be classified depending on the timing of the first attempt and the re-sit (*e.g.* type 1: first attempt in session 2, second attempt in session 3; type 2: first attempt in session 2, second attempt in session 4, etc.) and it would be of interest to find out which type of re-sits leads to the highest percentage of candidates improving the unit or the overall grade. There might be the case that candidates take examinations at an early stage of the course to familiarise themselves with the demands of the modular examinations or as confidence/motivation building sessions. Other candidates might take them at a later stage to practice their examination skills or to improve and earlier result.

The differences in the re-sitting patterns by centre type were small (the percentage of students taking no re-sits was higher in the independent sector). This was in line with a study carried out by QCA (2007b) about re-sitting patterns and policies in respect to GCE A-levels in seven subjects (including English literature and mathematics) which indicated that there was very little difference in the scale of re-sitting behaviour in terms of centre type. However, the QCA study highlighted that there were differences across the different centre types in terms of the training that a candidate might receive when preparing for a re-sit. For example, in a number of independent centres unlimited support was given to candidates wishing to re-sit in comparison to the majority of the state schools, where past papers tended to be all that was offered to re-sitting candidates.

Finally, opinions are divided as to whether re-sits should be allowed. Re-sits are perceived by some as unfair because they give candidates an opportunity to improve their attainment in those knowledge areas and skills tested by the re-taken modules. However, it should be borne in mind that there is some improvement that is 'valid'. For example, students might have performed better in the re-sit than in the first attempt of an examination due to extra teaching or due to personal circumstances or circumstances out of their control which may have affected performance at the first sitting. Also, as mentioned above, there is a 'maturation benefit' and, for example, students may be able to improve their general understanding and ability in a subject over time.

QUALITATIVE STRAND

Claims on the advantages of flexible assessment made by OCR were used to formulate the hypotheses of the qualitative strand of the research, resulting in the following research questions:

1) *Does ongoing feedback (positive and negative) motivate students? Does negative feedback de-motivate students?*
2) *Does ongoing feedback help students in identifying their learning needs?*
3) *Does modular assessment remove the pressure of an all-or-nothing exam?*
4) *What are the characteristics of modular students' test-taking motivation?*
5) *How does modularisation influence teachers' workload and attitudes?*
6) *Staying on track: do students in differing assessment routes show different levels of familiarity with their end-of-year examination during the year?*

A pilot study conducted with examiners of Business Studies IGCSE found that examiners were generally pessimistic about the possible effects of modularisation on the above issues. However, they could correctly forecast a number of outcomes of the main study.

Generally, students of modular subjects were motivated by frequent testing, and appreciated both the opportunity of re-sitting module exams and the feedback they received. Modular assessment was thought to provide a 'sense of readiness' for students. Some students of linear mathematics, being familiar with the modular curriculum in other subjects, expressed their wish to study mathematics in the modular route, as they felt it reduced exam stress and made preparation for the assessment easier; however, students of lower mathematical abilities were concerned about the additional stress and workload levels involved in more frequent testing.

Overall, teachers generally preferred the route they were working in at the time. Teachers in the modular assessment system appreciated the better planning opportunity around the exams, the clarity of the focus of their teaching requirements and felt that modular assessment contributed to their approach to Assessment for Learning. They also appreciated the reduced stress of teaching in terms of not having to re-motivate students at the end of the year. They felt modular assessment suits children who are not readily motivated otherwise to study and revise throughout the year. However, one teacher admitted having less flexibility than expected in timetabling modular exams throughout the year. The teacher in the linear route appreciated having more space and control to deliver the content effectively; furthermore, she did not find it a burden to revisit topics and re-motivate students before the end-of-year examination.

Frequent feedback, positive or negative, motivates students

Students of both subjects and across the ability range reported feeling motivated by feedback, and even by negative feedback (one which was worse than what they had been expecting), and all interviewed reported that the results prompted them to do better on the next module and on the terminal papers. Examiners in the pilot study and also some previous studies expected that negative feedback would result in the Matthew-effect, widening the performance gap between more and less able students (Merton, 1988); however, this tendency was not found in the present study. Overall,

students in the modular routes of mathematics and English appreciated seeing the grade and receiving feedback after module exams and they felt that they received feedback soon enough after they had sat the exam. They found it useful and motivating to be informed about their recent performance and also about how much improvement they could expect in their terminal paper.

Grade reports are unhelpful in identifying students' learning needs and informing their learning strategies

Although all students reported being satisfied with the amount of feedback they had received from their teacher, they reported missing the opportunity of going through their own marked papers or receiving suggestions about the areas they needed to improve on. Students reported that the papers were returned too late for them to be practical or useful. As a consequence, although students felt motivated by grade reports, they had vague or no plans for preparing for their end-of-year examination. When prompted, students could not give an account of the plans they would adopt to remedy their insufficient learning styles. Students would generally find it useful to receive detailed and personal suggestions on their weaknesses and strengths in previous examination papers. This could equip them with more information on how to change their focus of learning and strategies of exam preparation.

Modular assessment does not remove the stress and workload of an all-or-nothing exam

Data revealed that the amount of students' work in the two assessment routes in mathematics in the first half of the school year were quite different; students in the modular route experienced long periods of higher workload than linear students did; furthermore, the pattern of workload in the modular route was uneven, with peaks around mock exams and modular exams. This problem was correctly forecast by examiners in the pilot study, suggesting that sitting modular mathematics exams does not in itself alleviate the workload of either modular or end-of-year examinations. Furthermore, students in the modular route reported that the social pressure to achieve a good grade placed significant stress on them during both the modular and the end-of-year examinations. However, the possibility to re-sit modular examinations was mentioned as helpful in alleviating some of the examination stress experienced during modular exams, as it gave some students confidence about what to expect on their subsequent exams.

Linear mathematics students had different opinions about modular assessment, mostly based on their ability: more able students would welcome more frequent external assessments during the school year, while lower ability students were wary of the consequences in terms of exam stress and additional workload involved in modular exams, and they expressed their preference towards internal assessment.

For students of English, workload varied considerably during the course of the year, ranging from 'low workload' to 'high workload'. There were no differences in linear and modular students' workload levels; the two profiles were remarkably similar. Some students found the January unit exams stressful due to it coinciding with other examinations and their coursework assignments. Similarly to mathematics students, students of English also appreciated the opportunity to re-sit units, as they found it did alleviate some of the stress.

The effect of gender on workload

Data shows that gender may be a factor related to students' workload, but this relationship varies with the subject and with the type of assessment. For students of English, gender had no effect on workload when the two routes were analysed separately; however, when data was aggregated, boys seemed to experience slightly but statistically significantly higher average overall workload than girls did. In the case of linear mathematics, the average overall workload did not differ significantly for the two genders. For students of the modularised route, however, a slight but significant difference was found between the two genders between January and March, when girls showed a slight but significant rise in workload compared to boys.

Motivation of students: high extrinsic motivation on all module exams

Modular mathematics students perceived their modular exam to be quite valuable, and they were generally motivated to do well. However, data from the scales indicate that students did not really 'own' the examination, and that instead of being intrinsically motivated, they perceived it as an externally imposed, compulsory task. Students scored high on the amount of *pressure* while sitting the module exam in mathematics, and experiencing high pressure from parents was also mentioned by students in their interviews. Students felt they exerted quite a lot of *effort* during sitting the examination, and this might be due to their heightened perception of *value and usefulness* of the examination, and suggests that the high levels of pressure did result in high levels of effort on their part. Also, students scored very low on *perceived competence* and *perceived choice* in sitting the exam, and they gave the lowest ratings to the *enjoyment* scale. A tendency was found on the *competence* scale for girls to score slightly lower on *perceived competence* regarding their modular mathematics examination; it seems that girls experienced less intrinsic motivation than boys. However, this needs to be interpreted within the context of the finding that all students reported quite low scores on scales measuring intrinsic motivation.

Students of English had high scores for both units on *effort* and *value*, which implies that they appreciate the usefulness of the examination and make appropriate effort to do well on them. The amount of *pressure* was not as high as for mathematics students; however, the positive factors indicating intrinsic motivation (*enjoyment, competence* and *choice*) were rated similarly low by students of English for both units. As for gender differences, girls showed a small but statistically significant rise in *pressure* on unit 2432. Data revealed that the two unit examinations were not of similar importance for the students. Also, students were found to experience different levels of motivation on the two examinations depending on their gender: girls gave higher scores on *competence, value* and *effort* for unit 2431, while boys gave higher scores on *effort* for unit 2431.

Effects on teachers' workload

Mathematics teachers' workload levels varied with the assessment route, with the linear assessment system apparently placing higher levels of workload on the teachers in a more uneven distribution during the year: the linear curriculum resulted in a less monotonically rising workload curve for the participating teacher, with very busy periods alternating with much calmer times, while the modular assessment provided a more evenly spread workload for the teacher, rising throughout the year. Interestingly, the opposite pattern was found to be true for students' workload levels. This also means that examiners in the pilot study could not accurately foresee the effects of modularisation on teachers' workload, and proved to be overly pessimistic.

Teachers of English experienced a more monotonic curve of workload rises and drops than teachers of mathematics in either of the assessment routes; however, data suggests that significant individual differences may exist in the amount of teachers' workload, even within the same school.

Modularisation helps students 'stay on track' with their studies

Among the claims about the advantages of modularisation of GCSEs is that the unitised approach makes it easier for students to stay on track regarding their studies. This implies that students in the modular assessment route should be more familiar with the requirements of their examinations. Both modular and linear mathematics students' knowledge of their GCSE examinations was tested empirically in this study. Data has shown that modular mathematics students did, indeed, know more about their end-of-year examinations than linear mathematics students. This suggests that modularisation does indeed help students in staying on track with their studies.

A great amount of variation had been found among linear students in the percentage of the questions about the end-of-year examination they could answer correctly, whereas all modular students could answer at least 38% of the questions. Moreover, it was found that among linear mathematics students, more informed pupils experienced higher workloads, while the opposite trend was found for modular students; this might be explained by various personality factors.

LIMITATIONS

There were several limitations to this research and the most relevant of these are discussed here.

The first limitation is that just two GCSE subjects were explored. English and mathematics were chosen because they were among the few GCSE subjects already unitised and because of the availability of schools for the qualitative analyses. If further research is carried out in this area, more subjects should be investigated, for example, a science subject or a modern foreign language.

Another limitation concerns the candidates investigated in the statistical strand. Any analysis that used Key Stage 3 results as a measure of students' ability was restricted to candidates in maintained schools. This was due to the fact the independent schools do not have to follow the national curriculum and their students are not required to sit the Key Stage 3 tests.

A further limitation of the statistical analysis carried out in this research is that factors relating to the teacher's experience of the assessment route could have some impact on the outcome. Also, attitudes of students and teachers to the modular examinations (explored in the qualitative strand) as well as the way students are prepared for the modular examinations might play an important role in the outcomes. These were not taken into account in the statistical analyses as data on them was not available.

It might be argued that the proportion of modular or linear candidates in selective and independent schools (which usually outperform other types of centres) was higher than in other types of centres and this would help to account for the differences in modular and linear results. In this research school type was not taken into account and this can be viewed as a limitation. In future research it might be possible to investigate whether differences in modular and linear results are caused by differences in the proportions of candidates from different types of schools (*e.g.* selective, independent or comprehensive schools). However, previous research into modular A-levels (SCAA, 1996) showed that the candidates from selective and independent schools and from comprehensive schools and colleges represented very similar proportions of the total candidature in both modular and linear assessments.

It should also be borne in mind that there is an important difference in the way modular and linear awards (for example in GCSE mathematics) are made and this could produce different results in both assessment routes.

Regarding the qualitative strand of the study, a major limitation proved to be the low response rates from students and some teachers after the June GCSE examinations. This happened despite participants' agreement to take part in all phases of the data collection and that three different methods were employed to reach students after their end-of-year examinations. The lack of data from this period resulted in the inability of the researchers to answer some of the research questions.

A further limitation relates to the interview questions used in this study, as the way they were phrased may have affected the data being collected. Some of the interview questions should, in hindsight, have been piloted and improved. However, despite some questions being somewhat imbalanced, respondents did not always follow the lead of the question. Therefore, although the interview data is limited, it still provides useful illumination of the results of the statistical strand.

The strength of any qualitative research is also its limitation: namely, that it only could investigate the attitudes of a selected few, who do not represent the views of all candidates or teachers. However, the fact that the qualitative study complemented a detailed statistical analysis should balance this inherent limitation of the investigation. Furthermore, by reporting pupils' voice, the qualitative strand could enrich the analysis of the effects of modularisation by investigating issues from a different angle.

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APPENDIX A: PILOT STUDY (QUALITATIVE STRAND)

A pilot study was carried out in order to assess what examiners (some of them teachers) thought about modularisation, in order to tap into the general ideas and attitudes of professionals who would be closely affected by the changes.

Method

Ten examiners of IGCSE Business Studies were paid to be involved in a pilot study, which aimed to tap into markers' general views on several issues surrounding modularisation. The research questions of the qualitative strand and other issues were included in the pilot study, which was administered as a brief exercise within the 'Markers' metacognition' research project (Nádas, 2009), with the primary aim of providing meaningful tasks for examiners assigned as a control group.

As Business Studies IGCSE examinations do not follow a modular curriculum, examiners did not have first-hand experience on teaching or assessing within a modularised Business Studies curriculum; therefore, they were given information on OCR's plans on the modularisation of Business Studies GCSE in the form of a handout summarising the changes, the official leaflet from OCR website on course details, and also excerpts from the article '*Take GCSEs bit by bit then have a year's rest*', published by *The Times* on the 29th of August, 2008. Examiners discussed the following issues in groups for 30 minutes, and recorded their comments on answer sheets:

1. How do you think modular assessment will affect the time spent on exam preparation for teachers and students?
2. How do you think modular assessment will affect the motivation of teachers and students?
3. How do you think modular assessment will affect the workload of teachers and students?
4. How do you think modular assessment will affect the time spent on exam preparation for teachers and students?
5. How do you think modular assessment will affect enrichment activities?

Results

Participating examiners were quite pessimistic about the effect of modularisation on all of the issues. Some of their comments are directly quoted (in italics) in the following summary.

Regarding teachers' motivation, they expected that teachers would be de-motivated and '*traumatised due to January exams*', and were worried that they might not have the time to teach the modules. Modularisation was feared to '*lead to a treadmill'*, and that only small classes would benefit from the changes.

As for the effect on students' motivation, the picture was more mixed: some examiners thought modularisation would improve the learning process of students, while others were concerned that '*learning about whole subjects/topics can be limited as students only focus on "micro" topics',* or that *'students may lose sight of the needs and benefits of extended, "joined up" thinking'*. Some were concerned that students' learning and grades in other subjects will be damaged by modularisation;

others were worried that weaker students become de-motivated if they receive poor results during the year. However, some hoped that modularisation *'can really drive if results are good'*. Other examiners praised modularisation as it '*gives immediate focus'* for students.

As for the effect on teachers' workload, examiners were worried that teachers would need '*more admin skills'* and '*individualised learning programmes'*, which would place staff '*under pressure'*. They also mentioned the possibility that the workload levels of teachers increase due to preparing students for examination many times during the year, in addition to teaching the material. Some envisioned that teaching would be replaced by '*speed teaching'* due to the lack of time; however, others hoped that teachers might be more focused as a result. Again, some expressed their view that giving feedback on students' progress after modularisation would place more continuous pressure on teachers.

On the issue of modularisation's effects on students' workload, some examiners thought that many parents would '*pressurise*' their children to achieve at their GCSE. As for the benefits, they mentioned spreading of the workload over two years and the possible benefits for short term memory. Some also mentioned that gender might make a difference: girls would benefit in terms of differences in maturity of learning, and they also prefer coursework and continuous assessment. Some reckoned that modularisation allows students of unique attendance problems to be assessed.

To the question regarding how modular assessment will affect teachers' time spent on exam preparation, examiners commented that teachers' focus would probably narrow to '*one module at a time, with little emphasis upon synoptic style questions*', leading to '*fewer opportunities to bring all the elements of business problem solving together'*. More pessimistic examiners thought modularisation would sacrifice learning to make time for examination preparation: '*Entirely exam preparation time. Not sure whether learning takes place.'* However, they also mentioned that students and teachers getting informed assessment about their progress as an advantage of modularisation.

Examiners gave similar answers when their opinions were asked on the effects of modularisation for students' time, adding that modularisation '*may lead to stress'*.

Examiners thought modularisation would damage or make enrichment activities peripheral: '*enrichment activities require time, and if the activity is not rewarded by certification it's less likely to occur'*. Some added that only '*resource-rich schools [would] benefit'* from modularisation regarding the enrichment activities.

APPENDIX B: INTRINSIC MOTIVATION INVENTORY

This questionnaire measures how motivated you were to take your Maths GCSE examination. Remember, there are no right or wrong answers. Please fill in this part of the survey only if you took a GCSE in Maths in March 2009. For each statement, **please indicate how true it is for you**, using the following scale:

1	2	3	4	5	6	7
not at all true			somewhat true			very true

Please enter your ratings here: ⇩

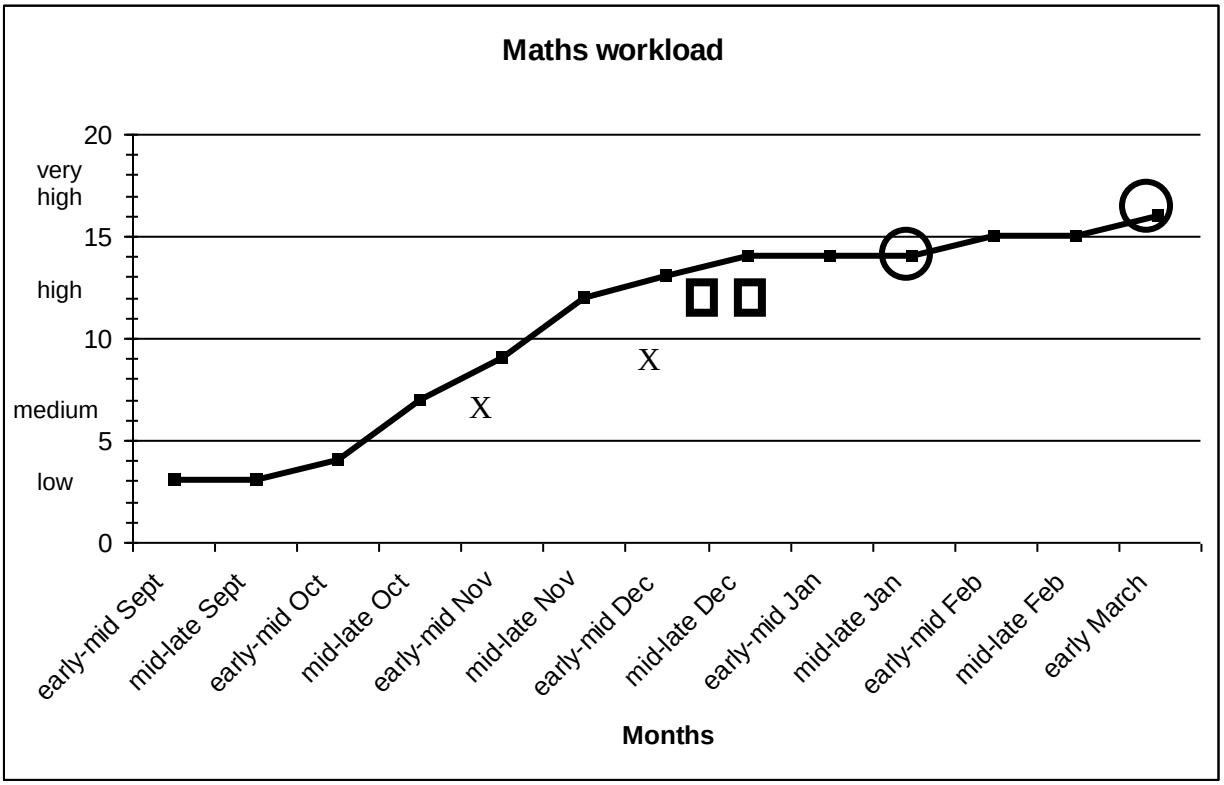
1	I didn't really have a choice about taking this exam.	
2	I felt very tense while sitting the examination.	
3	I think taking this exam could help me to achieve my future goals.	
4	I believe taking the exam could be of some value to me.	
5	While I was sitting the examination, I was thinking about how much I enjoyed it.	
6	I enjoyed taking the exam very much.	
7	I am satisfied with my performance in the exam.	
8	I would describe taking this exam as very interesting.	
9	I think I did pretty well on this exam, compared to other students.	
10	I was anxious while working on this examination.	
11	I felt pressured while answering the questions on this exam.	
12	The examination did not hold my attention at all.	
13	I did not feel nervous at all while sitting the exam.	
14	I didn't try very hard to do well on the exam.	
15	I thought this was a boring exam.	
16	I think it was important to sit the exam.	
17	This exam was fun to do.	
18	I was very relaxed while sitting the exam.	
19	I think that taking this exam is useful.	
20	This was an exam where I couldn't do very well.	
21	I tried very hard on this exam.	
22	It was important to me to do well at this exam.	
23	I took this exam because I wanted to.	
24	I believe I had some choice about taking this exam.	
25	After working on the exam for a while, I felt pretty competent.	
26	I think I was pretty good on this unit.	
27	I think this exam was important to take.	
28	I took this exam because I had no choice.	
29	I put a lot of effort into preparing for the exam.	
30	I believe sitting this exam could be beneficial to me.	
31	I felt like it was not my own choice to sit this exam.	
32	I was pretty skilled at this exam.	
33	I took this exam because I had to.	
34	I would be willing to re-sit this exam because it has some value to me.	
35	I thought taking the exam was quite enjoyable.	
36	I didn't put much energy into preparing for the exam.	
37	I felt like I had to take this exam.	

APPENDIX C: EXAMPLE OF WORKLOAD CHART

Measuring your workload in mathematics

I would like you to think about this school year in terms of your tasks studying maths (both in and out of class) and your exams in the subject.

Please draw a diagram which indicates the amount of workload in maths in this school year. To help you, here is one made by another student:



Explanation:
Circle = GCSE in maths X = tests in the class ▯ = a lot of homework

This chart is divided into 20 points and 4 sections:

0-5 points: '**low workload**' (not too much homework and no exams);

6-10 points: '**medium workload**' (some homework and exams but still do-able);

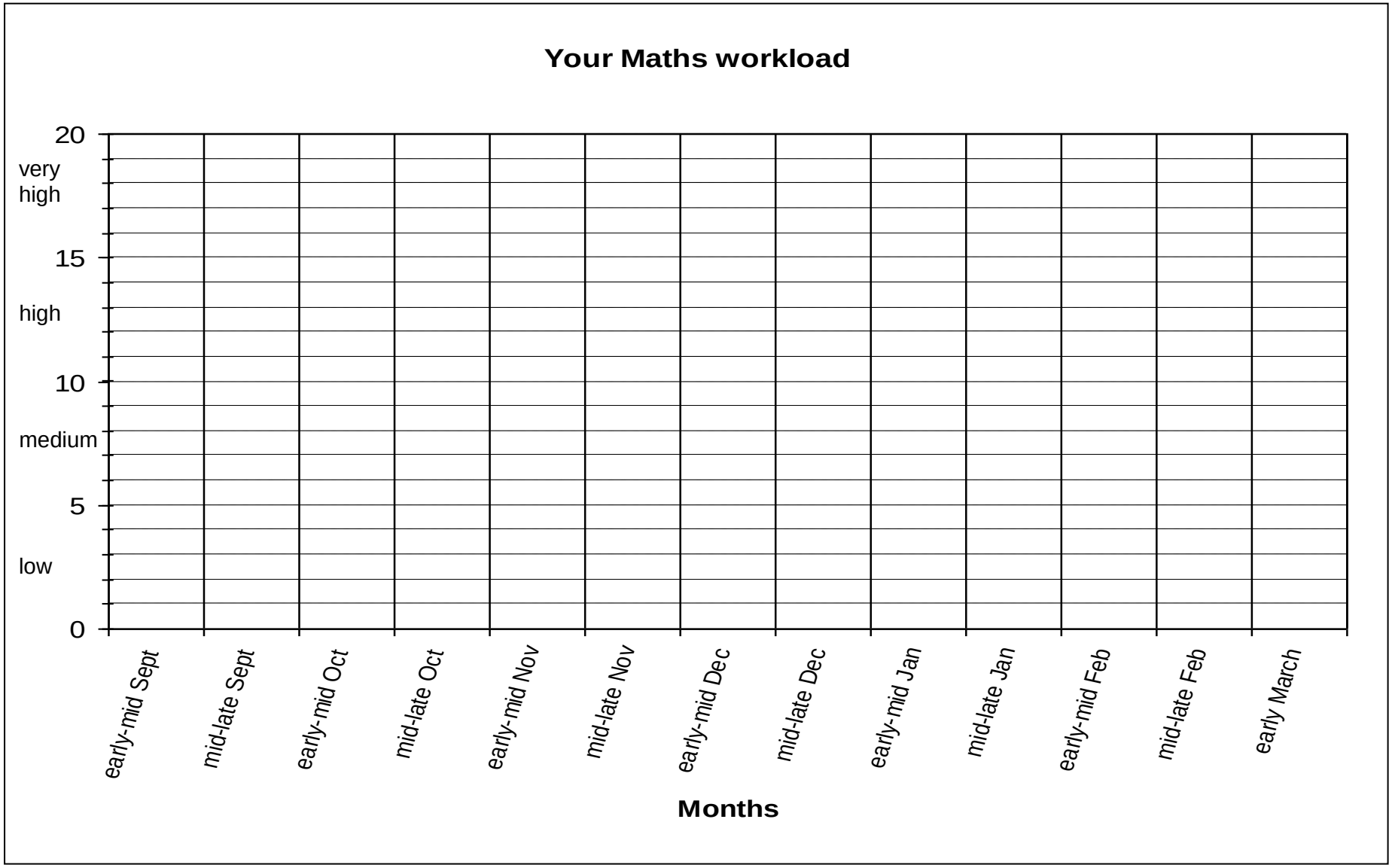
11-15 points: '**high workload**' (requiring much of your time and attention);

16-20 points: '**very high workload**' (too much to do).

This student had her GCSE in January and March, so she put a circle around those data points. She had a lot of homework before that, and also in December, so she put squares in the chart. She also had tests in the class, indicated by the crosses (X).

Please indicate your workload on the blank chart on the next page and explain below the chart.

Your diagram will be different from the one above – you might have not experienced low or very high workload. Remember, there is no wrong or right diagram – but it has to be true for you.


Your Maths workload
20
very high
15
high
10
medium
5
low
0
early-mid Sept
mid-late Sept
early-mid Oct
mid-late Oct
early-mid Nov
mid-late Nov
early-mid Dec
mid-late Dec
early-mid Jan
mid-late Jan
early-mid Feb
mid-late Feb
early March
Months

APPENDIX D: MEASURING STUDENTS' FAMILIARITY WITH THEIR GCSE EXAMINATIONS

MODULAR MATHEMATICS

Mini exam-quiz – how well do you know your exam?
Please fill in the table. Please WORK ON YOUR OWN…

	Duration (hours)	Weighting (the % it gives towards your grade)	Can you re-sit this exam? (Y/N)	Grades available	Total marks available	Which modules does this paper sample from?	Can you use a calculator on any part of this paper? (Y/N)	When does it take place in 2009? (d/m)
Any module exam		%						
Terminal paper (Foundation)		%		from to				
Terminal paper (Higher)		%		from to				

You can find the answers on www.ocr.org.uk.

LINEAR MATHEMATICS

Mini exam-quiz – how well do you know your exam?
Please fill in the table. Please WORK ON YOUR OWN…

Tier	Paper 1	Paper 2	Paper 3	Paper 4
	Foundation	Foundation	Higher	Higher
Grades available	From __ to___	From __ to___	From __ to___	From __ to___
Total marks available				
Duration (hours)				
Weighting (the % it gives towards your grade)	%	%	%	%
Can you use a calculator on this paper? (Y/N)				
When does it take place in 2009? (day/month)				
Can you re-sit this exam? (Y/N)				

You can find the answers on www.ocr.org.uk.

APPENDIX E1: FIRST INTERVIEW SCHEDULE FOR STUDENTS OF MODULAR MATHEMATICS

You are in year 11. You have just taken some GCSE examinations in Maths. I am going to ask you around 30 questions about your GCSE exam experience.

1. Which module exams did you just take?

Feedback on January module exams

2. Did you take any modules in January? IF 'NO': Go to Q14.
3. Do you think having an examination during the year helps your learning? How?
4. Do you know the results on your January exams?
5. Did you receive detailed feedback from your teacher?
6. Did this help you with preparing for the March exam?
7. Did the feedback from the January exam motivate you or de-motivate you for your March exam?
8. How did you use the feedback from the previous exam to help your learning?
9. Did you think the feedback you got was sufficiently informative for you?

Motivation and re-sit

Please think about the most recent exams you had in maths.

10. What kind of feedback would you be happy with for your March exam?
11. Are you thinking of re-sitting the examination? IF 'NO': Go to Q 18
12. Do you think the option of re-sit made a difference to how important the exam was for you when you took it?
13. Would you have done anything differently if there were no re-sit opportunities?

The following questions are about your activities in class

14. On average, how much time did you spend in class preparing for this exam?
15. Do you think this amount of time was enough? Too much? Too short?
16. How much and what kind of other activities were you involved in class which did not aim to prepare you for the exams?
17. Did the teacher discuss their plans and methods of teaching with you? Would you prefer to have a word in this? Is there anything you'd like to change?

The following questions are about Pressure and exam stress

18. What other subjects did you take GCSE exams in this March? Compared to the stress levels of your other exams this March, how stressful do you think your Maths exam was?
19. Did you get any guidance on how to reduce exam stress? From whom?
20. Do you think that your overall stress level about this examination was little/manageable/too much?

Workload and time management

21. How did you prepare for this exam?
22. Did you have to cover a lot? Approximately how many hours did you study for the exam after school? How much time did preparing for the exam took for you?
23. Did you feel under stress preparing for the exam?
24. Did you feel focussed during exam preparation?
25. How difficult was it for you to review the material before the exam?

26. Compared to other subjects, how difficult was it to prepare for the Maths exams?
27. Were you able to manage your time effectively when preparing for the exam?
28. Did you have a good overview on the material covered?
29. When preparing or revising for the exam, how much support did you have from your teacher?
30. What kind of support did they give?
31. Was that support enough/useful?
32. Do you think that your overall workload (including classes and out-of-school hours) preparing for this examination was little/manageable/too much?

Thank you. Please fill in the survey. Please add any comments you have.

APPENDIX E2: FIRST INTERVIEW SCHEDULE FOR STUDENTS OF LINEAR MATHEMATICS

1. Do you know your exam well? Results to mini quiz
2. Would you like to learn more about the exam or do you feel comfortable with what you know about it?
3. Is your Maths GCSE grade important for your education?
4. How much has your teacher talked to you about the examination?
5. Have you seen a past paper in Maths?
6. How much have you talked about the exam with other students / your parents or other relatives?
7. How much and what kind of other activities are you involved in class which aims to prepare you for the exams?
8. Please explain your workload chart to me!
9. Do you do your homework with your GCSE in mind, or just your maths lesson?
10. Are you motivated to study harder by having an exam?
11. Are you feeling a little nervous / stressed about the exam or are you totally relaxed?
12. Are you a good planner in general? Are you organised?
13. Do you have a plan for your revision strategy yet?
14. When do you think you will start revising?
15. What kind of support can you expect with your exam? Teacher, friends, family
16. Do you think it would be easier to revise the content if you had exams throughout the year?
17. Do you do any mock exams in school? If No: Go to Q21.
18. Are they helpful? / would you find them helpful?
19. Do you get feedback on them? How detailed?
20. How useful is the feedback you get in planning your learning?
21. Would you prefer having more frequent exams and feedback before the final exam in June?
22. Do you think more frequent feedback would help your learning? How?
23. Did the teacher discuss their plans and methods of teaching with you? Would you prefer to have a word in this? Is there anything you'd like to change?
24. Is there anything you'd change in the examination system?

APPENDIX E3: SECOND INTERVIEW SCHEDULE FOR STUDENTS OF MODULAR MATHEMATICS AND ENGLISH (ADMINISTERED AFTER THE GRADE REPORTS)

1. When did you learn about your results?
2. How did you learn about your results? (official feedback from teacher/exams officer, seen the report etc)
3. What do your grades tell you?
4. What can you say about your performance based on these grades?
5. Have you thought about what the reason behind this performance is? Why do you think you got these grades?
6. How different is this result from what you expected? (better/same/worse)
7. How different is this result from what you would like to see in June?
8. Did you go through your mistakes and strengths in the paper?
   a. NO: why? (not interested / not occurred to you / no opportunity)
   b. YES: alone or with teacher?
   c. YES: Do you think that now that you know your mistakes and strengths you will be better at avoiding these mistakes in the final paper?
9. Did you receive any other kind of feedback from your teacher? (NO: would you like to?)
10. Did you receive any other kind of feedback from anyone else?
11. Did receiving the grades prompt you to think about what to do next until your final exams?
12. Does seeing grades help you plan your preparation towards studying for the final paper?
13. What is your preparation plan until June?
14. Are you feeling more motivated / less motivated to study for the final exam now that you know these results? Why?
15. Did seeing this grade change your learning/preparation strategy for the June exam?
16. Do you think this grade report is a useful tool for you to plan your future learning and revision? Why? How?
17. How could the feedback be made more useful for your exam preparation and learning?
18. Would a different form of feedback help you more?
19. (To student of English) You sat the exam in January, and you got the result mid March. Does the elapsed time affect how you can use your feedback now?
20. Did it help you with your March exam to have sat an exam in January?
    (e.g. similar exam situation experience, gaining confidence, experience in revision, lessons learnt from January grade reports)
21. Do you have any other comments regarding the feedback/grade report?

APPENDIX E4: INTERVIEW WITH TEACHERS OF MODULAR MATHEMATICS OR ENGLISH

1. One of the advantages of modular assessment claims that the assessment can be timed to match the point of learning within the course, making it easier for candidates to show what they know, understand and can do. Do you find this in practice?
2. How much voice did you have in shaping the assessment system in your school?
3. Would you change anything in the existing modularised assessment system?
4. How much and what kind of enrichment activities are you involved in?
5. Do you think a modularised curriculum and assessment has an effect on the enrichment activities?
6. Do you think examinations have a beneficial or adverse effect on your teaching overall?
7. Do you think a modularised curriculum and assessment benefits student learning? How?
8. How do you think this exam motivated your students?
9. Some people think the opportunity to re-sit an exam de-motivates students. What is your experience?
10. Have you got anything to do with the grade reports? Do you use them in giving feedback to students?
11. Do you feel you have enough opportunities to report back to students on their achievements?
12. Were you motivated by the exam?
13. How did your motivation change throughout this school your up to now? Stable-fluctuating? high-low?
14. Do you think a modularised curriculum affects teaching and exam preparation time in class?
15. Do you think having regular exams might have an effect on exam preparation time in class? What would this effect be?
16. Do you think teaching in modules gives due weight to all elements of the curriculum? Or do you think it focuses more on the ones which form part of the exams?
17. Do you think a modularised curriculum helps you focus? How?
18. Do you think teaching in modules affects your planning and in resourcing your lessons? How?
19. Would you say that a modularised curriculum affects your teaching style? How?
20. In your experience, does a modularised curriculum allow teachers and students to negotiate on how students would like to learn?
21. Does teaching in modules affect cooperation between teachers, students and exam centres in your experience?
22. What other advantages / disadvantages do you see in teaching and assessing in modules?

Please fill in the workload survey.

APPENDIX E5: INTERVIEW WITH THE TEACHER OF LINEAR MATHEMATICS

1. Please fill in the survey, and please explain your workload chart.
2. How much and what kind of enrichment activities are you involved in? Is this affected by the linear assessment?
3. Do you think a linear curriculum and assessment benefits student learning? How?
4. Do you think teaching in a linear fashion gives due weight to all elements of the curriculum?
5. Do you think a linear curriculum helps you focus? How?
6. Do you think a linear curriculum affects your planning and in resourcing your lessons? How?
7. Do you usually have the examination on your mind when preparing for lessons?
8. How much direct examination preparation do you do in class these days?
9. How much have you discussed the students about the examination this year? Are they keen to receive info?
10. Do you think having examinations at the end of the course has a beneficial or adverse effect on your teaching overall?
11. Do you set up mock exams? IF no, GO TO Q16.
12. In your experience, are mock exams useful for the student? Why?
13. Do you find students are motivated by mock exams?
14. Do mock exams influence your teaching motivation?
15. How do mock exams contribute to your workload?
16. What advantages or disadvantages do you see in having one examination at the end of the 2-year course?
17. Do you feel you have enough opportunities to report back to students on their achievements?
18. Have you got anything to do with the grade reports? Do you use them in giving feedback to students?
19. Do you feel you need to re-motivate students before the examination to revisit the content that was covered previously? Is this difficult?
20. Would you prefer having more exams during the year? Why?
21. Would you say that a linear curriculum affects your teaching style? How?
22. Would you change anything in the existing assessment system?
23. In your experience, does a linear curriculum allow teachers and students to negotiate how students would like to learn?
24. Does teaching a linear course affect cooperation between teachers, students and exam centres in your experience?
25. What other advantages / disadvantages do you see in teaching and assessing in the linear fashion?

APPENDIX F: TABLES AND GRAPHS, GCSE ENGLISH. SPECIFICATION LEVEL

Combinations of units leading to a GCSE English, 2004-2009 [39]

Table F1: GCSE English – unit combinations (taken by more than 200 students). Cohort 1 (2004)

Unit					Frequency	Percent
2431	2432	2433	2434	2435		
Jun-04	Jun-04		Jun-04	Jun-04	57980	81.20
Jun-04	Jun-04		Jan-04	Jun-04	1989	2.79
Jun-04	Jun-04		Jan-04	Jan-04	1784	2.50
Jun-04	Jun-04	Jun-04		Jun-04	1699	2.38
Jun-04	Jun-04	Jun-03		Jun-04	1000	1.40
Jun-04	Jun-04	Jun-03	Jun-04	Jun-04	965	1.35
Jun-04	Jun-04	Jun-04	Jun-04	Jun-04	551	0.77
Jun-04	Jan-04	Jun-04		Jun-04	439	0.61
Jun-04	Jun-04	Jun-03, Jan-04		Jun-04	400	0.56
Jun-04	Jun-03	Jun-04		Jun-04	295	0.41
Jun-04	Jun-04	Jun-04		Jan-04	290	0.41
Jan-04	Jun-04		Jun-04	Jun-04	270	0.38
Jun-04	Jun-04		Jan-04, Jun-04	Jun-04	260	0.36
Jan-04, Jun-04	Jun-04		Jun-04	Jun-04	251	0.35
Jun-04	Jun-04		Jan-04, Jun-04	Jan-04	234	0.33
Jun-04	Jun-04	Jan-04		Jun-04	224	0.31
Jun-04	Jan-04, Jun-04		Jun-04	Jun-04	209	0.29
Jan-04, Jun-04	Jan-04, Jun-04		Jun-04	Jun-04	202	0.28

Table F2: GCSE English – unit combinations (taken by more than 200 students). Cohort 2 (2005)

Unit					Frequency	Percent
2431	2432	2433	2434	2435		
Jun-05	Jun-05		Jun-05	Jun-05	56659	81.56
Jun-05	Jun-05		Jan-05	Jan-05	1825	2.63
Jun-05	Jun-05		Jan-05	Jun-05	1397	2.01
Jun-05	Jun-05	Jun-05		Jun-05	1328	1.91
Jan-05	Jan-05		Jan-05	Jan-05	670	0.96
Jun-04	Jun-04		Jun-04	Jun-04	552	0.79
Jun-05	Jun-05	Jun-04	Jun-05	Jun-05	495	0.71
Jun-05	Jun-05	Jun-04		Jun-05	488	0.70
Jun-05	Jun-05	Jan-05		Jun-05	393	0.57
Jun-05	Jun-05	Jun-05	Jun-05	Jun-05	364	0.52
Jun-05	Jan-05, Jun-05		Jun-05	Jun-05	362	0.52
Jun-05	Jun-05	Jun-04, Jan-05		Jun-05	338	0.49
Jun-05	Jun-05		Jun-04	Jun-05	313	0.45
Jun-05	Jun-04	Jun-05		Jun-05	274	0.39
Jun-05	Jan-05		Jun-05	Jun-05	206	0.30
Jun-05	Jun-05	Jun-04	Jan-05	Jun-05	205	0.30

[39] Linear paths are highlighted in grey.

Table F3: GCSE English – unit combinations (taken by more than 200 students). Cohort 3 (2006)

Unit					Frequency	Percent
2431	2432	2433	2434	2435		
Jun-06	Jun-06		Jun-06	Jun-06	53317	81.10
Jun-06	Jun-06		Jan-06	Jun-06	1873	2.85
Jun-06	Jun-06	Jun-06		Jun-06	1623	2.47
Jun-06	Jun-06		Jan-06	Jan-06	1321	2.01
Jun-06	Jun-06	Jun-05		Jun-06	652	0.99
Jun-05	Jun-05		Jun-05	Jun-05	617	0.94
Jan-06	Jan-06		Jan-06	Jan-06	593	0.90
Jun-06	Jun-06		Jun-05	Jun-06	427	0.65
Jun-05, Jan-06	Jun-06		Jun-06	Jun-06	396	0.60
Jun-06	Jun-05	Jun-06		Jun-06	368	0.56
Jan-06, Jun-06	Jun-06		Jun-06	Jun-06	356	0.54
Jun-06	Jun-06	Jun-06	Jun-06	Jun-06	343	0.52
Jan-06, Jun-06	Jan-06, Jun-06		Jan-06, Jun-06	Jan-06, Jun-06	333	0.51
Jun-06	Jun-06	Jan-06		Jun-06	319	0.49
Jun-06	Jun-06		Jun-05	Jan-06	208	0.32

Table F4: GCSE English – unit combinations (taken by more than 200 students). Cohort 4 (2007)

Unit					Frequency	Percent
2431	2432	2433	2434	2435		
Jun-07	Jun-07		Jun-07	Jun-07	45432	78.54
Jun-07	Jun-07		Jan-07	Jun-07	1767	3.05
Jun-07	Jun-07		Jan-07	Jan-07	1674	2.89
Jan-07	Jan-07		Jan-07	Jan-07	1108	1.92
Jun-07	Jun-07	Jun-07		Jun-07	1020	1.76
Jun-07	Jun-07	Jun-06		Jun-07	772	1.33
Jun-06	Jun-06		Jun-06	Jun-06	736	1.27
Jun-07	Jun-07	Jun-06	Jun-07	Jun-07	443	0.77
Jan-07, Jun-07	Jan-07, Jun-07		Jan-07, Jun-07	Jan-07, Jun-07	373	0.64
Jun-07	Jun-07	Jan-07		Jun-07	343	0.59
Jan-07, Jun-07	Jan-07, Jun-07		Jan-07	Jan-07	332	0.57
Jun-07	Jun-07	Jun-07	Jun-07	Jun-07	310	0.54
Jun-07	Jun-07		Jun-06	Jun-07	259	0.45
Jun-07	Jun-07	Jun-06, Jan-07		Jun-07	255	0.44

Table F5: GCSE English – unit combinations (taken by more than 200 students). Cohort 5 (2008)

Unit					Frequency	Percent
2431	2432	2433	2434	2435		
Jun-08	Jun-08		Jun-08	Jun-08	37140	74.58
Jun-08	Jun-08		Jan-08	Jun-08	1446	2.90
Jan-08	Jan-08		Jan-08	Jan-08	1405	2.82
Jun-08	Jun-08		Jan-08	Jan-08	1290	2.59
Jun-07	Jun-07		Jun-07	Jun-07	804	1.61
Jan-08, Jun-08	Jan-08, Jun-08		Jan-08, Jun-08	Jan-08, Jun-08	616	1.24
Jun-08	Jun-08	Jun-08		Jun-08	570	1.14
Jun-08	Jun-08	Jan-08		Jun-08	549	1.10
Jan-08, Jun-08	Jun-08		Jun-08	Jun-08	456	0.92
Jun-08	Jun-08	Jun-07		Jun-08	431	0.87
Jan-08, Jun-08	Jan-08, Jun-08		Jan-08	Jan-08	393	0.79
Jun-08	Jun-08	Jun-08	Jun-08	Jun-08	365	0.73
Jun-07, Jun-08	Jun-08		Jun-08	Jun-08	288	0.58
Jun-08	Jun-08		Jun-07	Jun-08	271	0.54
Jun-08	Jun-08	Jun-07	Jun-08	Jun-08	250	0.50
Jan-08, Jun-08	Jan-08, Jun-08		Jun-08	Jun-08	220	0.44
Jan-08, Jun-08	Jan-08, Jun-08		Jan-08, Jun-08	Jan-08	214	0.43

Table F6: GCSE English – unit combinations (taken by more than 200 students). Cohort 6 (2009)

Unit					Frequency	Percent
2431	2432	2433	2434	2435		
Jun-09	Jun-09		Jun-09	Jun-09	30471	71.86
Jan-09	Jan-09		Jan-09	Jan-09	1890	4.44
Jan-09, Jun-09	Jan-09, Jun-09		Jan-09, Jun-09	Jan-09, Jun-09	1049	2.47
Jun-08	Jun-08		Jun-08	Jun-08	1038	2.44
Jun-09	Jun-09		Jan-09	Jun-09	797	1.88
Jan-09, Jun-09	Jan-09, Jun-09		Jan-09	Jan-09	778	1.83
Jun-09	Jun-09		Jan-09	Jan-09	634	1.5
Jun-09	Jun-09	Jun-08		Jun-09	488	1.15
Jun-09	Jun-09	Jun-08, Jan-09		Jun-09	377	0.89
Jan-09, Jun-09	Jun-09		Jun-09	Jun-09	364	0.86
Jun-09	Jun-09	Jun-09		Jun-09	338	0.8
Jun-09	Jun-09	Jan-09		Jun-09	251	0.59
Jun-09	Jun-09	Jun-09	Jun-09	Jun-09	229	0.54
Jun-09	Jun-09	Jun-08	Jun-09	Jun-09	224	0.53
Jun-09	Jun-09	Jan-09	Jun-09	Jun-09	223	0.53
Jun-08, Jun-09	Jun-08, Jun-09		Jun-08, Jun-09	Jun-08, Jun-09	217	0.51
Jun-09	Jun-09		Jun-09	Jan-09	209	0.49

Grade distributions in GCSE English, 2004-2009

Table F7: GCSE English grade distribution. Cohort 1 (2004)

Grade	Frequency	Percent	Cumulative Frequency	Cumulative Percent
A*	3286	4.60	3286	4.60
A	10846	15.19	14132	19.79
B	15831	22.17	29963	41.96
C	15607	21.86	45570	63.82
D	11307	15.84	56877	79.66
E	7132	9.99	64009	89.65
F	4076	5.71	68085	95.36
G	1936	2.71	70021	98.07
U	1188	1.66	71209	99.73

Table F8: GCSE English grade distribution. Cohort 2 (2005)

Grade	Frequency	Percent	Cumulative Frequency	Cumulative Percent
A*	3896	5.61	3896	5.61
A	11022	15.88	14918	21.49
B	15714	22.63	30632	44.12
C	14971	21.56	45603	65.68
D	10694	15.40	56297	81.08
E	6721	9.68	63018	90.76
F	3590	5.17	66608	95.93
G	1641	2.36	68249	98.29
U	957	1.38	69206	99.67

Table F9: GCSE English grade distribution. Cohort 3 (2006)

Grade	Frequency	Percent	Cumulative Frequency	Cumulative Percent
A*	4007	6.11	4007	6.11
A	10234	15.60	14241	21.71
B	15255	23.26	29496	44.97
C	14546	22.18	44042	67.15
D	10220	15.58	54262	82.73
E	6069	9.25	60331	91.98
F	3052	4.65	63383	96.63
G	1334	2.03	64717	98.67
U	744	1.13	65461	99.80

Table F10: GCSE English grade distribution. Cohort 4 (2007)

Grade	Frequency	Percent	Cumulative Frequency	Cumulative Percent
A*	3795	6.59	3795	6.59
A	9845	17.09	13640	23.68
B	14003	24.30	27643	47.98
C	12650	21.96	40293	69.94
D	8408	14.59	48701	84.53
E	4682	8.13	53383	92.66
F	2370	4.11	55753	96.77
G	1100	1.91	56853	98.68
U	621	1.08	57474	99.76

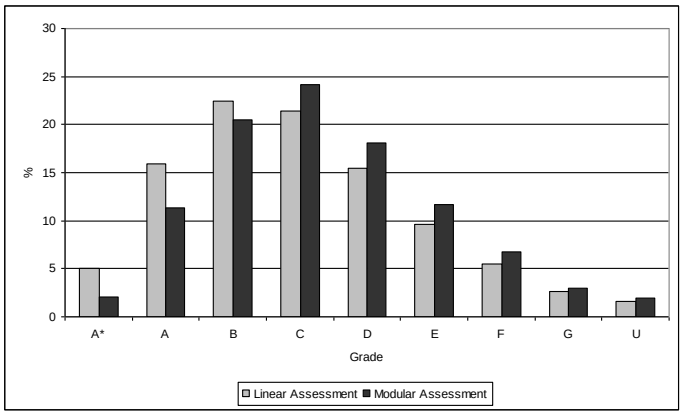
Table F11: GCSE English grade distribution. Cohort 5 (2008)

Grade	Frequency	Percent	Cumulative Frequency	Cumulative Percent
A*	3412	6.85	3412	6.85
A	8838	17.75	12250	24.60
B	12122	24.34	24372	48.94
C	11153	22.40	35525	71.34
D	6958	13.97	42483	85.31
E	3815	7.66	46298	92.97
F	1984	3.98	48282	96.95
G	947	1.90	49229	98.85
U	472	0.95	49701	99.80

Table F12: GCSE English grade distribution. Cohort 6 (2009)

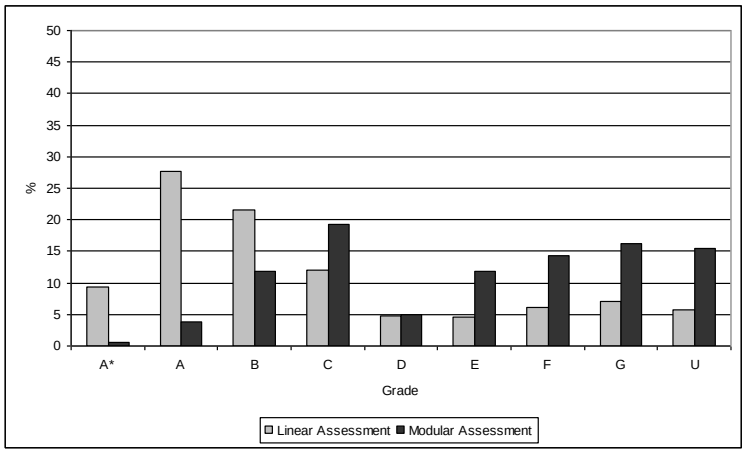
Grade	Frequency	Percent	Cumulative Frequency	Cumulative Percent
A*	3149	7.47	3149	7.47
A	7628	18.11	10777	25.58
B	10151	24.09	20928	49.67
C	9929	23.57	30857	73.24
D	5595	13.28	36452	86.52
E	2826	6.71	39278	93.23
F	1526	3.62	40804	96.85
G	770	1.83	41574	98.68
U	424	1.01	41998	99.69

Grade distributions in GCSE English by assessment route, 2004-2009

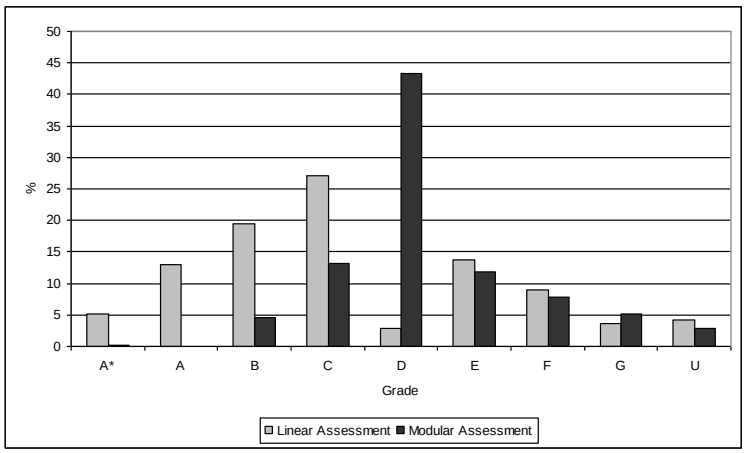


June 2004

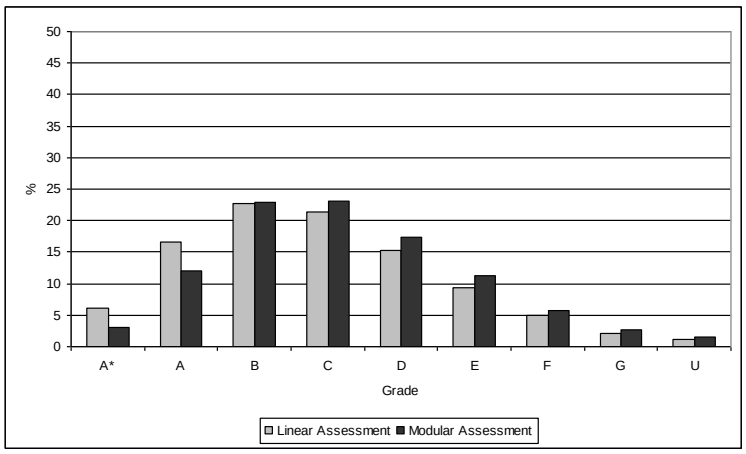
Figure F1: Grade distributions in GCSE English – Linear vs. Modular. Cohort 1 (2004)



(a) June 2004

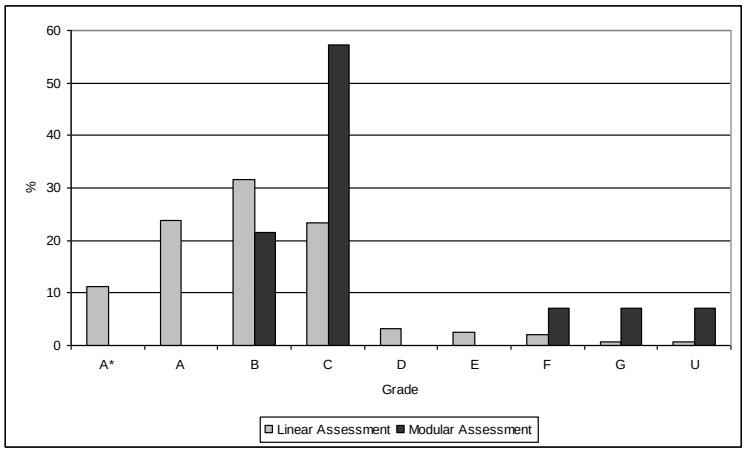


(b) January 2005

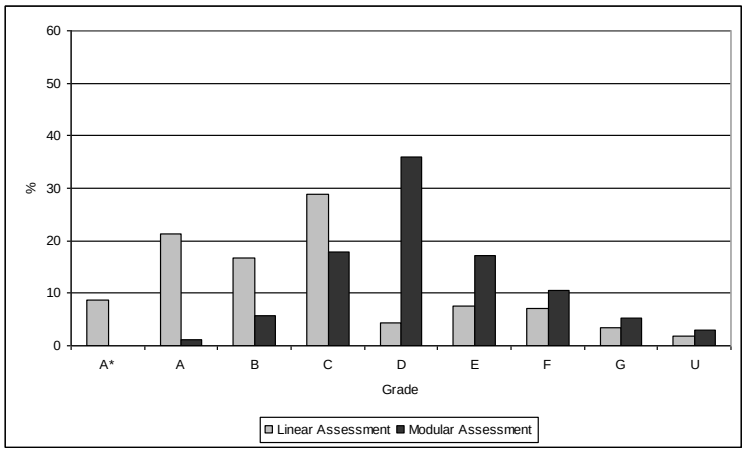


(c) June 2005

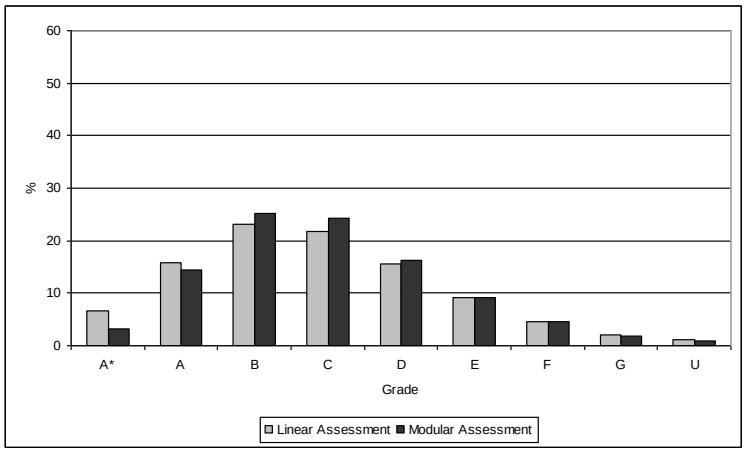
Figure F2: Grade distributions in GCSE English – Linear vs. Modular. Cohort 2 (2005)



(a) June 2005

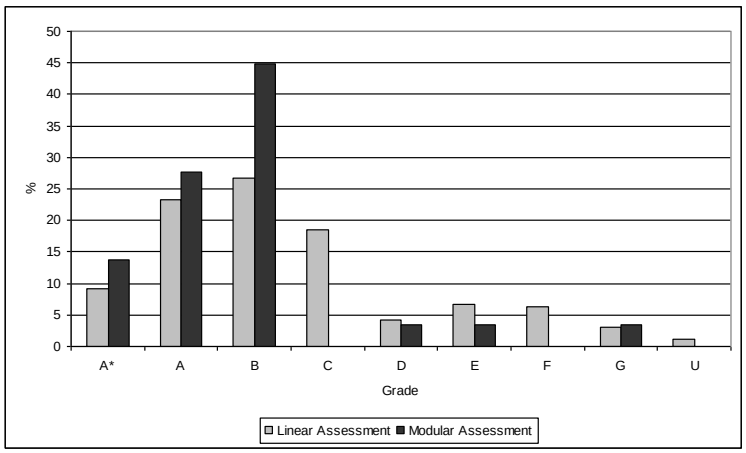


(b) January 2006

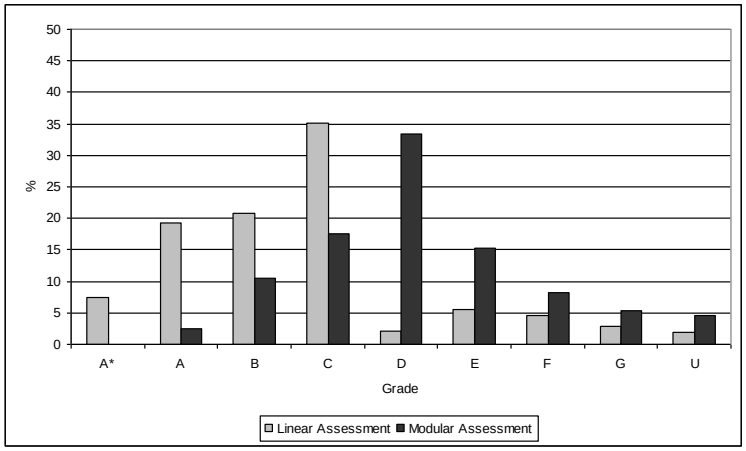


(c) June 2006

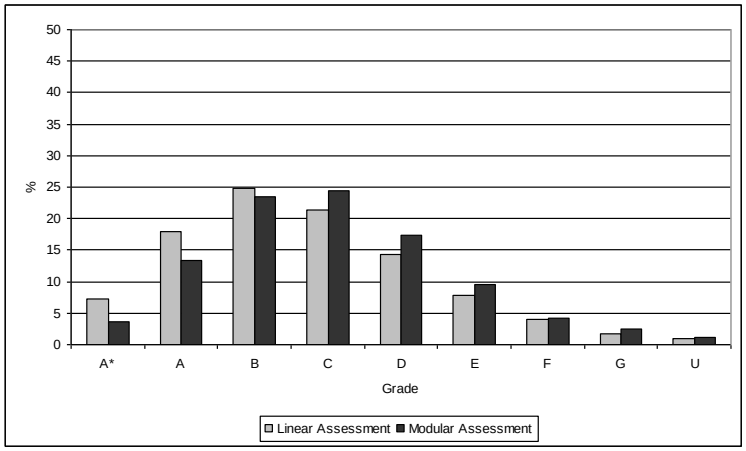
Figure F3: Grade distributions in GCSE English – Linear vs. Modular. Cohort 3 (2006)



(a) June 2006

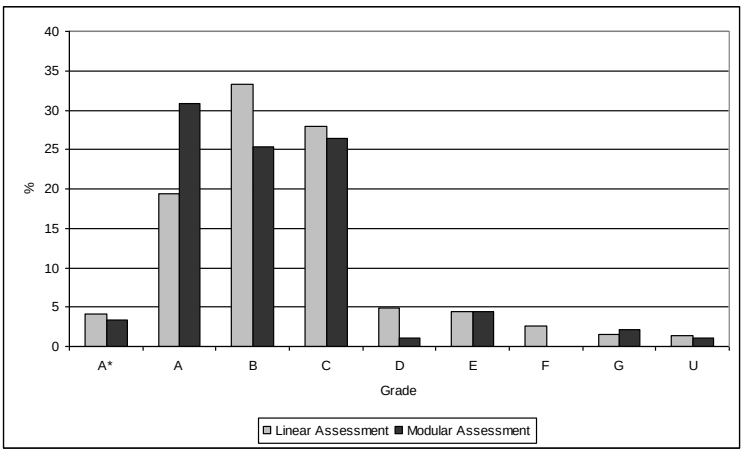


(b) January 2007

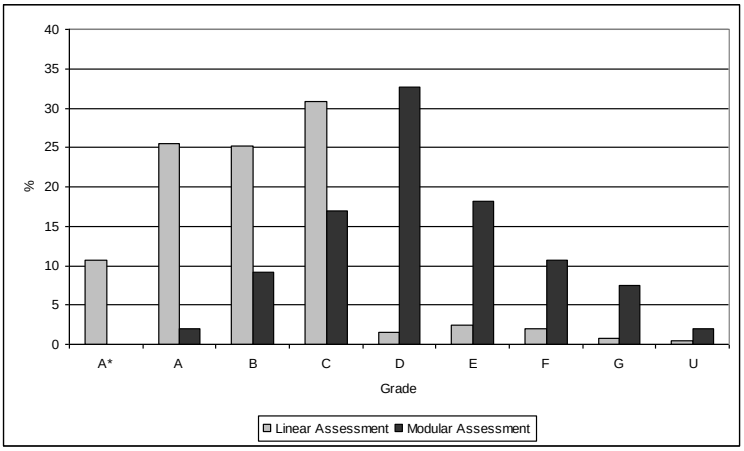


(c) June 2007

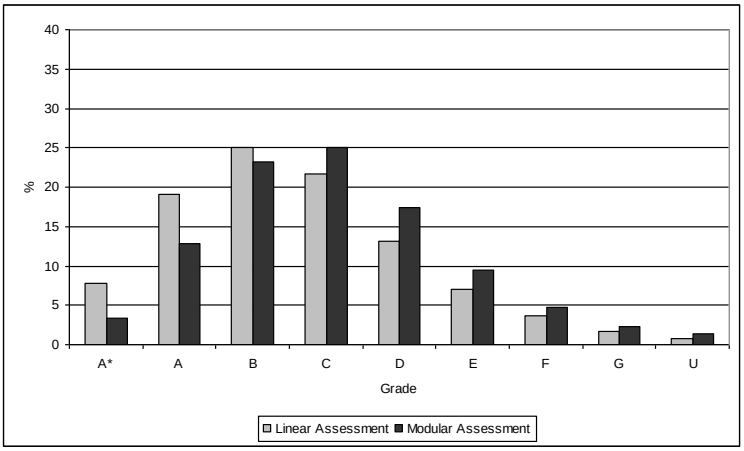
Figure F4: Grade distributions in GCSE English – Linear vs. Modular. Cohort 4 (2007)



(a) June 2007

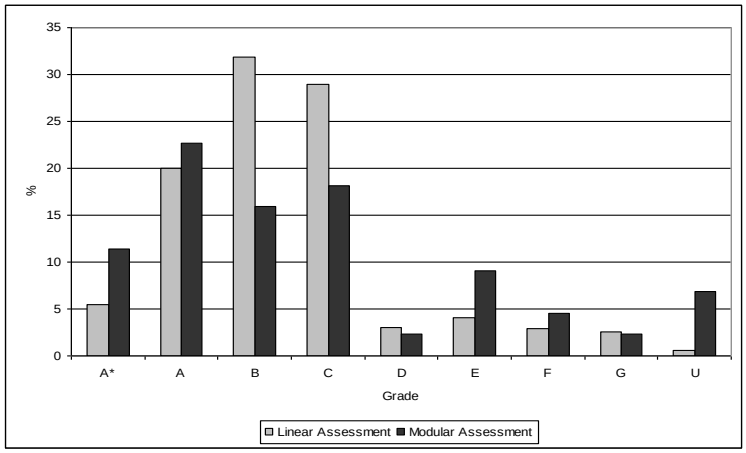


(b) January 2008

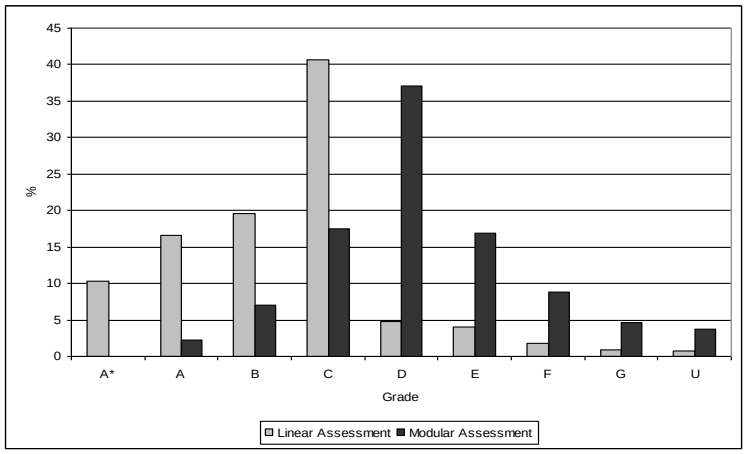


(c) June 2008

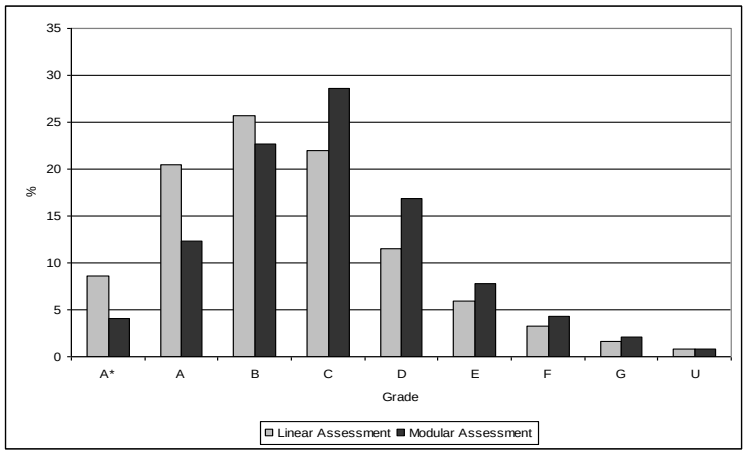
Figure F5: Grade distributions in GCSE English – Linear vs. Modular. Cohort 5 (2008)



(a) June 2008



(b) January 2009



(c) June 2009

Figure F6: Grade distributions in GCSE English – Linear vs. Modular. Cohort 6 (2009)

***Logistic Regression tables: Linear vs. Modular assessment route*[40]**

Table F13: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Cohort 1 (2004)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.24**	**1.27**	**0.51**	**1.67**	**2.76**	**15.77**	-0.15	1.43
At least grade A	**0.26**	**1.30**	**0.22**	**1.25**	**2.22**	**9.21**	0.12	1.41
At least grade B	**0.35**	**1.42**	**0.12**	**1.13**	**2.21**	**9.12**	**0.17**	**1.34**
At least grade C	**0.73**	**2.08**	0.01	1.01	**2.14**	**8.50**	-0.03	0.98
At least grade D	**0.97**	**2.64**	-0.07	0.93	**1.97**	**7.17**	0.00	0.93
At least grade E	**1.05**	**2.86**	**-0.09**	**0.91**	**1.85**	**6.36**	-0.01	0.91
At least grade F	**0.88**	**2.41**	-0.10	0.90	**1.79**	**5.99**	0.13	1.03
At least grade G	**0.70**	**2.01**	0.14	1.15	**1.85**	**6.36**	0.09	1.26

Table F14: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Cohort 2 (2005)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.35**	**1.42**	**0.41**	**1.51**	**2.79**	**16.21**	-0.21	1.23
At least grade A	**0.34**	**1.40**	**0.26**	**1.30**	**2.34**	**10.36**	0.01	1.31
At least grade B	**0.30**	**1.35**	0.00	1.00	**2.28**	**9.82**	**0.19**	**1.21**
At least grade C	**0.58**	**1.79**	0.07	1.07	**2.20**	**9.05**	**0.17**	**1.27**
At least grade D	**0.77**	**2.16**	0.04	1.04	**2.00**	**7.42**	0.14	1.20
At least grade E	**0.97**	**2.64**	**0.16**	**1.17**	**1.87**	**6.50**	-0.01	1.16
At least grade F	**0.73**	**2.08**	**0.28**	**1.32**	**1.75**	**5.77**	0.10	1.46
At least grade G	**0.45**	**1.57**	**0.35**	**1.42**	**1.78**	**5.91**	0.07	1.51

[40] Significant effects are highlighted in bold type.

Table F15: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Cohort 3 (2006)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	0.06	1.06	**0.38**	**1.46**	**2.88**	**17.87**	0.29	1.95
At least grade A	**0.37**	**1.45**	0.09	1.09	**2.36**	**10.54**	0.16	1.29
At least grade B	**0.58**	**1.79**	0.00	1.00	**2.36**	**10.54**	0.04	1.04
At least grade C	**0.86**	**2.36**	0.07	1.07	**2.23**	**9.34**	-0.14	0.93
At least grade D	**1.07**	**2.92**	0.00	1.00	**2.04**	**7.68**	-0.13	0.88
At least grade E	**1.07**	**2.92**	0.03	1.03	**1.83**	**6.26**	-0.02	1.01
At least grade F	**0.75**	**2.12**	-0.04	0.96	**1.77**	**5.88**	0.19	1.17
At least grade G	**0.54**	**1.72**	0.03	1.03	**1.81**	**6.10**	0.17	1.22

Table F16: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Cohort 4 (2007)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.33**	**1.39**	**0.46**	**1.58**	**2.72**	**15.20**	**-0.34**	**1.13**
At least grade A	**0.29**	**1.34**	0.12	1.13	**2.19**	**8.95**	0.12	1.27
At least grade B	**0.47**	**1.60**	0.06	1.06	**2.19**	**8.98**	**0.11**	**1.19**
At least grade C	**0.80**	**2.23**	**0.16**	**1.17**	**2.16**	**8.68**	-0.01	1.16
At least grade D	**1.23**	**3.42**	0.08	1.08	**2.00**	**7.37**	-0.16	0.92
At least grade E	**1.33**	**3.78**	0.13	1.14	**1.85**	**6.35**	-0.19	0.94
At least grade F	**1.16**	**3.19**	**0.41**	**1.51**	**1.75**	**5.77**	-0.12	1.34
At least grade G	**0.48**	**1.62**	**0.28**	**1.32**	**1.71**	**5.54**	0.27	1.74

Table F17: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Cohort 5 (2008)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	0.27	1.31	**0.33**	**1.39**	**3.11**	**22.41**	-0.06	1.31
At least grade A	**0.32**	**1.38**	0.10	1.11	**2.42**	**11.30**	0.17	1.31
At least grade B	**0.53**	**1.70**	0.10	1.11	**2.43**	**11.39**	0.03	1.14
At least grade C	**0.76**	**2.14**	**0.27**	**1.31**	**2.22**	**9.21**	-0.02	1.28
At least grade D	**1.10**	**3.00**	**0.18**	**1.20**	**1.97**	**7.19**	-0.18	1.00
At least grade E	**1.05**	**2.86**	**0.23**	**1.26**	**1.71**	**5.50**	-0.14	1.10
At least grade F	**1.07**	**2.92**	**0.41**	**1.51**	**1.56**	**4.78**	-0.23	1.20
At least grade G	**0.90**	**2.46**	**0.48**	**1.62**	**1.51**	**4.52**	-0.34	1.15

Table F18: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Cohort 6 (2009)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.52**	**1.68**	0.31	1.37	**0.23**	**1.26**	-0.03	1.33
At least grade A	**0.55**	**1.73**	**0.72**	**2.06**	**0.20**	**1.22**	-0.02	2.01
At least grade B	**0.73**	**2.08**	**0.83**	**2.29**	**0.17**	**1.19**	-0.15	1.98
At least grade C	**0.82**	**2.27**	**0.81**	**2.24**	**0.17**	**1.18**	-0.11	2.01
At least grade D	**0.87**	**2.39**	**0.32**	**1.38**	**0.17**	**1.19**	0.00	1.38
At least grade E	**0.76**	**2.14**	**0.28**	**1.33**	**0.15**	**1.17**	0.18	1.58
At least grade F	**0.63**	**1.88**	**0.38**	**1.47**	**0.13**	**1.13**	0.21	1.80
At least grade G	**1.07**	**2.91**	**0.79**	**2.21**	**0.10**	**1.11**	-0.41	1.46

Impact of re-sits on overall outcomes

Table F19: Regression parameters and odds ratios for gender, number of units re-sat and general attainment. Cohort 1 (2004)

Grade	Gender (F)		Number of units re-sat		General attainment	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.06**	**1.06**	-0.15	0.86	**2.77**	**15.98**
At least grade A	**0.19**	**1.21**	**-0.14**	**0.87**	**2.22**	**9.24**
At least grade B	**0.25**	**1.28**	**-0.47**	**0.62**	**2.22**	**9.18**
At least grade C	**0.35**	**1.42**	-0.01	0.99	**2.14**	**8.51**
At least grade D	**0.48**	**1.62**	**0.29**	**1.34**	**1.97**	**7.19**
At least grade E	**0.53**	**1.69**	**0.34**	**1.40**	**1.85**	**6.36**
At least grade F	**0.50**	**1.65**	**0.49**	**1.63**	**1.79**	**5.97**
At least grade G	**0.39**	**1.48**	**0.54**	**1.72**	**1.85**	**6.35**

Table F20: Regression parameters and odds ratios for gender, number of units re-sat and general attainment. Cohort 2 (2005)

Grade	Gender (F)		Number of units re-sat		General attainment	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.08**	**1.09**	-0.12	0.89	**2.79**	**16.34**
At least grade A	**0.18**	**1.19**	**-0.28**	**0.75**	**2.34**	**10.40**
At least grade B	**0.23**	**1.26**	**-0.49**	**0.61**	**2.28**	**9.81**
At least grade C	**0.36**	**1.44**	**-0.53**	**0.59**	**2.21**	**9.07**
At least grade D	**0.45**	**1.56**	0.03	1.03	**2.01**	**7.43**
At least grade E	**0.48**	**1.62**	**0.13**	**1.14**	**1.87**	**6.51**
At least grade F	**0.40**	**1.49**	**0.27**	**1.31**	**1.75**	**5.77**
At least grade G	**0.25**	**1.28**	**0.46**	**1.59**	**1.78**	**5.93**

Table F21: Regression parameters and odds ratios for gender, number of units re-sat and general attainment. Cohort 3 (2006)

Grade	Gender (F)		Number of units re-sat		General attainment	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.16**	**1.18**	**-0.38**	**0.68**	**2.89**	**18.07**
At least grade A	**0.26**	**1.29**	**-0.34**	**0.71**	**2.36**	**10.55**
At least grade B	**0.30**	**1.35**	**-0.42**	**0.65**	**2.35**	**10.52**
At least grade C	**0.37**	**1.45**	**-0.28**	**0.75**	**2.23**	**9.33**
At least grade D	**0.48**	**1.62**	**0.09**	**1.09**	**2.04**	**7.69**
At least grade E	**0.53**	**1.69**	**0.09**	**1.10**	**1.84**	**6.27**
At least grade F	**0.46**	**1.58**	0.07	1.08	**1.77**	**5.88**
At least grade G	**0.34**	**1.40**	0.14	1.15	**1.81**	**6.10**

Table F22: Regression parameters and odds ratios for gender, number of units re-sat and general attainment. Cohort 4 (2007)

Grade	Gender (F)		Number of units re-sat		General attainment	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	0.01	1.01	**-0.58**	**0.56**	**2.72**	**15.22**
At least grade A	**0.20**	**1.22**	**-0.42**	**0.66**	**2.19**	**8.93**
At least grade B	**0.28**	**1.33**	**-0.49**	**0.61**	**2.19**	**8.96**
At least grade C	**0.40**	**1.49**	**-0.42**	**0.66**	**2.16**	**8.69**
At least grade D	**0.55**	**1.73**	-0.01	0.99	**2.00**	**7.37**
At least grade E	**0.59**	**1.80**	0.00	1.00	**1.85**	**6.36**
At least grade F	**0.53**	**1.70**	0.00	1.00	**1.75**	**5.77**
At least grade G	**0.34**	**1.41**	0.09	1.09	**1.71**	**5.55**

Table F23: Regression parameters and odds ratios for gender, number of units re-sat and general attainment. Cohort 5 (2008)

Grade	Gender (F)		Number of units re-sat		General attainment	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.11**	**1.12**	**-1.08**	**0.34**	**3.10**	**22.27**
At least grade A	**0.23**	**1.26**	**-0.42**	**0.66**	**2.42**	**11.26**
At least grade B	**0.27**	**1.32**	**-0.40**	**0.67**	**2.42**	**11.26**
At least grade C	**0.37**	**1.45**	**-0.36**	**0.70**	**2.22**	**9.16**
At least grade D	**0.49**	**1.63**	**-0.09**	**0.92**	**1.97**	**7.19**
At least grade E	**0.48**	**1.61**	**-0.09**	**0.91**	**1.71**	**5.52**
At least grade F	**0.45**	**1.57**	-0.05	0.95	**1.57**	**4.79**
At least grade G	**0.32**	**1.38**	**0.18**	**1.20**	**1.50**	**4.50**

Table F24: Regression parameters and odds ratios for gender, number of units re-sat and general attainment. Cohort 6 (2009)

Grade	Gender (F)		Number of units re-sat		General attainment	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.48**	**1.62**	**-0.86**	**0.42**	**0.23**	**1.25**
At least grade A	**0.51**	**1.67**	**-0.66**	**0.52**	**0.19**	**1.22**
At least grade B	**0.60**	**1.82**	**-0.52**	**0.59**	**0.17**	**1.18**
At least grade C	**0.73**	**2.08**	**-0.40**	**0.67**	**0.16**	**1.18**
At least grade D	**0.87**	**2.38**	**-0.04**	**0.96**	**0.17**	**1.19**
At least grade E	**0.88**	**2.41**	**0.07**	**1.07**	**0.15**	**1.17**
At least grade F	**0.76**	**2.14**	**0.16**	**1.18**	**0.13**	**1.14**
At least grade G	**0.82**	**2.27**	**0.31**	**1.36**	**0.10**	**1.11**

APPENDIX G: LOGISTIC REGRESSION

Logistic regression is a type of regression analysis that is used when the dependent variable or outcome is a dichotomous variable (*i.e*. it takes only two values, which usually represent the occurrence or non-occurrence of some event) and the independent variables are continuous, categorical, or both. It is used to predict the probability that the 'event of interest' will occur as a function of the independent variables (see, for example, Hosmer and Lemeshow, 2000).

In the following, the logistic regression model used to answer the research question "*Are there differences in outcomes between the group of students who followed a linear assessment route and the group who followed a modular assessment route once concurrent/prior attainment has been taken into account?*" is described. For the other research questions in this report very similar models were used.

The dependent variable was the presence/absence of a grade (*e.g.* grade A*) in the GCSE subject under consideration with the variable taking the value 1 if the candidate obtained the grade and 0 otherwise.

The independent or explanatory variables were: gender, general attainment score and assessment route. These variables were categorical with the exception of the general attainment score which was a continuous variable. An interaction term between gender and assessment route was also included.

The categorical independent variables had a baseline category with which all other categories in the variable were compared. 'Girl' was taken as reference for the gender and 'Linear' for the assessment route.

The form of the model was

$$\log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 Gender + \beta_2 Assessment + \beta_3 Gender \times Assessment + \beta_4 Ability$$

where p was the probability that Y=1 (*e.g.* probability of obtaining grade A*) and β_0, β_1, β_2, β_3 and β_4 were the regression coefficients, which were estimated from the data.

A positive regression coefficient for an independent variable means that the variable increases the probability of the outcome, while a negative regression coefficient means that the variable decreases the probability of the outcome; a large regression coefficient means that the variable strongly influences the probability of the outcome; while a near-zero regression coefficient means that the variable has little influence on the probability of the outcome.

In particular, a positive significant gender effect means that, for a given value of the general attainment score and a specific assessment route, the probability of obtaining the grade is higher for girls than for boys.

A positive significant 'General attainment / Ability' effect means that the probability of obtaining the grade significantly increases with increasing scores in the attainment measure.

A positive significant 'Assessment Route' effect means that, for a given general attainment score, the probability of obtaining the grade is significantly higher for a student following the linear assessment route than for a student following the modular route. On the other hand, a negative significant 'Assessment Route' effect means that, for a given general attainment score, the probability of obtaining the grade is significantly higher for a student following the modular assessment route than for a student following the linear one.

A significant ‘Assessment Route by Gender’ interaction effect indicates that the probability of obtaining the grade in each assessment route differs by gender. A positive effect means that the effect of the ‘Assessment Route’ is greater for girls than for boys. A negative effect means that the effect is greater for boys.

Exponentiation of the parameter estimates for the independent variables in the model yields the odds ratios. An odds ratio (OR) is defined as the relative amount by which the odds of the outcome increase (OR greater than 1) or decrease (OR less than 1) when the value of the predictor variable is increased by one unit. For categorical variables this represents the odds as compared to the baseline category, for example, the odds for a boy compared to the odds of a girl. The odds ratio can be used as a measure of effect size.

APPENDIX H: TABLES AND GRAPHS, GCSE ENGLISH. UNIT LEVEL

UNIT 2431

Logistic Regression tables: Linear vs. Modular assessment route[41]

Table H1: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2431, cohort 1 (2004)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	-0.02	0.99	-0.08	0.92	**1.58**	**4.85**	0.15	1.07
At least grade A	-0.05	0.95	-0.06	0.94	**1.43**	**4.20**	**0.26**	**1.22**
At least grade B	0.04	1.04	**0.10**	**1.10**	**1.52**	**4.57**	**0.26**	**1.43**
At least grade C	**0.15**	**1.17**	**-0.09**	**0.91**	**1.56**	**4.75**	**0.20**	**1.12**
At least grade D	**0.54**	**1.72**	**-0.13**	**0.87**	**1.54**	**4.67**	0.04	0.91
At least grade E	**0.67**	**1.96**	**-0.29**	**0.75**	**1.44**	**4.24**	0.02	0.76
At least grade F	**0.55**	**1.73**	**-0.34**	**0.71**	**1.37**	**3.95**	0.14	0.82
At least grade G	**0.55**	**1.73**	**-0.22**	**0.80**	**1.30**	**3.67**	0.03	0.83

Table H2: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2431, cohort 2 (2005)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	-0.06	0.95	**0.37**	**1.44**	**1.67**	**5.30**	0.07	1.55
At least grade A	0.06	1.07	**0.27**	**1.31**	**1.52**	**4.57**	0.12	1.48
At least grade B	**0.33**	**1.39**	**0.21**	**1.23**	**1.58**	**4.85**	-0.04	1.18
At least grade C	**0.52**	**1.68**	0.04	1.04	**1.59**	**4.92**	-0.02	1.02
At least grade D	**0.69**	**2.00**	0.02	1.02	**1.48**	**4.39**	-0.06	0.96
At least grade E	**0.86**	**2.37**	-0.02	0.98	**1.42**	**4.12**	-0.16	0.83
At least grade F	**0.77**	**2.17**	-0.08	0.92	**1.39**	**4.03**	-0.10	0.83
At least grade G	**0.58**	**1.78**	-0.02	0.98	**1.36**	**3.90**	-0.03	0.95

[41] Significant effects are highlighted in bold.

Table H3: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2431, cohort 3 (2006)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.38**	**1.46**	**0.44**	**1.55**	**1.65**	**5.22**	-0.06	1.46
At least grade A	**0.28**	**1.33**	**0.22**	**1.25**	**1.48**	**4.41**	0.05	1.31
At least grade B	**0.37**	**1.45**	-0.05	0.96	**1.59**	**4.90**	0.09	1.04
At least grade C	**0.58**	**1.79**	0.03	1.03	**1.61**	**4.99**	-0.11	0.92
At least grade D	**0.72**	**2.06**	-0.03	0.97	**1.48**	**4.38**	-0.11	0.86
At least grade E	**0.79**	**2.21**	-0.10	0.91	**1.33**	**3.77**	-0.02	0.89
At least grade F	**0.78**	**2.19**	-0.09	0.91	**1.18**	**3.26**	-0.09	0.84
At least grade G	**0.79**	**2.21**	-0.13	0.88	**1.05**	**2.87**	-0.23	0.70

Table H4: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2431, cohort 4 (2007)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	0.19	1.21	**0.45**	**1.57**	**1.55**	**4.72**	**-0.41**	**1.05**
At least grade A	**0.27**	**1.32**	**0.24**	**1.28**	**1.36**	**3.88**	**-0.21**	**1.04**
At least grade B	**0.50**	**1.64**	**0.18**	**1.19**	**1.40**	**4.05**	**-0.18**	**1.00**
At least grade C	**0.78**	**2.19**	-0.01	0.99	**1.50**	**4.49**	**-0.25**	**0.78**
At least grade D	**0.87**	**2.38**	**-0.10**	**0.90**	**1.54**	**4.65**	-0.14	0.79
At least grade E	**0.97**	**2.62**	-0.04	0.96	**1.41**	**4.08**	-0.19	0.79
At least grade F	**0.93**	**2.53**	-0.01	0.99	**1.23**	**3.42**	-0.12	0.88
At least grade G	**0.92**	**2.50**	0.14	1.15	**1.07**	**2.91**	-0.26	0.88

Table H5: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2431, cohort 5 (2008)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	0.11	1.12	**0.47**	**1.60**	**1.79**	**6.00**	-0.19	1.32
At least grade A	**0.20**	**1.22**	**0.13**	**1.14**	**1.59**	**4.89**	-0.07	1.07
At least grade B	**0.30**	**1.35**	0.05	1.06	**1.60**	**4.97**	0.06	1.12
At least grade C	**0.49**	**1.63**	0.06	1.06	**1.58**	**4.83**	-0.01	1.05
At least grade D	**0.77**	**2.15**	-0.04	0.96	**1.52**	**4.56**	-0.14	0.84
At least grade E	**0.69**	**2.00**	**-0.15**	**0.86**	**1.32**	**3.72**	-0.05	0.82
At least grade F	**0.55**	**1.72**	**-0.17**	**0.84**	**1.16**	**3.19**	-0.03	0.82
At least grade G	0.22	1.25	**-0.23**	**0.79**	**1.02**	**2.78**	0.14	0.91

Table H6: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2431, cohort 6 (2009)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.82**	**2.27**	**0.68**	**1.97**	**0.17**	**1.18**	**-0.55**	**1.14**
At least grade A	**0.72**	**2.05**	**0.79**	**2.21**	**0.15**	**1.16**	**-0.31**	**1.62**
At least grade B	**0.57**	**1.78**	**0.69**	**1.99**	**0.14**	**1.15**	-0.15	1.72
At least grade C	**0.62**	**1.85**	**0.44**	**1.55**	**0.14**	**1.15**	-0.08	1.44
At least grade D	**0.75**	**2.13**	0.08	1.09	**0.15**	**1.16**	-0.06	1.02
At least grade E	**0.75**	**2.11**	-0.09	0.91	**0.14**	**1.15**	0.03	0.94
At least grade F	**0.59**	**1.80**	**-0.23**	**0.79**	**0.12**	**1.13**	0.15	0.92
At least grade G	**0.43**	**1.53**	**-0.35**	**0.71**	**0.10**	**1.10**	0.16	0.83

UNIT 2432

Logistic Regression tables: Linear vs. Modular[42]

Table H7: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2432, cohort 1 (2004)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.54**	**1.71**	**0.65**	**1.91**	**1.58**	**4.87**	**-0.48**	**1.18**
At least grade A	**0.22**	**1.24**	**0.24**	**1.28**	**1.50**	**4.50**	0.04	1.33
At least grade B	**0.47**	**1.59**	**0.21**	**1.23**	**1.61**	**5.02**	-0.04	1.19
At least grade C	**0.67**	**1.95**	**-0.05**	**0.95**	**1.57**	**4.81**	-0.02	0.93
At least grade D	**0.85**	**2.34**	**-0.16**	**0.85**	**1.58**	**4.86**	-0.03	0.83
At least grade E	**0.92**	**2.50**	**-0.23**	**0.80**	**1.50**	**4.46**	0.02	0.81
At least grade F	**0.82**	**2.26**	**-0.33**	**0.72**	**1.33**	**3.80**	0.09	0.78
At least grade G	**0.66**	**1.94**	**-0.27**	**0.77**	**1.20**	**3.32**	0.09	0.84

[42] Significant effects are highlighted in bold.

Table H8: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2432, cohort 2 (2005)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.27**	**1.31**	0.06	1.06	**1.66**	**5.24**	-0.17	0.89
At least grade A	**0.19**	**1.21**	-0.08	0.93	**1.55**	**4.71**	0.01	0.93
At least grade B	**0.18**	**1.20**	**-0.25**	**0.78**	**1.64**	**5.17**	**0.16**	**0.92**
At least grade C	**0.24**	**1.27**	**-0.27**	**0.76**	**1.64**	**5.13**	**0.24**	**0.97**
At least grade D	**0.62**	**1.85**	**-0.14**	**0.87**	**1.61**	**4.99**	0.02	0.89
At least grade E	**0.72**	**2.05**	**-0.12**	**0.89**	**1.53**	**4.61**	0.00	0.88
At least grade F	**0.73**	**2.08**	**-0.19**	**0.82**	**1.39**	**4.03**	-0.03	0.80
At least grade G	**0.51**	**1.66**	**-0.22**	**0.80**	**1.23**	**3.43**	-0.04	0.78

Table H9: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2432, cohort 3 (2006)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**-0.33**	**0.72**	**-0.23**	**0.80**	**1.78**	**5.94**	**0.53**	**1.36**
At least grade A	**0.15**	**1.16**	**-0.20**	**0.82**	**1.64**	**5.16**	**0.24**	**1.04**
At least grade B	**0.44**	**1.55**	**-0.26**	**0.77**	**1.68**	**5.37**	0.04	0.80
At least grade C	**0.69**	**1.98**	**-0.25**	**0.78**	**1.65**	**5.22**	-0.11	0.69
At least grade D	**0.81**	**2.25**	**-0.22**	**0.80**	**1.62**	**5.03**	-0.10	0.73
At least grade E	**0.89**	**2.44**	**-0.34**	**0.71**	**1.48**	**4.41**	-0.09	0.65
At least grade F	**0.92**	**2.51**	**-0.26**	**0.77**	**1.27**	**3.58**	-0.21	0.62
At least grade G	**0.79**	**2.20**	**-0.22**	**0.81**	**1.10**	**3.02**	-0.17	0.68

Table H10: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2432, cohort 4 (2007)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	-0.07	0.93	0.05	1.05	**1.62**	**5.05**	0.14	1.21
At least grade A	**0.20**	**1.22**	-0.09	0.92	**1.50**	**4.48**	0.08	1.00
At least grade B	**0.46**	**1.58**	-0.07	0.94	**1.57**	**4.79**	0.03	0.97
At least grade C	**0.73**	**2.07**	-0.07	0.93	**1.62**	**5.08**	-0.03	0.91
At least grade D	**1.19**	**3.28**	-0.01	0.99	**1.62**	**5.07**	**-0.22**	**0.80**
At least grade E	**1.29**	**3.63**	0.03	1.03	**1.51**	**4.52**	-0.19	0.86
At least grade F	**1.18**	**3.26**	0.04	1.04	**1.34**	**3.81**	-0.13	0.91
At least grade G	**1.05**	**2.87**	0.13	1.14	**1.21**	**3.36**	-0.19	0.94

Table H11: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2432, cohort 5 (2008)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.24**	**1.27**	0.14	1.15	**1.83**	**6.23**	0.21	1.42
At least grade A	**0.34**	**1.40**	-0.01	0.99	**1.66**	**5.26**	0.13	1.12
At least grade B	**0.59**	**1.80**	0.06	1.06	**1.70**	**5.49**	-0.09	0.97
At least grade C	**0.72**	**2.06**	-0.03	0.97	**1.75**	**5.76**	-0.10	0.88
At least grade D	**0.99**	**2.70**	**-0.16**	**0.86**	**1.71**	**5.53**	**-0.21**	**0.69**
At least grade E	**0.95**	**2.60**	**-0.28**	**0.76**	**1.52**	**4.59**	-0.09	0.69
At least grade F	**0.85**	**2.34**	-0.13	0.88	**1.28**	**3.61**	-0.11	0.78
At least grade G	**0.79**	**2.21**	-0.08	0.92	**1.12**	**3.07**	-0.24	0.72

Table H12: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2432, cohort 6 (2009)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.34**	**1.41**	**0.74**	**2.10**	**0.17**	**1.18**	-0.06	1.98
At least grade A	**0.47**	**1.61**	**0.65**	**1.92**	**0.15**	**1.16**	-0.09	1.76
At least grade B	**0.58**	**1.79**	**0.60**	**1.82**	**0.15**	**1.16**	**-0.17**	**1.53**
At least grade C	**0.77**	**2.16**	**0.35**	**1.41**	**0.15**	**1.16**	**-0.18**	**1.18**
At least grade D	**0.80**	**2.22**	**-0.04**	**0.96**	**0.16**	**1.17**	0.02	0.98
At least grade E	**0.77**	**2.16**	**-0.28**	**0.75**	**0.15**	**1.16**	0.10	0.83
At least grade F	**0.57**	**1.76**	**-0.37**	**0.69**	**0.12**	**1.13**	0.19	0.83
At least grade G	**0.48**	**1.62**	**-0.40**	**0.67**	**0.10**	**1.10**	0.23	0.84

UNIT 2433

Logistic Regression tables: Linear vs. Modular[43]

Table H13: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2433, cohort 1 (2004)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.54**	**1.72**	**-1.17**	**0.31**	**1.16**	**3.19**	**-0.79**	**0.14**
At least grade A	**0.60**	**1.83**	**-1.35**	**0.26**	**0.85**	**2.34**	**-1.05**	**0.09**
At least grade B	**0.65**	**1.92**	**-1.58**	**0.21**	**0.68**	**1.98**	**-1.23**	**0.06**
At least grade C	**0.52**	**1.67**	**-2.02**	**0.13**	**0.46**	**1.58**	**-1.14**	**0.04**
At least grade D	**0.46**	**1.59**	**-2.38**	**0.09**	**0.28**	**1.33**	**-1.02**	**0.03**
At least grade E	**0.40**	**1.50**	**-2.51**	**0.08**	**0.18**	**1.20**	**-0.93**	**0.03**
At least grade F	**0.31**	**1.37**	**-2.63**	**0.07**	**0.09**	**1.09**	**-0.81**	**0.03**
At least grade G	**0.26**	**1.30**	**-2.67**	**0.07**	0.01	1.01	**-0.76**	**0.03**

Table H14: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2433, cohort 2 (2005)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	0.32	1.38	**-0.97**	**0.38**	**1.17**	**3.24**	**-0.68**	**0.19**
At least grade A	0.20	1.22	**-1.53**	**0.22**	**0.87**	**2.38**	**-0.68**	**0.11**
At least grade B	**0.23**	**1.25**	**-1.91**	**0.15**	**0.66**	**1.93**	**-0.74**	**0.07**
At least grade C	**0.38**	**1.46**	**-2.16**	**0.12**	**0.47**	**1.60**	**-0.85**	**0.05**
At least grade D	**0.35**	**1.42**	**-2.41**	**0.09**	**0.33**	**1.39**	**-0.79**	**0.04**
At least grade E	**0.29**	**1.34**	**-2.54**	**0.08**	**0.23**	**1.26**	**-0.72**	**0.04**
At least grade F	**0.18**	**1.20**	**-2.66**	**0.07**	**0.15**	**1.16**	**-0.59**	**0.04**
At least grade G	**0.11**	**1.11**	**-2.73**	**0.07**	**0.08**	**1.09**	**-0.50**	**0.04**

[43] Significant effects are highlighted in bold.

Table H15: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2433, cohort 3 (2006)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**1.00**	**2.73**	**-1.40**	**0.25**	**1.09**	**2.98**	**-1.86**	**0.04**
At least grade A	**0.81**	**2.25**	**-1.78**	**0.17**	**0.87**	**2.39**	**-1.53**	**0.04**
At least grade B	**0.64**	**1.90**	**-1.99**	**0.14**	**0.66**	**1.93**	**-1.23**	**0.04**
At least grade C	**0.55**	**1.73**	**-2.13**	**0.12**	**0.44**	**1.56**	**-1.11**	**0.04**
At least grade D	**0.44**	**1.55**	**-2.18**	**0.11**	**0.31**	**1.36**	**-0.96**	**0.04**
At least grade E	**0.37**	**1.45**	**-2.23**	**0.11**	**0.22**	**1.25**	**-0.86**	**0.05**
At least grade F	**0.29**	**1.34**	**-2.26**	**0.10**	**0.15**	**1.16**	**-0.79**	**0.05**
At least grade G	**0.26**	**1.29**	**-2.26**	**0.10**	**0.10**	**1.11**	**-0.76**	**0.05**

Table H16: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2433, cohort 4 (2007)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.93**	**2.53**	**-2.65**	**0.07**	**1.20**	**3.32**	**-0.71**	**0.03**
At least grade A	**0.49**	**1.64**	**-2.58**	**0.08**	**0.91**	**2.48**	**-0.71**	**0.04**
At least grade B	**0.23**	**1.26**	**-2.49**	**0.08**	**0.62**	**1.86**	**-0.64**	**0.04**
At least grade C	**0.23**	**1.26**	**-2.51**	**0.08**	**0.42**	**1.52**	**-0.75**	**0.04**
At least grade D	**0.27**	**1.30**	**-2.52**	**0.08**	**0.28**	**1.32**	**-0.71**	**0.04**
At least grade E	**0.23**	**1.26**	**-2.54**	**0.08**	**0.18**	**1.20**	**-0.63**	**0.04**
At least grade F	**0.22**	**1.25**	**-2.55**	**0.08**	**0.11**	**1.12**	**-0.62**	**0.04**
At least grade G	**0.17**	**1.19**	**-2.56**	**0.08**	**0.05**	**1.06**	**-0.58**	**0.04**

Table H17: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2433, cohort 5 (2008)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**1.14**	**3.14**	**-1.16**	**0.31**	**1.11**	**3.03**	**-2.04**	**0.04**
At least grade A	**0.86**	**2.37**	**-1.56**	**0.21**	**0.90**	**2.46**	**-1.87**	**0.03**
At least grade B	**0.72**	**2.06**	**-2.03**	**0.13**	**0.64**	**1.90**	**-1.57**	**0.03**
At least grade C	**0.58**	**1.79**	**-2.30**	**0.10**	**0.39**	**1.47**	**-1.34**	**0.03**
At least grade D	**0.51**	**1.66**	**-2.37**	**0.09**	**0.24**	**1.27**	**-1.07**	**0.03**
At least grade E	**0.45**	**1.57**	**-2.41**	**0.09**	**0.14**	**1.15**	**-0.96**	**0.03**
At least grade F	**0.43**	**1.54**	**-2.42**	**0.09**	**0.07**	**1.07**	**-0.92**	**0.04**
At least grade G	**0.38**	**1.47**	**-2.41**	**0.09**	0.02	1.02	**-0.90**	**0.04**

Table H18: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2433, cohort 6 (2009)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.74**	**2.10**	**-3.67**	**0.03**	**0.15**	**1.16**	-12.95	0.00
At least grade A	**0.77**	**2.15**	**-3.04**	**0.05**	**0.12**	**1.13**	**-2.68**	**0.00**
At least grade B	**0.64**	**1.90**	**-2.84**	**0.06**	**0.10**	**1.10**	**-3.06**	**0.00**
At least grade C	**0.56**	**1.76**	**-2.99**	**0.05**	**0.07**	**1.07**	**-2.70**	**0.00**
At least grade D	**0.49**	**1.63**	**-3.20**	**0.04**	**0.05**	**1.05**	**-2.24**	**0.00**
At least grade E	**0.40**	**1.50**	**-3.22**	**0.04**	**0.04**	**1.04**	**-2.02**	**0.01**
At least grade F	**0.35**	**1.42**	**-3.22**	**0.04**	**0.02**	**1.02**	**-1.79**	**0.01**
At least grade G	**0.35**	**1.42**	**-3.17**	**0.04**	**0.02**	**1.02**	**-1.71**	**0.01**

UNIT 2434

Logistic Regression tables: Linear vs. Modular[44]

Table H19: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2434, cohort 1 (2004)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	0.14	1.15	**0.92**	**2.52**	**2.04**	**7.66**	0.22	3.13
At least grade A	0.29	1.33	**0.66**	**1.94**	**1.83**	**6.24**	**0.17**	**2.30**
At least grade B	**0.22**	**1.25**	**0.70**	**2.01**	**1.60**	**4.95**	**0.27**	**2.63**
At least grade C	**0.21**	**1.23**	**0.91**	**2.49**	**1.27**	**3.57**	**0.38**	**3.63**
At least grade D	**0.25**	**1.28**	**1.42**	**4.13**	**0.94**	**2.57**	**0.36**	**5.91**
At least grade E	**0.15**	**1.16**	**1.60**	**4.97**	**0.63**	**1.88**	**0.41**	**7.48**
At least grade F	0.08	1.08	**1.97**	**7.18**	**0.37**	**1.44**	**0.31**	**9.82**
At least grade G	0.03	1.03	**2.18**	**8.87**	**0.22**	**1.24**	**0.35**	**12.60**

[44] Significant effects are highlighted in bold.

Table H20: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2434, cohort 2 (2005)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.29**	**1.34**	**0.73**	**2.07**	**2.12**	**8.36**	0.06	2.21
At least grade A	**0.52**	**1.68**	**0.51**	**1.67**	**1.85**	**6.33**	-0.04	1.61
At least grade B	**0.51**	**1.66**	**0.66**	**1.93**	**1.56**	**4.77**	0.04	2.00
At least grade C	**0.40**	**1.49**	**0.81**	**2.24**	**1.27**	**3.56**	0.23	2.83
At least grade D	**0.36**	**1.43**	**1.13**	**3.10**	**0.93**	**2.53**	**0.25**	**3.98**
At least grade E	**0.25**	**1.28**	**1.47**	**4.36**	**0.62**	**1.87**	**0.29**	**5.83**
At least grade F	**0.20**	**1.22**	**1.94**	**6.96**	**0.33**	**1.40**	**0.24**	**8.85**
At least grade G	**0.17**	**1.19**	**2.25**	**9.50**	**0.17**	**1.18**	**0.17**	**11.31**

Table H21: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2434, cohort 3 (2006)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	0.15	**1.16**	**0.57**	**1.77**	**2.09**	**8.08**	0.26	2.29
At least grade A	-0.02	**0.98**	**0.64**	**1.89**	**1.85**	**6.39**	0.53	3.23
At least grade B	0.03	**1.03**	**0.71**	**2.03**	**1.57**	**4.80**	0.51	3.39
At least grade C	0.04	**1.04**	**0.75**	**2.11**	**1.22**	**3.39**	0.60	3.83
At least grade D	-0.03	**0.97**	**1.00**	**2.72**	**0.85**	**2.35**	0.68	5.38
At least grade E	**-0.14**	**0.87**	**1.31**	**3.69**	**0.55**	**1.73**	0.75	7.84
At least grade F	**-0.21**	**0.81**	**1.62**	**5.07**	**0.28**	**1.32**	0.78	11.02
At least grade G	**-0.21**	**0.81**	**1.88**	**6.52**	**0.12**	**1.13**	0.74	13.72

Table H22: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2434, cohort 4 (2007)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	0.20	1.23	**0.34**	**1.41**	**2.05**	**7.77**	0.16	1.66
At least grade A	0.09	1.09	**0.38**	**1.47**	**1.83**	**6.20**	**0.44**	**2.28**
At least grade B	0.01	1.01	**0.62**	**1.85**	**1.55**	**4.72**	**0.52**	**3.12**
At least grade C	**0.22**	**1.25**	**0.87**	**2.39**	**1.24**	**3.46**	**0.32**	**3.30**
At least grade D	**0.22**	**1.25**	**1.13**	**3.10**	**0.86**	**2.37**	**0.35**	**4.42**
At least grade E	0.07	1.07	**1.46**	**4.31**	**0.56**	**1.74**	**0.50**	**7.07**
At least grade F	-0.03	0.97	**1.88**	**6.53**	**0.29**	**1.34**	**0.54**	**11.19**
At least grade G	-0.09	0.91	**2.12**	**8.32**	**0.16**	**1.17**	**0.60**	**15.14**

Table H23: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2434, cohort 5 (2008)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.27**	**1.31**	-0.07	0.93	**2.23**	**9.32**	0.01	0.94
At least grade A	-0.09	0.92	0.02	1.02	**1.95**	**7.00**	**0.48**	**1.65**
At least grade B	-0.02	0.98	**0.38**	**1.46**	**1.67**	**5.31**	**0.53**	**2.48**
At least grade C	0.10	1.11	**0.60**	**1.82**	**1.29**	**3.65**	**0.49**	**2.96**
At least grade D	0.00	1.00	**1.00**	**2.71**	**0.94**	**2.57**	**0.59**	**4.87**
At least grade E	**-0.18**	**0.84**	**1.35**	**3.86**	**0.60**	**1.83**	**0.82**	**8.80**
At least grade F	**-0.28**	**0.75**	**1.88**	**6.56**	**0.30**	**1.35**	**0.84**	**15.19**
At least grade G	**-0.32**	**0.72**	**2.23**	**9.34**	**0.16**	**1.17**	**0.84**	**21.54**

Table H24: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2434, cohort 6 (2009)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.55**	**1.73**	**0.64**	**1.90**	**0.18**	**1.20**	0.23	2.39
At least grade A	**0.48**	**1.62**	**0.99**	**2.69**	**0.15**	**1.16**	0.05	2.82
At least grade B	**0.42**	**1.52**	**0.88**	**2.41**	**0.13**	**1.14**	**0.15**	**2.80**
At least grade C	**0.28**	**1.32**	**0.72**	**2.05**	**0.11**	**1.12**	**0.37**	**2.97**
At least grade D	0.02	1.02	**0.86**	**2.37**	**0.10**	**1.10**	**0.69**	**4.72**
At least grade E	-0.05	0.95	**1.39**	**4.02**	**0.06**	**1.06**	**0.87**	**9.64**
At least grade F	**-0.15**	**0.86**	**2.10**	**8.16**	**0.02**	**1.02**	**1.17**	**26.43**
At least grade G	**-0.20**	**0.82**	**2.39**	**10.88**	**0.01**	**1.01**	**1.59**	**53.47**

UNIT 2435

Logistic Regression tables: Linear vs. Modular[45]

Table H25: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2435, cohort 1 (2004)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.28**	**1.33**	**0.21**	**1.24**	**1.53**	**4.61**	**-0.22**	**0.99**
At least grade A	**0.22**	**1.24**	**-0.13**	**0.87**	**1.48**	**4.37**	0.02	0.89
At least grade B	**0.33**	**1.39**	**-0.13**	**0.88**	**1.37**	**3.94**	-0.07	0.82
At least grade C	**0.50**	**1.65**	**-0.11**	**0.90**	**1.28**	**3.61**	-0.07	0.84
At least grade D	**0.36**	**1.43**	-0.04	0.96	**1.21**	**3.35**	0.16	1.12
At least grade E	**0.31**	**1.36**	0.04	1.04	**1.16**	**3.19**	0.16	1.22
At least grade F	0.18	1.20	0.07	1.07	**1.15**	**3.15**	0.24	1.36
At least grade G	0.04	1.04	-0.07	0.94	**1.15**	**3.17**	0.17	1.11

Table H26: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2435, cohort 2 (2005)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.29**	**1.34**	**0.32**	**1.38**	**1.59**	**4.91**	-0.13	1.22
At least grade A	**0.17**	**1.19**	0.10	1.10	**1.49**	**4.43**	0.09	1.21
At least grade B	**0.24**	**1.27**	-0.02	0.98	**1.39**	**4.03**	0.11	1.10
At least grade C	**0.50**	**1.66**	-0.04	0.96	**1.33**	**3.79**	-0.01	0.95
At least grade D	**0.53**	**1.70**	-0.08	0.92	**1.26**	**3.52**	0.01	0.92
At least grade E	**0.52**	**1.68**	-0.02	0.98	**1.21**	**3.37**	-0.07	0.92
At least grade F	**0.59**	**1.80**	0.08	1.08	**1.24**	**3.46**	-0.18	0.90
At least grade G	0.08	1.08	-0.31	0.73	**1.27**	**3.56**	0.16	0.86

[45] Significant effects are highlighted in bold.

Table H27: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2435, cohort 3 (2006)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.38**	**1.46**	**0.40**	**1.49**	**1.62**	**5.08**	**-0.24**	**1.17**
At least grade A	**0.19**	**1.22**	0.09	1.09	**1.52**	**4.57**	0.06	1.16
At least grade B	**0.37**	**1.45**	-0.01	0.99	**1.41**	**4.12**	-0.08	0.91
At least grade C	**0.41**	**1.50**	**-0.16**	**0.85**	**1.30**	**3.68**	0.07	0.91
At least grade D	**0.50**	**1.64**	-0.12	0.89	**1.24**	**3.44**	-0.01	0.88
At least grade E	**0.44**	**1.55**	**-0.18**	**0.83**	**1.19**	**3.29**	0.08	0.90
At least grade F	0.38	1.46	-0.17	0.85	**1.22**	**3.37**	-0.05	0.80
At least grade G	-0.06	0.94	**-0.59**	**0.55**	**1.22**	**3.40**	0.11	0.62

Table H28: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2435, cohort 4 (2007)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	0.15	1.17	0.10	1.11	1.61	**4.98**	0.02	1.13
At least grade A	**0.17**	**1.18**	0.06	1.06	1.52	**4.59**	0.10	1.17
At least grade B	**0.23**	**1.25**	-0.07	0.93	1.39	**4.01**	0.09	1.02
At least grade C	**0.55**	**1.74**	**-0.15**	**0.86**	1.31	**3.72**	-0.05	0.82
At least grade D	**0.78**	**2.18**	-0.10	0.90	**1.27**	**3.55**	**-0.28**	**0.68**
At least grade E	**0.56**	**1.75**	**-0.29**	**0.75**	**1.21**	**3.37**	-0.09	0.69
At least grade F	**0.52**	**1.68**	-0.23	0.80	**1.23**	**3.41**	-0.18	0.67
At least grade G	**0.24**	**1.27**	-0.41	0.66	**1.28**	**3.58**	-0.02	0.65

Table H29: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2435, cohort 5 (2008)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	0.01	1.01	**0.24**	**1.27**	**1.61**	**5.00**	0.01	1.28
At least grade A	0.12	1.12	0.05	1.05	**1.57**	**4.81**	0.08	1.14
At least grade B	**0.28**	**1.32**	-0.08	0.93	**1.41**	**4.11**	0.00	0.93
At least grade C	**0.64**	**1.89**	-0.09	0.92	**1.32**	**3.75**	-0.17	0.78
At least grade D	**0.69**	**1.99**	-0.01	0.99	**1.25**	**3.47**	-0.19	0.81
At least grade E	**0.58**	**1.79**	**0.16**	**1.17**	**1.22**	**3.38**	-0.13	1.03
At least grade F	**0.74**	**2.10**	**0.39**	**1.47**	**1.18**	**3.26**	-0.42	0.97
At least grade G	**0.80**	**2.23**	**0.44**	**1.56**	**1.15**	**3.15**	**-0.69**	**0.79**

Table H30: Regression parameters and odds ratios for gender, assessment route, general attainment and gender by assessment route. Unit 2435, cohort 6 (2009)

Grade	Gender (G)		Assessment Route (L)		General attainment		Gender * Assessment Route	
	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio	Estimate	Odds Ratio
Grade A*	**0.40**	**1.50**	**0.23**	**1.26**	**0.14**	**1.16**	-0.04	1.20
At least grade A	**0.39**	**1.48**	**0.26**	**1.29**	**0.13**	**1.14**	-0.05	1.23
At least grade B	**0.41**	**1.50**	**0.15**	**1.16**	**0.11**	**1.12**	-0.01	1.15
At least grade C	**0.52**	**1.68**	-0.04	0.96	**0.13**	**1.14**	0.08	1.03
At least grade D	**0.60**	**1.82**	0.03	1.03	**0.14**	**1.15**	0.07	1.11
At least grade E	**1.02**	**2.78**	-0.03	0.97	**0.12**	**1.13**	**-0.49**	**0.59**
At least grade F	**0.99**	**2.68**	0.03	1.03	**0.11**	**1.11**	-0.48	0.64
At least grade G	**0.93**	**2.54**	0.14	1.15	**0.09**	**1.09**	-0.56	0.66

APPENDIX I: TABLES AND GRAPHS, GCSE MATHEMATICS

Combinations of units leading to a GCSE in mathematics, 2008-2009

Table I1: GCSE mathematics C – unit combinations (taken by more than 200 students). Cohort 1 (2008)

Jan-07	Mar-07	Jun-07	Jan-08	Mar-08	Jun-08	Frequency	Percent
M8		M9		M10	TH, CA	3576	6.11
M6		M7		M8	TH, CA	2107	3.60
M7		M8		M9	TH, CA	2032	3.47
M5		M6		M7	TF, CA	1463	2.50
M8		M9		M10	TH, CB	1333	2.28
M6		M7		M8	TH, CB	990	1.69
M4		M5		M6	TF, CA	915	1.56
M7		M8		M9	TH, CB	891	1.52
M3		M4		M5	TF, CA	820	1.40
M7		M8		M9	M10, TH, CA	722	1.23
M5		M6	M6	M7	TF, CA	547	0.93
M5		M6		M7	TF, CB	493	0.84
M7		M8	M8	M9	TH, CA	476	0.81
M2		M3		M4	TF, CA	459	0.78
M6		M7		M8	TF, CA	374	0.64
M8		M9	M9	M10	TH, CA	363	0.62
M6		M7	M7	M8	TH, CA	361	0.62
M7		M8		M8	TH, CA	353	0.60
M6		M7		M8	M8, TH, CA	332	0.57
M4		M5		M6	TF, CB	322	0.55
		M9		M10	TH, CA	321	0.55
M7		M8	M9		M10, TH, CA	295	0.50
M5		M6	M6	M7	M7, TF, CA	293	0.50
	M8		M9		M10, TH, CA	290	0.50
M6		M7		M7	TF, CA	288	0.49
M5		M6		M6	TF, CA	287	0.49
M5		M6		M7	TF, CA	287	0.49
M1		M2		M3	TF, CA	284	0.49
M7		M8		M9	TH, CB	259	0.44
M3		M4		M5	TF, CB	256	0.44
M4		M5	M5		TF, CA	249	0.43
M8		M9		M10	TH, CA	247	0.42
M7		M8	M8		TH, CB	241	0.41
M4		M5		M5	TF, CA	233	0.40
M6		M7	M6		TF, CA	210	0.36
M6		M7	M7		TF, CA	200	0.34

Table I2: GCSE mathematics C – unit combinations (taken by more than 200 students). Cohort 2 (2009)

Jan-08	Mar-08	Jun-08	Jan-09	Mar-09	Jun-09	Frequency	Percent
M8		M9		M10	TH	4498	8.35
M7		M8		M9	TH	2379	4.42
M6		M7		M8	TH	2003	3.72
M5		M6		M7	TF	1364	2.53
M4		M5		M6	TF	858	1.59
M3		M4		M5	TF	806	1.50
M7		M8		M9	TH	732	1.36
M7		M8	M8	M9	TH	691	1.28
M5		M6	M6	M7	TF	648	1.20
M8		M9	M9	M10	TH	598	1.11
M8		M9		M10	TH	560	1.04
M6		M7	M7	M8	TH	539	1.00
		M9		M10	TH	516	0.96
M5		M6	M6	M7	M7, TF	487	0.90
M7		M8	M9		M10, TH	486	0.90
M6		M7		M8	M9, TH	405	0.75
M5		M6		M7	M7, TH	402	0.75
M6		M7		M8	TF	362	0.67
M8		M9		M10	TH	326	0.61
M4		M5	M5	M6	TF	321	0.60
M2		M3		M4	TF	320	0.59
M6		M7	M7	M8	M8, TH	314	0.58
M6		M7	M8		M9, TH	302	0.56
M8		M9	M9	M10	M10, TH	296	0.55
M6		M7	M7	M8	TF	295	0.55
	M8		M9		M10, TH	270	0.50
M6		M7		M8	M8, TH	266	0.49
M6		M7	M7	M6	TF	261	0.48
M7		M8		M9	M8, TH	260	0.48
M1		M2		M3	TF	255	0.47
M6		M7	M6	M7	TF	254	0.47
M5		M6		M7	M6, TF	252	0.47
M7		M8	M9		TH	240	0.45
M7		M8	M8	M9	M9, TH	234	0.43
M5		M6		M7	M6, M7, TF	229	0.43
M6		M7	M8		TH	221	0.41
M6		M7		M8	M7, TH	214	0.40
M6		M7		M7	TF	209	0.39
M7		M8		M8	TH	200	0.37

Grade distributions in GCSE mathematics, 2008-2009

Table I3: GCSE mathematics grade distribution. Cohort 1 (2008)

Grade	Frequency	Percent	Cumulative Frequency	Cumulative Percent
A*	3675	4.08	3675	4.08
A	9901	10.99	13576	15.07
B	14059	15.60	27635	30.67
C	23159	25.70	50794	56.37
D	14263	15.83	65057	72.20
E	9714	10.78	74771	82.98
F	8018	8.90	82789	91.88
G	4592	5.10	87381	96.98
U	2413	2.68	89794	99.66

Table I4: GCSE mathematics grade distribution. Cohort 2 (2009)

Grade	Frequency	Percent	Cumulative Frequency	Cumulative Percent
A*	4526	5.25	4526	5.25
A	9289	10.77	13815	16.02
B	12692	14.71	26507	30.73
C	22948	26.60	49455	57.33
D	13732	15.92	63187	73.25
E	7960	9.23	71147	82.48
F	6936	8.04	78083	90.52
G	4760	5.52	82843	96.04
U	2774	3.22	85617	99.26

Table I5: Grade distribution in GCSE mathematics C units for students with and without re-sits, cohort 1 (2008)

Module		Grade								
		A*	A	B	C	D	E	F	G	U
M1	No re-sits								95.20	4.80
	At least one re-sit								77.52	22.48
M2	No re-sits							16.11	73.40	10.49
	At least one re-sit							7.50	48.13	44.38
M3	No re-sits							31.69	56.27	12.03
	At least one re-sit							22.17	63.29	14.54
M4	No re-sits						5.26	51.52	30.50	12.73
	At least one re-sit						2.67	48.53	34.51	14.29
M5	No re-sits						35.01	50.43		14.56
	At least one re-sit						21.06	60.43		18.51
M6	No re-sits					45.74	40.02			14.25
	At least one re-sit					29.54	56.92			13.55
M7	No re-sits				51.07	34.99				13.94
	At least one re-sit				26.23	55.31				18.46
M8	No re-sits			40.48	44.75					14.77
	At least one re-sit			16.39	59.01					24.61
M9	No re-sits		42.72	43.07						14.21
	At least one re-sit		23.64	53.36						23.00
M10	No re-sits	30.94	47.11							21.95
	At least one re-sit	17.74	56.17							26.10

Table I6: Grade distribution in GCSE mathematics C units for students with and without re-sits, cohort 2 (2009)

Module		Grade								
		A*	A	B	C	D	E	F	G	U
M1	No re-sits								93.53	6.47
	At least one re-sit								75.00	25.00
M2	No re-sits							16.98	73.54	9.48
	At least one re-sit							8.59	65.08	16.33
M3	No re-sits							33.61	54.75	11.64
	At least one re-sit							26.75	58.35	14.90
M4	No re-sits						6.91	53.69	28.69	10.70
	At least one re-sit						5.29	49.18	34.02	11.52
M5	No re-sits						38.48	49.48		12.11
	At least one re-sit						23.35	61.80		14.85
M6	No re-sits					53.46	32.21			14.33
	At least one re-sit					40.48	47.78			11.74
M7	No re-sits				54.52	33.72				11.77
	At least one re-sit				34.03	55.09				10.88
M8	No re-sits			47.05	43.21					9.74
	At least one re-sit			25.54	60.79					13.66
M9	No re-sits		43.70	42.10						14.20
	At least one re-sit		30.50	53.57						15.93
M10	No re-sits	31.35	47.63							21.03
	At least one re-sit	22.24	54.82							22.94