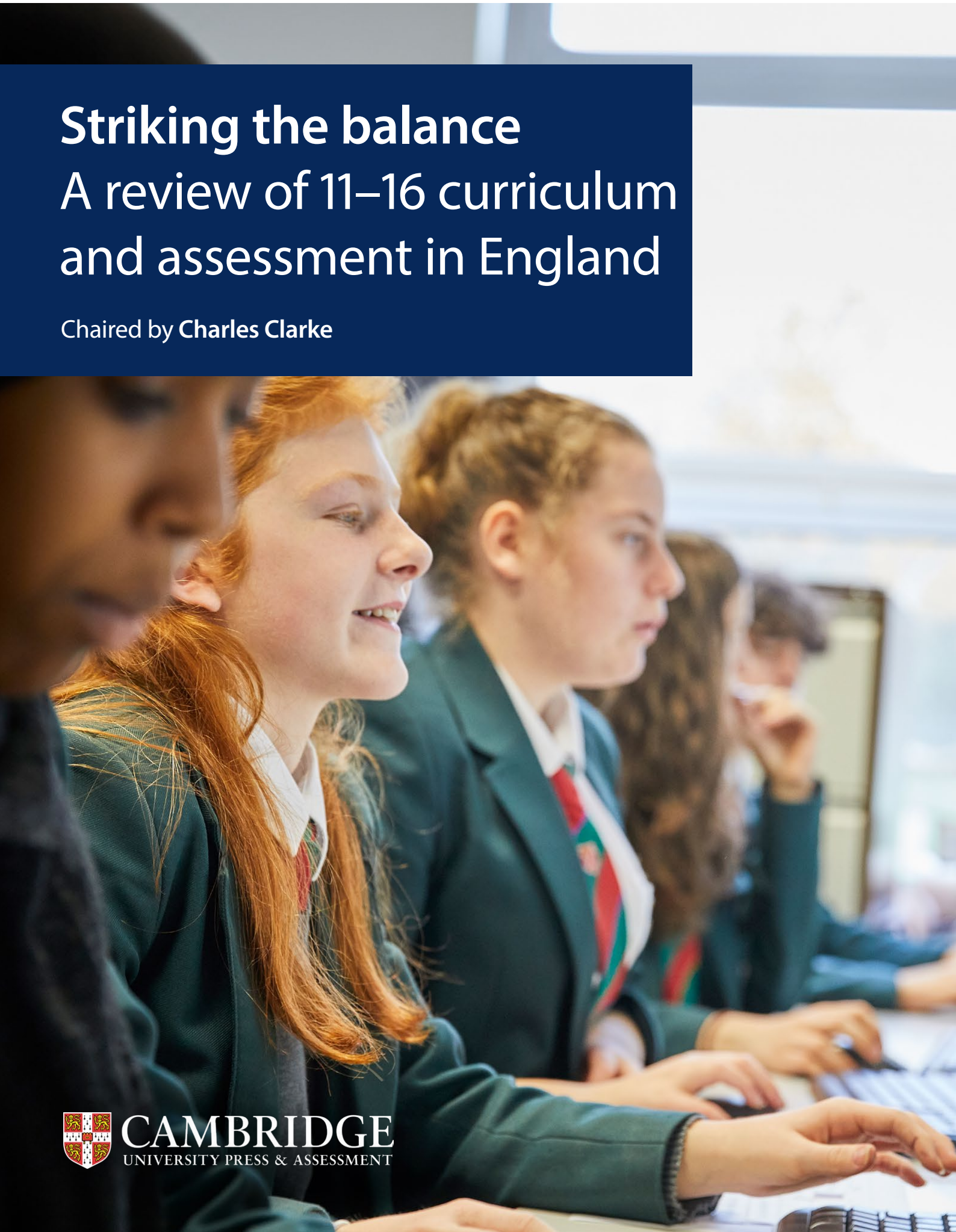
OCR
Oxford Cambridge and RSA

Striking the balance

A review of 11–16 curriculum and assessment in England

Chaired by **Charles Clarke**



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An introduction to OCR and Cambridge University Press & Assessment

OCR is a leading UK awarding body. We provide engaging GCSEs, A and AS Level and vocational qualifications in a wide range of subjects to equip students with the knowledge and skills they need for their future, helping them achieve their full potential.

Our heritage is long-established and provides us with expertise across academic and vocational qualifications. Established in 1998, we have experience, knowledge and skills that have enabled us to build a reputation for reliably high standards.

As part of Cambridge University Press & Assessment, we have access to unrivalled expertise and research capability across assessment and examinations: International Education is the largest provider of international qualifications for students up to 19 years old, and the English team are world-renowned experts in English language assessment.

Research is at the heart of all our qualifications and programmes and the Assessment Network provides professional development to the assessment community.

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Foreword by Jill Duffy, Chief Executive of OCR

Sometimes people are surprised by the things they miss. When I visited schools after the pandemic, what struck me most was how many students couldn't wait to get back to exams after the lockdown-enforced experiment with teacher assessed grades.

These young people were excited to be able to control their own destiny, and to have the agency to demonstrate their own skills and knowledge. They also saw taking exams as a life milestone they had missed out on. The way the education sector pulled together through the pandemic years was inspiring, but the loss of exams brought with it so many challenges – not least the variations in results – that it was a reminder of just how important this method of assessment is.

Put simply, independently assessed exams are the best way to test what a student has learned in a way that is objective, fair and consistent. They are a very good thing. But what this report has found is that you can have too much of a good thing, and in England in recent years we may have reached that point in some crucial parts of 11–16 education.

It should be possible to reduce the volume of examinations taken right at the end of Key Stage 4 while maintaining and enhancing standards and rigour. I am aware that may seem like an unusual statement for an examination body to make. At OCR we know how important exams are. But our mission as a not for profit is not to sell exams, it is to help students reach their potential. Our experience, our wide consultations, our research, and that of our colleagues at Cambridge, tell us that reform to 11–16 education is needed if we are to continue helping young people in England to meet their potential.

This is also far from our only recommendation in a report that offers a way forward with a mixture of bold and gradual proposed reforms. We should be clear: there is much that is working very well, and there are also many complex challenges. The solutions we are suggesting are substantial and pragmatic. They are realistic steps that we believe the government can put in place to start a long-term improvement in 11–16 education.

This report comes at an important time. When we began this work with Charles Clarke in February 2024, there was already a growing consensus that change was needed in curriculum and assessment over this most crucial period of schooling. As we publish our findings, a new government is beginning its first full term of Parliament and has already announced a welcome review into curriculum and assessment.

This report provides a wealth of evidence and recommendations that can inform that review. Much of this evidence comes from the very people most affected by potential reforms to education: young people, teachers and educationalists.

As the government has already indicated, that reform should be an evolution not a revolution. Shock therapy is not needed and would not be helpful. The GCSE is a trusted and recognised qualification, valued by students, universities and employers. What is needed is a long-term plan for realistic reform to tackle key areas that can most help young people. Reviewing the balance of assessments. Reforming maths and English. Broadening the curriculum to meet modern challenges. And embracing digital assessment.

There are no easy answers in this report. But we set out a path that we believe can build on everything that is working well in English education. This is the right moment for change, and we must not miss this opportunity.

An introduction by Charles Clarke

This review was established to address the curriculum and assessment challenges at Key Stages 3 and 4 – the five years from the age of 11 to 16 which are the core of our secondary school system, central to enabling our young people to fulfil themselves and their potential in all dimensions of their lives. We haven't ignored the other stages of education from primary through to higher education – it is important to look at how each phase interconnects, but it is not the main focus of this report.

We conducted substantial research among teachers and students and talked to a wide range of experts. This evidence suggests that there is widespread dissatisfaction with the way in which the curriculum and assessment systems over this age range are working at the moment. Morale in teaching, including serious teacher shortages, is far lower than it needs to be if children are to get the teacher inspiration which is at the source of all learning.

That isn't to say we don't have some firm foundations to build on. Performance in schools has been resilient. Attainment across core subjects has largely held up in international comparison studies. This is thanks in large part to the professionalism and commitment shown by teachers throughout the years of austerity, during the pandemic and the cost of living crisis, but is also testimony to the fact that much of what we have works. We are not calling, like some, for the abolition of GCSEs or a complete overhaul of the system.

Nevertheless too many children are emerging at 16 without the basic skills that they need to be able to navigate a very rapidly changing world. For example, nearly 300,000 16 year olds leave school each year without a standard GCSE pass.

There are very many reasons for this, and so many important issues to address, but we have decided to limit the scope of our review to four important aspects:

- **Reducing the assessment burden**
- **Digital assessment and learning**
- **English and maths at 11–16**
- **Curriculum evolution at 11–16**

In addition to our research, we have based our review on the hard practical experience of OCR (ocr.org.uk), one of the country's main examination boards. We understand that there is no silver bullet to change the country's large and complex education system but that there needs to be consistent and applied reform over some years but in a clear direction, which this report hopes to offer.

Our conclusions are set out in the body of this document but first and foremost we set out clearly the main changes that we think are necessary:

- Throughout the whole five years the curriculum itself needs to engage students by being far more contemporary and forward-looking, including more content on digital skills and artificial intelligence (AI), and climate change and sustainability
- The Key Stage 3 years, 11 to 14, need to be focused far more rigorously on building the foundational skills, particularly in maths and English, which enable all pupils to move forward to further study in a way which will deliver results
- Assessment needs to be balanced far more evenly across the whole five-year period, rather than being focused almost entirely in the last part of the final academic year at age 16

We are of course aware that the new Labour government has established a curriculum review, led by Professor Becky Francis, and we hope that this report will offer something to assist that review. We are also aware that a wide range of commentators in recent years have argued for a broader curriculum, for example the Times Education Commission's 2022 report *Bringing out the Best*:

> *"A British Baccalaureate, offering broader academic and vocational qualifications at 18, with parity in funding per pupil in both routes, and a slimmed-down set of exams at 16 to bring out the best in every child."*

We support moves in that direction and our recommendations are designed accordingly.

We are also aware that the Royal Society's Mathematical Futures programme and the Oracy Commission are reporting in September. We have talked to them and hope that our recommendations supplement what they are saying.

The curriculum

Across the whole range of subjects, and at all ages, the curriculum needs to motivate, engage and excite children so that they can fulfil their own aspirations. This means that what is learned needs to be focused far more on the world as it now is and is going to be than on the past. It should be more about enabling young people to develop the skills and confidence to meet the challenges which they will face in the future than simply acquiring the canons of knowledge which have been built up over centuries.

We think that means thinking of the core subjects of maths and English more widely and comprehensively than we currently do and focusing particularly at Key Stage 3 on developing the wider foundational skills in these fields. This will provide a more secure foundation in these subjects for proceeding to GCSEs at Key Stage 4.

So for example we suggest that a new benchmark assessment of maths should be introduced at the age of 14, and recommend the need to strengthen formative and diagnostic assessment at 11–13. The Royal Society has recommended that rather than mathematics, the subject should be referred to as mathematical and data education, and it is helpful to use this term when thinking about maths as a broad subject that covers many disciplines and should not exist as something separate that is taught only in maths lessons.

We similarly think that the concept of 'English' should be defined more widely to include the range of language and presentational skills which are of central importance in the modern wider world. These include reading and writing, spelling and grammar, comprehension and interpretation, oracy and articulation, active listening and media comprehension. And these should all understand the context of our modern diverse society, including the interconnected, globalised world in which we live.

Strengthening assessment at 14 and earlier can also be extended to the humanities and science to establish for all children a foundation level of skills, competence and capacity at the age of 14, from which study and learning can be developed to the GCSE at the age of 16. This is also good preparation for post-16 studies, whether in an A Level, vocational or technical route, which are less focused on the foundation skills and encourage the more developed understanding and capacity that can allow every student to develop self-confidence, independence and creativity for the future. All of our recommendations are designed to encourage those developments.

As we discuss in the report these issues arise differently in different subjects and we don't believe it is necessary to move at the same pace to make changes in all of these in all subject areas. However we do believe that maths and English are particularly important disciplines where this foundational approach should be applied.

In primary schools the development of maths and English skills has rightly always been seen as particularly important. We suggest that this focus should be taken forward to the age of 14 by developing foundational skills to the level which is necessary for students to enjoy living in modern society and being confident to do so.

The EBacc / Progress 8 system is widely criticised for inhibiting flexibility in the curriculum. We demonstrate some of the ways in which this system limits the options for study available to young people and go on to suggest ways in which the broader elements of the curriculum, which have suffered as a result, can be brought back into focus.

Assessment and examinations

What is actually taught in schools is obviously very much dependent on the assessment regime which is in place. This is because assessment outcomes are the central means by which students themselves, their families, schools and teachers are held accountable for their success, in a wide variety of ways. However we need to review the balance between the various purposes of assessment and examinations.

The principal beneficiaries of any assessment regime ought to be the pupils themselves. The assessment process ought to help the student, supported by their parents and teachers, to understand what they know, understand and can do and where they need to put in the effort to increase their knowledge, understanding or skills to master their subject.

A further purpose of assessment is to lead to the awarding of high-stakes qualifications. The achievement of a qualification, and the desire to attain one, can be highly motivating and rewarding – something to celebrate in its own right. It is also vital that qualifications have public confidence and are recognised by employers and higher and further education so that students are rewarded with qualifications which genuinely open doors to new opportunities.

These purposes are then supplemented by allowing accountability measures which enable schools and teachers to be assessed in order better to inform parents. But the latter should be a supplementary aspect of the assessment regime and not its essential purpose.

The evidence which we have seen leads us to conclude that the balance has now moved too far away from assisting the student to learn and too far towards sometimes misleading school and teacher accountability. Moreover the volume of school time and energy which is taken up by current assessment regimes reduces the time available for teaching and learning and so can inhibit the space for creative activity within the school day.

Additionally examinations and assessment from 11 to 16 are focused too much at the age of 16 the very final academic year of the five years of Key Stages 3 and 4.

Combined with the well-known challenges of the transition from Key Stage 2 to Key Stage 3, as children normally move from one school to another, there is a good deal of evidence that Key Stage 3 (ages 11 to 14) is simply not working as well as it needs to. We conclude that it is essential to establish a more even assessment regime across ages 11 to 16 with less pressure on the 'high-stakes' GCSE at 16.

There are a number of ways in which this can be done, all which will reduce the overall burden of assessment. We address these in detail in the body of the report but these could include reducing the number of exams in a particular subject while still retaining the same standard and rigour, or taking some modules in a particular subject in each year of Key Stage 4 rather than at the end or increasing the availability of fact sheets etc. in examinations and developing non-examined and teacher assessment (NEA).

But an essential component is the development of digital methods of assessment. In a number of subjects digital assessment can be done quickly, effectively and often enjoyably, in a way which enables the student to measure and assess their own progress so that they can target their learning in the most effective way. Some argue that many schools are not yet in a position to offer digital assessment methods either because their own digital infrastructure is insufficiently strong or because their teachers do not have the necessary expertise. These concerns do not in our opinion justify delaying the process of introducing digital assessment options where they can be effective.

It is worth emphasising here that digital methods are often particularly appropriate and effective for assessing some of the foundational competences and skills which we describe above in relation to the curriculum, notably at Key Stage 3. In addition to foundational maths and English skills, the example of a 'language ladder' for modern foreign languages (constructed rather like the system of music grade examinations) or competency-based qualifications as recommended by the British Computer Society demonstrate the range of applications which can be considered.

Digital methods could also replace much of the mock examination culture which remains a very strong element of the overall assessment burden.

However an important issue remains the need to find effective ways to synchronise any digital skill-based assessments with the wider GCSE examinations. For example digitally assessed language skills do not also include the wider cultural and history dimensions which are embodied in GCSE languages qualifications. Similar challenges arise in all of the main subject areas.

Nevertheless our overall conclusion is that very substantial steps can be taken to reduce the overall intensity of assessment and enable more creative approaches.

Implementation

This report seeks to make a virtue of signalling the direction of steady change over a number of years to create a curriculum and assessment system in English schools which really is fit for the future. No quick fixes or dramatic change will be sustainable, or even really deliverable. Change needs to be steady and gradual in a consistent direction which is maintained over a number of years.

And though a large number of changes are needed change has to be holistic in nature. Reforms need to move in the same direction. It must also be a whole education approach which is inclusive of learning difference and special educational needs and disabilities (SEND). There are a number of themes which we emphasise:

- Firstly, different subjects and different stages of education will require different approaches in regard both to the curriculum and to assessment. The GCSE system creates an apparently uniform approach at the age of 16 which can be somewhat misleading both in relation to academic and vocational subjects and in relation to forms of assessment which simply do not fit within it, such as the music grade system. This diversity should inform the reform process.

- Secondly, change can and should take place in stages. Different subjects can be approached in different ways. Changes can be progressively implemented in different groups of schools or different parts of the country. There does not need to be a moment of cataclysmic change at one time. It is far more effective to move steadily, improving all the time, based on experience.

- Thirdly, teachers are absolutely central to implementing any change. If we work with teachers change will happen effectively; if not it won't. We attach particular importance to offering continuous professional development (CPD) (often online) for teachers. This should already be far better established in education than it is. A look at comparable professions indicates much deeper use of CPD to enable professionals to handle rapid change both in their profession and around them. A programme of comprehensive teacher CPD is of central importance. This can only work if teachers are given time and space to develop, which is one of the reasons why a reduction in the burden of assessment and addressing curriculum overload is so important.

- Fourthly, effective accountability regimes remain extremely important. Assessment data for schools should continue to be published but should be adjusted to emphasise progress, or lack of it, rather than comparison across schools.

All this said, we believe that the prize of coherently implemented reform of the 11–16 curriculum and assessment system is enormous, both in terms of assisting children to fulfil their personal ambitions in a wide variety of different ways but also in enabling the education system as a whole to better serve the needs of a rapidly changing society and increasingly complex world.

Executive summary

This report aims to contribute to the debate around 11–16 curriculum and assessment reform at a crucial moment. The government's own review, led by Professor Becky Francis, is a welcome opportunity to reform and strengthen an education system that is faced with numerous and significant challenges. These challenges are not simple, nor will they be solved by education alone; this report will not find a silver bullet, but instead a number of realistic and achievable policies that can improve 11–16 education for students and teachers.

It is important to note that there is much about 11–16 education that is working well. **The GCSE is an internationally recognised and highly trusted qualification.** There is no case for replacing the GCSE. Nonetheless, the need for reforming and evolving significant aspects of 11–16 curriculum and assessment in England, to meet the challenges of education and employment now and in the future, is urgent and immediate.

This report is based on wide consultation with stakeholders – including over 2,000 students and teachers – roundtable events, surveys and desk research. This is supported by the extensive experience and knowledge within OCR and Cambridge University Press & Assessment – the latter of which provides original research through its Assessment Research Division, as well as international perspectives.

The findings and recommendations are underpinned by a desire to **maintain and raise standards and rigour**. We have found that the volume of assessment and size of the curriculum can be reduced without reducing the integrity of exams, or the value of the qualification. Similarly, the changes we recommend to help the 'forgotten third' of maths students seek to provide those students with the fundamental skills and knowledge they are currently leaving school without; not reduce the rigour of the qualifications.

Addressing the balance of assessment and addressing curriculum overload

Exams have many benefits – they are objective and authentic measures of a student's performance. Confidence in these qualifications among the public, employers and universities is high. They are efficient and scalable, and they provide a useful structure for learning. But assessment at Key Stage 4 is dominated by terminal examinations at the end of the two years, rather than a broader basket of measures. **Put simply, you can have too much of a good thing.**

The current volume and intensity of examination at GCSE and for vocational Key Stage 4 qualifications in England is too high, with students taking an average of 31.5 hours of exams each, and is higher than most comparable jurisdictions. The time in the exams themselves is in addition to time taken up on revision and mock exams. This dependence on exams as the only mode of assessment means there is too much focus on a narrow range of learning.

There is scope for reducing the length and quantity of exams. We found that OCR GCSE Maths paper 1 is **99.7 percent accurate in predicting**, within one grade, what that candidate's final grade will be after completing all three exams taken by maths students. It is broadly feasible to conclude that it would be possible to make a *modest* reduction in assessment time to existing GCSEs while still maintaining acceptable levels of reliability. However, any significant reduction in assessment time would need to be accompanied by some reduction in content.

This highlights that **the overreliance on exams is exacerbated by a curriculum that is overloaded with content**. The content of GCSEs can and should be reduced. The potential for reducing content varies from subject to subject, with maths, the sciences, and history standing out as particularly overloaded.

A wider range of assessment models can include **Non-Exam Assessments (NEAs), a modular approach, and greater use of 'open book' exams and exam aids**. All of these alternatives have associated risks along with benefits, and in particular a thorough review of NEA models will be required to ameliorate the risk of plagiarism, and additional requirements on teachers.

The maths curriculum and assessment for 11–16 year olds

In the chapter on adjusting the balance of assessment we argued that there is too much content and too much assessment at GCSE. GCSE Maths is a case in point. Reforms to the subject in 2015 added so much content it was dubbed "Big Fat Maths". The impact is rushed learning, and too many students being left behind.

It is in everyone's interest to make some tough choices to reduce the size of current maths content. This can be achieved by consensus, informed by a notional agreement of the amount to be cut, and by scrutiny of curricula from other high-performing jurisdictions. Some aspects of the curriculum may be better placed in further and additional maths qualifications, or elsewhere in the curriculum. There is also a major role for utilising maths in wider contexts that sit in other parts of the national curriculum.

Nearly one-third of GCSE students fail to achieve what the government describes as a 'pass'. Only about a fifth pass their resits, condemning the rest to revisit the demoralising experience of failing the exam. Poor performance is also linked to deprivation and the attainment gap. Not only do roughly one-third of students 'fail' the Maths GCSE but research by Cambridge University Press & Assessment has also found strong evidence that they are **reaching 16 without the basic foundations** in number skills that they need for life, work and study.

There are other aspects of the treatment of maths across the 11–16 phase, particularly at Key Stage 3, that need addressing. Indeed, the problems seem to begin at age 11, and the transition from primary to secondary school sees attainment and attitudes drop. The unreliability of Key Stage 2 testing means students' potential, or maths learning needs, are not always known when they begin secondary school.

Paradoxically for a report that largely argues for a reduction in the assessment burden, we are convinced that there is a need for a maths examination for young people aged 14, or when ready. The assessment should be delivered on-screen, and cover the basic functions that underpin Key Stage 3 including mastery of elementary algebra, simple trigonometry and data interpretation – those very areas our analysis of GCSE scripts showed many students had failed to grasp by the end of Key Stage 4.

The English curriculum and assessment for 11–16 year olds

In all of our roundtables, focus groups and surveys for this report, the GCSE in English was universally unpopular. Teachers believe this is a significant factor in the ongoing decline in popularity of the subject at A Level.

The GCSE in English is poorly designed and narrow in the skills it requires. Many of the stakeholders we consulted argued for a qualification that develops a student's ability to master a wider range of forms of writing than currently feature in the GCSE, including the use of digital modes and writing for business purposes. There is also a feeling that the current treatment of creative writing is 'inauthentic' and not well suited to examinations.

Although there is a formal spoken 'presentation' component to the GCSE, it does not contribute to a student's overall grade, so is not treated as a priority. It also fails to capture wider oracy skills beyond formal presentation. **Oracy needs to feature throughout the curriculum.** An assessment of presentation skills near the end of Key Stage 4 would be too little too late.

As with maths, there is a dip in performance in English over the 11–16 period. There are other similarities: the GCSE casts a long shadow over Key Stage 3, and formative assessment and progress measures are not always effectively applied. There is a need for more structured assessments at Key Stage 3 to measure progress and diagnose student skills and knowledge. It is important to note that **we are not advocating a return to the widely unpopular Key Stage 3 SATs in Maths and English**. But we have recommended the introduction of a

benchmark qualification at 14, that can be taken when ready, is on-screen, concentrates on what a student can do, and is not linked to school accountability measures.

Digital assessment and learning

There are a great many reports predicting the potential of digital technology to transform high-stakes assessment. But the approaches so far and those planned for the medium term are generally cautious. This is understandable given the critical nature of qualifications and tests which are, by definition, high stakes.

The use of digital testing in higher education and elsewhere gives a sample of the wider potential of new technology to transform traditional approaches both to assessment and learning. We review some of the technology already being used or in development, including micro-credentialling, gamification, collaborative learning platforms, and immersive environments.

It is likely that, in time, some of these approaches will drive changes to formal assessment, particularly in relation to adaptive testing, modularisation and assessments that can be taken anytime anywhere.

These developments are mainly taking place in the sphere of low stakes formative assessment and testing, sometimes in an uncoordinated fashion and the deployment of technology varies from school to school. There are risks of inequity of access and the potential to exacerbate the digital poverty gap.

Practices in other jurisdictions suggest that, when it comes to high stakes testing, the UK is not atypical although there are a few countries that are investing heavily and experimenting with assessment at pace. However, the vast potential of the transformative use of digital assessment in schools is not being harnessed by government and there is no national strategy for coordinating the use of digital learning.

Evolving the curriculum

There is much to commend the current curriculum – it has admirable depth and is knowledge rich, but there is a widespread view that the curriculum as experienced by most young people is **too narrow**.

The curriculum in England hasn't been updated for years and there are few mechanisms for oversight of the whole system or that allow for change, leading instead to infrequent 'big bang changes' every decade or so.

Some of the impacts of a lack of ongoing review of the curriculum include the narrowing of subject choices and the decline in uptake of some subjects. The issue of curriculum overload is a key problem.

There are two glaring omissions from the current curriculum: climate change education and digital literacy. There are aspects of the curriculum which could better reflect the diversity of modern Britain.

We recommend ways in which changes can be made to broaden the curriculum and to rebalance the current approach to assessment at GCSE. Our view is that changes can and should be made in an incremental way, focussing on priority areas and avoiding the cumulative impact of too much concurrent change. This can only be achieved through the creation of a curriculum body, independent of government, with the responsibility for overseeing this evolution.

Finally, we hope that those responsible for reviewing and monitoring the curriculum find this report useful in identifying priority areas for change so that we can continuously improve the opportunities, learning experiences and attainment of all our young people.

Recommendations

Adjusting the balance of assessment and addressing curriculum overload:

- **Reduce the length and number of assessments used at GCSE.** The number of hours spent sitting GCSEs is currently unnecessarily high and needs to be reduced while still retaining standards and rigour. It is evident that there is considerable scope for doing this without impacting on the reliability and validity of exams. This could be done without reducing the content of GCSEs but it would be better to reduce content and assessment time in parallel.

- **Reduce the amount of content in GCSEs.** There is nothing fundamentally wrong with the content of GCSEs other than that there is too much of it. The potential for reducing content varies from subject to subject, with the sciences, maths and history standing out as subjects where the volume of content is most commonly described as excessive.

- **Schedule some exams early or make limited use of modular exams or Non-Exam Assessment (NEA) in some subjects.** There is scope to look at opportunities, at subject level, for spreading assessments over a longer period of time so that not all exams are taken in a concentrated period at the end of Key Stage 4. The advantages and challenges associated with modularisation are set out on "Using a modular approach to spread assessment across a longer time period" on page 25.

- **Require the exam boards and the regulator to conduct a thorough but urgent review of existing NEA models**. This should be with a view to making them more reliable, clearer about the skills being assessed, more manageable for teachers, and less subject to misuse through AI. This would provide future opportunities to introduce a more balanced mix of exams and NEA such as we see in other high performing jurisdictions.

- **Make greater use of examination aids** such as formulae sheets and open book approaches to reduce the revision burden. This can be done relatively quickly, as we saw with experiences post-Covid where formulae sheets were used.

The maths curriculum and assessment for 11–16 year olds

Any strategy for reforming maths at 11–16 must focus on the goal that no young person completes this phase of learning without gaining the fundamentals of maths that are needed to equip them for life and further study.

- **Reduce the length and number of assessments used in GCSE maths.** The assessment burden at GCSE is currently unnecessarily high and needs to be reduced to free up more curriculum and teaching time. It is evident that there is considerable scope for doing this without impacting on the reliability and validity of exams. This could be done without reducing the content of GCSEs but it would be better to reduce content and assessment time in parallel.

- **Reduce the amount of content in GCSE Maths.** Although there are always tough choices to make it is critical that the amount of content in the GCSE is reduced to enable students to acquire a deeper understanding and mastery of the fundamentals. It isn't possible to prioritise everything. Some of the more demanding content could be moved into additional maths qualifications already taken by higher achievers at 16, and some could be covered post 16.

- **Take a more systematic and coherent approach to Key Stage 3.** This should include:
  - An expansion of the Maths Hubs Programme, building on the mastery approach embedded at Key Stage 2
  - A coherent and integrated use of formative tests during Key Stage 3, and support for better use of diagnostic tests at the point of transition from primary to secondary education
  - A concerted effort by publishers, policymakers, teachers and researchers to develop textbooks in tandem with curriculum reform.

- **Develop and introduce a maths qualification, mainly to be taken at 14**, which provides a structured focus to Key Stage 3, benchmarks the maths needed by all young people by the age of 16, which is on-screen, can be taken when ready and generates a profile of achievements.

The English curriculum and assessment for 11–16 year olds

- **The English GCSE should be redesigned as a matter of urgency**. Policymakers should not wait for the conclusion of a full review of all subjects, curriculum and assessment before such a redevelopment. Areas for consideration should include:
  - **Including more media, non-fiction and multi-modal texts**, including film, TV, drama and digital texts as part of English while recognising that these should also be part of the wider curriculum as they will be encountered within other subjects.
  - **Increasing the diversity of literary texts available for study within GCSE.** The literary canon should better reflect the range of cultures and experiences of all young people.
  - **Restoring the study of spoken language** to the GCSE. This is an important element of studying English at Key Stage 4, but also supports better preparation for study at A Level and beyond.
  - **Considering how Non-Exam Assessment (NEA) can be used to provide more appropriate ways of assessing creative and professional writing.** This should reflect the ways in which fiction and non-fiction texts are planned, drafted and written for a range of purposes, but also needs to be part of a wider review of NEA constructs and take account of the emergence of AI.

- **Trial the assessment of speaking and listening, using models developed for English for speakers of other languages (ESOL) students.** We recognise that speaking and listening are only one dimension of oracy and other less formal, teacher-assessed approaches should also be trialled.

- **Make the treatment of oracy a greater focus of school inspection in line with national curriculum requirements.**

- **Develop and introduce an English qualification, mainly to be taken at 14**, which provides a structured focus to Key Stage 3, benchmarks the English competences needed by all young people by the age of 16, which is on screen, can be taken when ready and generates a profile of achievements.

Digital assessment and learning

Government should ensure there are mechanisms in place to:

- **influence strategic direction and development of national education policy to best take advantage of technology and**

- **develop a national digital infrastructure and resources strategy leading to greater national coherence**

- The exams regulator, Ofqual, must work with awarding organisations, schools and government to **develop a clear framework in which the trialling of new digital approaches to formal assessment are encouraged**.

Evolving the curriculum

- **Government should put in place mechanisms for the ongoing review and evaluation of curriculum and assessment.** The approach to change should be incremental – evolutionary, not revolutionary. We advocate the creation of a curriculum body, independent of government, which should take the lead on developing and maintaining a broad and balanced curriculum. It should set the long-term vision and oversee and plan for the steps that move us in that direction whilst regulating the pace and impact of cumulative change. It would work with Ofqual, the qualifications regulator, to introduce changes to assessment approaches.

A review of the curriculum should include:

- **A reduction in exam time and content in individual GCSE subjects.** We have said this before, but it is vital to do this if we are to ensure there is room for wider curriculum activities and to address the decline of some important subjects.

- **Recognition that climate change and sustainability topics must be made more explicit throughout the curriculum and within individual subjects and qualifications.** Topics should feature more heavily in support materials and within examination questions. A vocational qualification that looks at sustainability in business and develops carbon literacy should be introduced. In the section on climate change we have set out some actions in more detail that would support the inclusion of quality climate change education. Above all, it is essential that the government should provide leadership and a sense of urgency in supporting the communities of interested parties in implementing climate change education.

- **The reinstatement of digital literacy in the curriculum. This should include formal assessment leading to a qualification.** It is an essential part of the curriculum that has gone missing. To ensure its prominence as a core subject a new GCSE or vocational equivalent should be introduced; this should be designed from scratch as a digital assessment. It should include content on the technical use of IT but also wider aspects such as recognising misinformation, ethical use of social media and the appropriate use of AI.

- **A review of the current EBacc measure so schools are encouraged to offer a wider range of subjects.** There are some immediate changes that might be made, such as introducing additional subjects to the 'subject pillars', notably creative and vocational subjects . However, in the longer term, it will be necessary to develop a vision that sets out how broad we want the curriculum to be and what range of choices should be made available to all. New accountability measure should then be developed which are servant to that vision.

- **Changes to curriculum and assessment materials where required to ensure that they are relevant to modern Britain and encourage diversity.** The aim should be to achieve a balance in preserving those things about our culture and history that unite us while reflecting the diversity of our society and culture, and the differing interests, talents, and abilities of our young people.

Adjusting the balance of assessment and addressing curriculum overload

> "The evidence we have received is compelling. Change to the education system for 11–16 year olds is urgently needed, to address an overloaded curriculum, a disproportionate exam burden and declining opportunities to study creative and technical subjects."

Jo Johnson, Chair of the Lords Education for 11–16 Year Olds Committee

Rebalancing assessment

Approaches to assessment at GCSE and to vocational Key Stage 4 qualifications need to be rebalanced. The emphasis on examinations at the end of Key Stage 4 in the English system has become excessive. This eats into valuable learning time, places logistical demands on schools and colleges, and creates a concentrated period of pressure in the final term for both students and teachers. A related concern is the amount of content that needs to be taught for each subject. Any moves to reduce this intensity of assessment would provide some respite for a beleaguered workforce and take some pressure off young people at a time when mental health issues are spiralling.

There is a strong argument for spreading the 'burden of assessment' across a wider timeframe and for adopting a wider range of assessment methods, while maintaining the rigour and central importance of examinations.

When judging whether the volume of exams taken in the English system is excessive or not, it is instructive to see how the number of exams taken by 16 year olds in England compares with those taken at the equivalent stage in other high-performing jurisdictions. The table below clearly demonstrates that England is an outlier.

Table 1: International comparisons of exam times at lower secondary[1]

Jurisdiction	Assessment name	Typical exam time required	No of subjects taken	Total exam time (approx.)
Australia (Victoria)	National Assessment Programme (NAPLAN)	40–65 mins per subject	4	**4 hours**
Canada (Alberta)	Provisional Achievement Testing Programme	1.25–3.25 hours per subject	4	**10 hours**
England	GCSE	3.5 hours per subject	8–9 on average	**31.5 hours**
New Zealand	National Certificate of Educational Achievement (NCEA)	3 hours per subject	Typically, 5 or 6	**18 hours**
Poland	Egzamin Maturalny	3 hours per subject	At least 4	**12 hours (minimum)**
Republic of Ireland	Junior certificate	2 hours per subject	7–8 (on average)	**16 hours**
Singapore	O Levels	3.5 hours per subject	Between 4 and 9	**Up to 31.5 hours**
USA (Massachusetts)	Massachusetts Comprehensive Assessment System	2 hours per subject	At least 4	**8 hours (minimum)**

These comparisons are inevitably crude, and care should be taken to recognise that in many of the examples given the exams are supplemented by teacher assessments and that the contexts are very different. Nevertheless, the contrast is striking and the exams referred to above are high stakes for the young people who take them because they determine the opportunities and pathways available to them in the next phase of their education.

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1 Benton, T. (2021). *How long should a high stakes test be?* Cambridge Assessment Internal Research Report.

It is useful to note how we arrived at the current situation, as well as some of the issues arising from an overdependence on terminal examinations. First, however, it is important to note the many benefits of exams, which remain the most valuable method of assessment in education, when used in the right way.

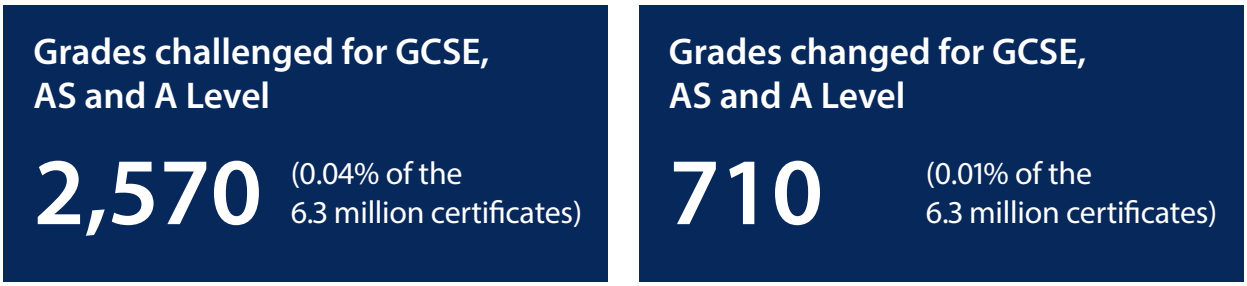
The many benefits of exams

Although, as we have argued, exams are far from perfect, they bring with them many benefits. It can be no coincidence that they feature almost universally in all education systems across the globe.

Technology allows for the sophisticated analysis of data and close monitoring of examiner performance. There is reliable historical data and exam boards hold massive archives of scripts which allow for comparisons to be made over time using a sophisticated blend of data and professional judgement to arrive at the final results.

There are checks and balances through appeals and reviews of marking, and the fact that the number of grades challenged in relation to GCSEs, A and AS Levels represents 0.04 percent of the 6.3 million certificates issued suggests high levels of confidence in the system (see **figure 1**).

Figure 1: Number of grades challenged and changed at AS and A Level



Source: Ofqual[2]

Exams provide an **objective and authentic** measure of a student's performance. Examiners mark students' work 'blind' without any knowledge of a student's ethnicity, gender or background. It is extremely difficult to cheat in an exam, so examiners can be confident that a student's work is their own and any evidence of collusion is very likely to be identified.

They may require management and resource, but exams are relatively **efficient and scalable**, allowing millions of students to be entered every year.

Exams provide a **structure** to learning through their specified content and criteria which provide **clear information about what needs to be learned and understood**. Because of their high-stakes nature, they concentrate minds on the learning that is required, which can be **motivational**. That they are **knowledge-rich** is of great value – it ensures young people end their key stages of education have a body of knowledge that is useful for progression and culturally enriching.

Although there may be concerns from the public about the excessive emphasis on exam results, **public confidence** in exam results is high. They are used extensively by employers, universities and colleges in their selection processes and exams are familiar to and understood, in general terms, by all members of society.

So, even if there are issues with exams they may yet be the best option for measuring young people's attainment. The concern is not with the use of exams per se, but rather with their excessive use and the reliance on exams rather than a broader basket of measures. **Put simply, you can have too much of a good thing.**

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2 Ofqual. (2024). *Appeals for GCSE, AS, A level and Project: 2022 to 2023 academic year.* https://www.gov.uk/government/statistics/appeals-for-gcse-as-a-level-and-project-2022-to-2023-academic-year

The purpose of exams

As Charles Clarke points out in his introduction to this report:

> *"The principal beneficiaries of any assessment regime ought to be the pupils themselves. The assessment process ought to help the student, supported by their parents and teachers, to understand what they know, understand and can do and where they need to put in the effort to increase their knowledge, understanding or skills to master their subject.*
>
> *A further purpose of assessment is to lead to the awarding of high-stakes qualifications. The achievement of a qualification, and the desire to attain one, can be highly motivating and rewarding – something to celebrate in its own right. It is also vital that qualifications have public confidence and are recognised by employers and higher and further education so that students are rewarded with qualifications which genuinely open doors to new opportunities."*

Reforms to GCSEs and other Key Stage 4 qualifications in England

The introduction of reformed GCSEs in 2015 led to a marked increase in the volume of exams. The introduction of the **reforms in England brought an approximate increase in examination time of 8 hours per pupil**, and exams are nearly all taken in a concentrated period over a single summer term, which, according to one report, comes to 33 hours' worth on average per pupil.[3] This summer (2024) the GCSE exam period was fitted into a timetable that ran from 9 May to 21 June.

Although GCSEs are the main source of examinations, many GCSE students also study at least one vocational qualification. According to Ofqual, 380,500 Technical Awards were certificated in the academic year 2022/23.4 'Technical Awards' is the generic title given to vocational qualifications which are studied at Key Stage 4 and recognised in school performance tables. In 2018 a requirement was introduced that the proportion of a Key Stage 4 vocational qualification's content that is assessed by examination must be at least 40 percent. This significantly increased the amount of examination time for many of these qualifications.[5]

Issues associated with an overdependence on terminal examinations

The use of examinations as the main, and often the only, mode of assessment raises several points for consideration:

Potential lack of resilience in the system

When all things are equal, exams can function effectively, but they do not always prove resilient when things go wrong. The cancellation of exams during Covid is a clear example, but every year there are circumstances such as floods or fires that impact locally on exams, and every year many individuals fail to attend some or all of their exams through no fault of their own.

Exams are just a snapshot taken on a single day

As a former Head of Ofqual put it:

> *"Exams are a bit like a snapshot, a photograph – whereas teacher assessment allows teachers to observe student performance over a much longer period, in a rather more complex way, taking into account lots of different pieces of work and arriving at a holistic judgment. We can feel satisfied that it's likely to give a much more accurate and substantial*

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3 "Back in 2017, the Association for School and College Leaders (ASCL) carried out analysis about reformed GCSEs which found that a pupil taking a typical set of these qualifications faced spending over eight extra hours sitting exams compared to the old system. In total, this amounted to 22 exams over a total length of 33 hours." ASCL Blog (December 2022).

4 Ofqual. (2024, March 26). *Annual qualifications market report: academic year 2022 to 2023*. Ofqual/24/7119/1. GOV.UK. https://www.gov.uk/government/statistics/annual-qualifications-market-report-academic-year-2022-to-2023

5 Para 6.1 *Technical qualifications for 2024 key stage 4 performance tables guidance for awarding organisations*, DfE.

> *reflection of what their students are capable of achieving."*
> Simon Lebus, Interim Head of Ofqual in the context of alternative arrangements to exams during Covid

This points to some of the limitations of using exams as the predominant instrument for measuring performance and to the benefits of broadening the range of assessment approaches – though as will be noted below, non-examined assessments bring with them their own challenges and risks.

Not everyone performs to their full potential under exam conditions

Anyone can have a bad day, or an exceptionally good one. Volatility in exam results – the phenomenon of a pupil performing much better or worse in an exam than expected – is a well-recognised phenomenon and remains a feature of all exams. This is so much the case that Cambridge Assessment produced a report recommending statistical approaches which, in the context of school accountability measures, would help teachers and policymakers to model for and have more informed discussions about changes in scores from year to year – as the title of the report puts it, *Volatility Happens*.[6]

Some identifiable groups of learners perform less well at exams than their peers, even though, when assessed by different measures they show a high level of knowledge, skills and understanding:

> *"The received wisdom is that exams are fairer and more impartial… [but] the evidence from our schools suggests that students living in poverty are most adversely affected by having to perform in high-stakes moments in the exam hall."*[7]

And one of the teachers we consulted with told us:

> *Some students can never show what they can do through exams alone – they are set up for a life in school that is miserable with only failure at the end of it.*

Exams can't assess everything

A minority of subjects, those involving the demonstration of certain skills and knowledge which are not readily assessable by traditional examinations, use other assessment approaches by necessity. For this reason, the assessment by examination for any part of GCSE Art and Design is prohibited under the current regulations.[8] Languages make use of oral assessments, and performance-based assessment features in assessing music and drama (although to a surprisingly limited extent).

But there are valuable skills and activities relevant to a range of other subjects which are not easily assessed by exams alone. Important competencies, values and behaviours that prepare young people for life, study and work are better assessed through activities such as teamwork, research and surveys, using AI, interrogating digital data sets, completing projects and assignments, or carrying out practical activities requiring creativity or experimentation. Many of these activities can and should take place outside of traditional classroom settings.

Furthermore, as the Association of School and College Leaders (ASCL) puts it, the use of exams in performance and skills-based subjects can also take some of the joy out of such subjects: *"A further barrier to a broader secondary curriculum is the assessments themselves. The reforms of the last decade have seen a greater emphasis on exams and essay writing, including in art, vocational and technical subjects. ASCL members believe that this has undermined love for the subjects in*

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6 Crawford, C., & Benton, T. (2017). *Volatility happens: Understanding variation in schools' GCSE results. Cambridge Assessment Research Report*.

7 Hyman, P. (2021, August 15). Let's not return to flawed exams. We have better ways to assess our children. *The Guardian*. https://www.theguardian.com/commentisfree/2021/aug/15/lets-not-return-to-flawed-exams-we-have-better-ways-to-assess-our-children

8 "An awarding organisation must ensure that no assessment for a GCSE Qualification in Art and Design which it makes available is an Assessment by Examination". Ofqual. (2021, November 11). *GCSE subject-level conditions and requirements for art and design (2022)*. GCSE (Art and Design) 2.2. https://www.gov.uk/government/publications/gcse-subject-level-conditions-for-2022/gcse-subject-level-conditions-and-requirements-for-art-and-design-2022

some students, and led to fewer students taking certain optional subjects due to the demands of the assessment." [9]

A bias towards assessing knowledge

Exams are not just memory tests. As well as requiring the recall of knowledge they are designed to assess a wide range of skills that involve the application of this knowledge, for example: critical thinking, evaluating hypotheses, argument, creativity, speed and accuracy in calculations, digesting and synthesising information, and summarising texts.

Young people are required to accumulate and retain a great deal of knowledge. In the context of a crowded curriculum with limited time to teach everything, this can mean in practice that teachers feel forced to prioritise the acquisition of knowledge at the expense of nurturing a deeper understanding of and the application of that knowledge. Not only does this come at the expense of the attainment of deeper learning but it also means that the teaching process can become 'joyless' for teachers and young people alike. That this is a reality is strongly evidenced by responses to our teacher and student surveys. We should be clear that we are referring to the impact of curriculum overload. We are not arguing against the importance of retaining things in memory and we recognise that a knowledge-weak curriculum reinforces social differences and solidifies social disadvantage. What you know differentiates you.

Teacher and student views

These are some of the things teachers said in our recent OCR survey of teachers with over 1,000 responses:

- Exams should place more emphasis on skills than memorising things that you can look up on your phone in seconds.
- The workplace doesn't operate like a 100 percent memory test, unless you're a surgeon or similar, so purely having exams isn't reflective of life.
- Exams are not a good way of showing what a person can do or show. It only tests their memory on the day in a stressful environment. It has no correlation to the world of work.
- Different exams test different knowledge and skills but some have definitely moved towards regurgitating knowledge and memory rather than the application of skills and knowledge.
- Exams aren't fit for purpose in the 21st century. They rely far too much on recall which then filters through the whole education system at the expense of teaching and learning that cultivates skills and values.
- Exams are a snapshot of what a student can recall on a particular day. It does not provide an overall insight into what they know.

And this is how it feels for many young people:[10]

- Exams are just questions on content memorised instead of allowing students to delve deeper into a subject they enjoy.
- I have anxiety and memory problems due to other mental health issues, so exams were the worst possible way of assessing me, especially in an environment I was not comfortable in.
- Exams favour those who have great memory, less those who can apply the knowledge.
- Some bits are memory tests – such as learning quotes for GCSE English Literature from a play, a book and lots of poems.
- Exams only show how well you can remember things, coursework and other tasks show the examiner how the students have learnt and progressed over a period of time.
- GCSEs felt like a memory test, but A Levels (and my degree exams) don't feel like that.

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9 Association of School and College Leaders. (2023, December). *Labour's proposed Curriculum and Assessment Review: Initial thoughts from the Association of School and College Leaders*. https://www.ascl.org.uk/ASCL/media/ASCL/Our%20view/Consultation%20responses/2023/ASCL-initial-thoughts-on-Labour-s-Curriculum-and-Assessment-Review-Dec-23.pdf

10 In parallel with our survey of teachers we sought the views of young people. This survey also received over 1,000 responses.

Other problems associated with a high volume of assessment

Exams reduce the time available for teaching and learning

The actual time spent sitting final exams is the tip of the iceberg. Most students now sit two or three sets of mocks – a half timetable of mocks in Year 10 and Year 11 followed by a full set of mocks later in Year 11. Arguably, pupils sit more exam-style tests through the course than they used to when exams were modular. This is partly driven by schools wanting more and more information on student progress. In effect, exams which were designed to be linear and taken at the end of a course are treated as though they are formative.

All of this eats into valuable teaching time, and places further limitations and pressures on what can be offered within an already crowded curriculum and can diminish the wider support that young people need.

The large amount of resource and effort spent on managing exams within schools and colleges

The logistics involved in managing examinations is significant. From the process of making examination entries through to providing suitable and compliant venues, hiring invigilators, dealing with timetable clashes, maintaining security, accommodating the growing number of access arrangements, applying for special considerations, the issuing of results, dealing with appeals and cases of suspected malpractice make for a resource-intensive and complex set of activities – all of which are exacerbated by the sheer volume of exams.

Much of the burden of administering exams rests with hard-pressed exams officers.

The National Association of Examinations Officers conducts an annual survey of its members. In 2023, members highlighted some of the following challenges: [11]

- The recruitment and retention of invigilators
- Access arrangements – the number of different access arrangements which need to be accommodated and rooming access arrangements for candidates
- Workload – insufficient time to undertake current tasks
- The increased number of qualifications taken within centres increasing the scope of the role
- Lack of support / leadership from senior leadership team / line manager
- Teaching staff being unaware of exam-related information / deadlines / regulations
- Awarding organisation (i.e. exam board) processes – managing the different processes which exist between them

The impact on young people's mental health and wellbeing

It is difficult to untangle the causes of the current mental health crisis affecting young people. Exam stress is often cited by teachers and by students themselves as a contributing factor. In a survey conducted by the National Education Union, 73 percent of teachers said that reformed GCSEs had, in their view, contributed negatively to pupils' mental health.[12] In a survey by the children's commissioner for England, two-thirds of children described homework and exams as their greatest cause of stress.[13]

Following original research commissioned by the National Union of Teachers in 2015, Professor Merryn Hutchings of London Metropolitan University said in her final report:[14] "While acknowledging that there are other causes of stress among young people, teachers claimed

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11 National Association of Examination Officers. (2023). *Exams officer survey - 2023*. https://www.thenaeo.org/userfiles/files/FINAL-2023-Exams-Officer-Survey-results.pdf

12 Monbiot, G. (2022, April 27). England's punitive exam system is only good at one thing: preserving privilege. *The Guardian*. https://www.theguardian.com/commentisfree/2022/apr/27/england-exam-system-children-mental-health

13 The Children's Commissioner for England. (2020, May 20). Children and stress, what's worrying them most. *Children's Commissioner Blog*. https://www.childrenscommissioner.gov.uk/blog/children-and-stress-whats-worrying-them-most/

14 Hutchings, M. (2015). *Exam Factories? The impact of accountability measures on children and young people*. https://www.researchgate.net/publication/309771525_Exam_Factories_The_impact_of_accountability_measures_on_children_and_young_people

that stress about exams or tests was often the immediate trigger…" and went on to provide this statement from an experienced secondary teacher:

> *"I have never known stress-related conditions to be so prevalent in secondary education … Self-harming is rife in KS4. Last year one pupil was hospitalised for three months in a psychiatric ward following a suicide attempt, another very nearly starved herself to death... Another student with Crohn's disease became exceptionally unwell at exam time."*

It would be wrong to argue that we should shield young people entirely from the stress of exams – stress can be positive and motivational and can help to build resilience. But with two sets of mocks in Year 11, a child can end up in revision mode for most of the year. Some do. Some burn out before the real exams and it seems reasonable to conclude that a more phased and proportionate approach to exams would be desirable.

> "Overload of content in many GCSEs means pressure on students impacting their chances of success, mental health and general enjoyment of the process of education."[15]

Accessibility

Exams need to be accessible; reasonable and valid steps must be taken to ensure that young people can sit examinations and take other assessments.

In relation to assessment, colleagues across the exams industry are hugely committed to enabling as many students as possible to sit exams. Their commitment and care are amazing. A glance at the contents pages of the Joint Council for Qualifications' regulations on access arrangements and special arrangements (**figure 2**) is testament to this[16]. It is also a reminder that exams are not ideal for many young people and a more balanced diet of assessment methods and a reduction in the volume of exams could be fairer and less labour-intensive for everyone involved:

Figure 2: The contents page to the JCQ's *Access Arrangements and Reasonable Adjustments*

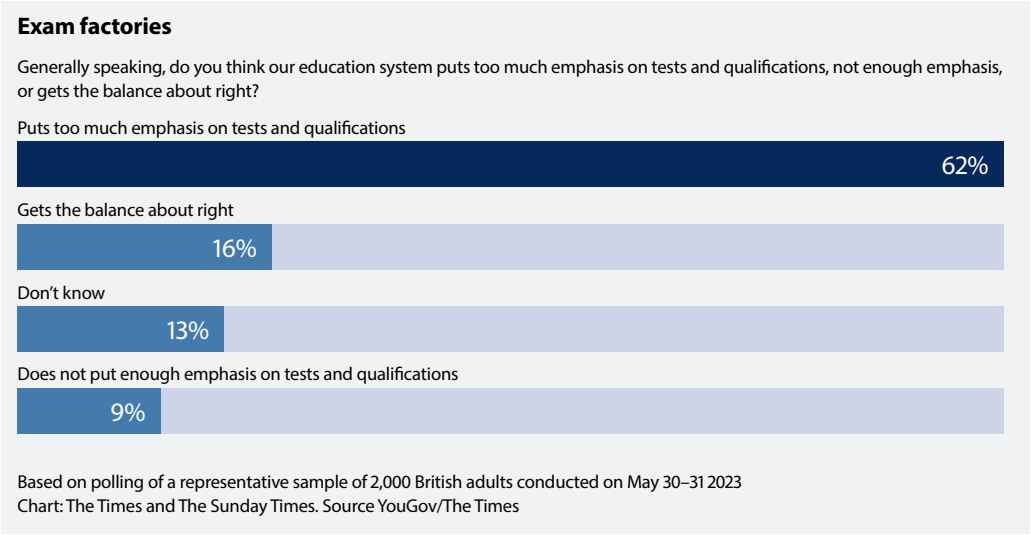
15 Response to OCR teacher survey.

16 Joint Council for Qualifications (JCQ). (2023). *Access Arrangements and Reasonable Adjustments*. https://www.jcq.org.uk/wp-content/uploads/2023/08/AA_regs_23–24_FINAL-3.pdf

Negative public attitudes to exams and their role in education

A YouGov poll commissioned by *The Times* shows that the majority of British adults have concerns about the emphasis the current system places on exams:

Figure 3: Polling of British adults about the emphasis on tests and qualifications



Options for reducing the reliance and emphasis on terminal exams

The options for reducing the amount of assessment include shortening the length and number of exams, using alternative assessment approaches such as Non-Exam Assessment (NEA) or adopting more modular approaches where the assessment is spread out over the duration of a course of study.

How long should an exam be?

Knowing how long an exam needs to be is essential when exploring the options available for shortening their length or having fewer of them. The average volume of examinations per GCSE subject is 4 hours but there is some variation. Students taking a Maths GCSE are required to sit three papers, each lasting 1 hour 30 mins. We were therefore interested to learn that OCR's GCSE Maths paper 1 is **99.7 percent accurate in predicting**, within one grade, what that candidate's final grade will be after completing all three exams.[17] Similar levels of accuracy in predicting can be found across the sciences. One of OCR's History A papers is 96 percent accurate and an English paper comes in at 95 percent – all accurate within one grade.[18]

Although there are good reasons for wanting to ensure that an exam samples from the full range of content studied, the fact that a student's final grade can be predicted so accurately from performance in one paper does suggest that a reduction in overall assessment time could be achieved without a significant impact on reliability. Furthermore, sampling fewer topics over a longer period of time reduces predictability.

Research by Cambridge University Press & Assessment sought to answer the difficult question of how long an exam needs to be.[19] It identified that there are inevitable trade-offs – the shorter the exam the fewer things get assessed and, inevitably, this leads to a decline in the

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17 Gill, T. (2020). *How reliable are component grades as predictors of qualification grades?* Cambridge Assessment Internal Research Report.

18 Ofqual is often quoted as saying that GCSEs are only accurate within one grade anyway. The truth is slightly more nuanced than that (our italics): "The results showed that, for the GCE and GCSE units analysed, at least 89 per cent of all candidates with a particular grade (other than the highest or lowest grade) have true scores either in that grade or immediately adjacent." Wheadon, C.. & Stockford, I. (2010, April). *Classification accuracy and consistency in GCSE and A level examinations offered by the Assessment and Qualifications Alliance (AQA) November 2008 to June 2009*. Ofqual/11/4823. https://assets.publishing.service.gov.uk/media/5a755dbce5274a59fa717981/2011-03-16-aqa-classification-accuracy-and-consistency-in-gcse-and-a-levels.pdf

19 Benton, T. (2021). *How long should a high stakes test be?* Cambridge Assessment Internal Research Report.

validity and reliability of the exam. Balancing the need for reliability and keeping exams relatively short and manageable is, in part, an artform, but the tentative conclusions of the research included:

> *"From applying psychometric formulas, it is clear that GCSEs and A levels in England are of sufficient length to likely meet the levels of reliability that are recommended in the academic literature. However, some of the (less stringent) recommendations might also be met by somewhat shorter examinations. Furthermore, comparison within decisions in other countries make it clear that different decisions are possible. This is particularly evident for examinations taken as part of lower secondary education where the total exam time for GCSEs in England appears relatively high compared to other countries."*

The paper makes reference to *precedent* as one of the major factors in determining the length of a paper. This may feel arbitrary but there are very good reasons for designing a paper that follows the construct of an established predecessor that has been tried and tested with large volumes of candidates and which is supported by copious data. But it also highlights some apparent inconsistencies of approach:

> *"…it seems curious that GCSE Mathematics generally requires a greater amount of exam time (4 hours and 30 minutes) than GCSE English (4 hours). This is all the more curious given that since Mathematics tends to involve many short-answer questions this subject will more naturally lend itself to high reliability coefficients than GCSE English. This point is included purely to illustrate that comparisons between subjects may provoke us to think more deeply about the examination lengths that are required."*

During our discussions with our research colleagues in Cambridge University Press & Assessment the following view was expressed:

> *"My feeling is that a single 90 minute exam for each GCSE subject would be the absolute bare minimum to stay respectable but wouldn't allow all the content that is assessed at the moment to be included."*

In conclusion, while further work would be needed, subject by subject, given the varying nature of each subject, **it would be possible to make a *modest* reduction in assessment time to existing GCSEs**. This could be done while still **maintaining acceptable levels of rigour, reliability and validity and without any reduction in the amount of content to be studied**. However, any *significant* reduction in assessment time would need to be accompanied by some reduction in content – the problem of excessive examinations comes hand in hand with too much content.

The use of Non-Exam Assessment (NEA) instead of some exams

NEA in the form of teacher assessments can be used to replace some exams, can be taken at different times of the year, is regarded as less stressful and can assess some things more validly than is possible in an exam. The current mainstream approaches to NEA bring with them challenges and, as part of our recommendations, we recommend a full review of these existing approaches.

The term NEA covers any assessment that isn't an exam, as this guidance from the regulator, Ofqual, points out:

> *"The term 'non-exam assessment' covers a range of different forms of assessment. Non-exam assessments are not necessarily 'internally' or teacher-marked nor undertaken over an extended period of time. A performance may, for example, be undertaken under timed conditions and marked by a visiting exam board assessor, but because not all students will be assessed simultaneously it does not fall within our definition of 'assessment by exam'."* [20]

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20 Ofqual. (2016, May). *GCE Subject Level Conditions and Requirements for Science (Biology, Chemistry, Physics) and Certificate Requirements.*

NEA includes all forms of teacher-led assessment and covers a spectrum from the assessment of an artefact or extended essay or report, to the assessment of 'ephemeral' performances in subjects like music, sport and drama. Where an artefact, report, or coursework is produced this can be the main source of evidence that informs a teacher's judgement. However, it is often the case that the process of arriving at that end product is included in the assessment criteria – *how* the student went about creating the final product. High-stakes teacher assessment requires internal standardisation to confirm that all teachers within an institution are making consistent judgements, followed by external moderation carried out by an exam board.

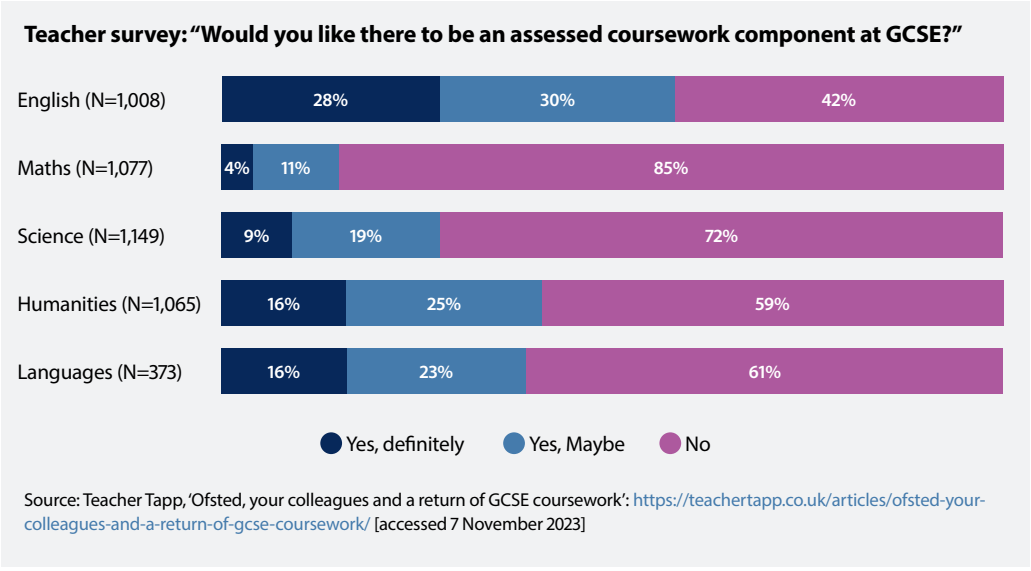
The 2015 GCSE reforms involved removing or significantly reducing the NEAs in many GCSE subjects, but several subjects have still retained NEA due to the constructs that need to be assessed in those subjects. Although more than half of GCSEs now have 100 percent exam assessment (13 out of 22 subjects, including all English, Maths and Science GCSEs), there are multiple GCSEs that include non-exam assessment. Even more noteworthy is that one GCSE (Art and Design) is required, by regulation, *not* to have any exam assessment at all.[21]

Views among teachers and educationalists about NEA are polarised. Those who are against the use of NEA, except where absolutely unavoidable, provide a compelling list of problems with NEA which includes:

- Unconscious teacher bias which discriminates against disadvantaged pupils
- Unreliable teacher judgements
- Conflicts of interest
- The burden of administration and the amount of teacher time involved in supporting students, marking and internal standardisation
- The risk that student work is not their own or that they have received too much help
- Tasks becoming overly formulaic

A Teacher Tapp survey reveals that the majority of teachers in almost all subjects are against the introduction of NEA to those GCSEs that are currently assessed by examination alone, with the notable exception of English. This is perhaps not so surprising given that NEA means more work for already overworked teachers.

Figure 4: Surveying teachers about an assessed coursework component at GCSE



Source: Teacher Tapp, 'Ofsted, your colleagues and a return of GCSE coursework': https://teachertapp.co.uk/articles/ofsted-your-colleagues-and-a-return-of-gcse-coursework/ [accessed 7 November 2023]

On the other side of the debate, advocates of NEA point to the benefits of:

- increased task authenticity
- different ways of capturing students' skills and understanding
- personalised assessments

21 "An awarding organisation must ensure that no assessment for a GCSE Qualification in Art and Design which it makes availableis an Assessment by Examination." Ofqual. (2021, November 11). *GCSE subject-level conditions and requirements for art and design (2022)*. GOV.UK. https://www.gov.uk/government/publications/gcse-subject-level-conditions-for-2022/gcse-subject-level-conditions-and-requirements-for-art-and-design-2022

- motivation
- reduced assessment anxiety
- addressing students' interests, needs and attitudes
- flexibility around school resources for assessments
- a counterbalance to the sole use of a single assessment model (exams)

Professor Dylan Wiliam argues that NEA has the potential to deliver far more reliable assessment than examinations:

> *"By using teacher assessment, we would in effect be using assessment conducted over tens, if not hundreds, of hours for each student, providing a degree of reliability that has never been achieved in any system of timed written examination. The key to improved reliability lies with increased use of teacher assessment, standardised and moderated to minimise the potential for bias."*

Advocates also argue there are things that exams can't assess. NEA can allow the assessment of a wider body of student work and has the potential to value, encourage and measure a range of competencies, values and behaviours that are less suited to the exam hall; skills that universities and employers tell us they value greatly, such as:

- creativity
- verbal communication
- experimentation
- independent learning
- designing and conducting an investigation

A Cambridge report tells us that students learn things when undertaking their NEA which are not explicitly assessed by assessment criteria.[22] These include:

- time management
- conducting research
- emotional / psychological aptitudes (such as confidence, resilience, self-esteem, taking responsibility)
- teamwork and communication

Views of universities on NEA

When A Levels were being reformed, Cambridge Assessment sought higher education institutions' (HEI) shared views[23] on the preparedness of first-year undergraduates. Weaknesses included:

- Critical and higher order thinking skills
- Academic writing skills
- Independent inquiry
- Research skills
- Analytical tasks

All the above are arguably attributes best developed through NEA. HEIs use a greater variety of different types of assessment than are used at GCSE or A Level.

The wider value of coursework is set out eloquently in the following, taken from a thread about a blog on the history of the English GCSE:

> *"It would also be interesting to explain to people how rigorous the standardisation and moderation procedures were for coursework portfolios. Admittedly agreement trials (locally and in school) were time consuming, but they did mean that classroom teachers and departments were held directly accountable for their assessments. The regional meetings were undoubtedly the best CPD [Continuing Professional Development] I ever had – they*

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22 Vitello, S., & Child, S. (2018). *Vocational qualifications for 14–16 year olds: Exploration of knowledge, skills and teacher perceptions*. 5th International Conference on Employer Engagement in Education and Training.

23 Suto, I. et al. (2013). A Level Reform: Is the Government in Tune with Its Stakeholders? *Research Matters: A Cambridge Assessment Publication*, 16, 9–14.

gave an opportunity to share ideas from other schools."
(Karen Jones, 24 April 2023)

In conclusion, if there were to be a move to a greater use of NEA it would need to be done cautiously, and considered on a subject-by-subject basis (perhaps starting with English), taking care to bring the teaching communities alongside. **Teachers and school leaders would need assurances that the workload was manageable and scalable**, that the benefits for learners were proportionate to any extra effort, that the underpinning administration was as streamlined as possible, and **that the introduction of NEA would come hand in hand with a reduction in the volume of examinations**. In reimagining NEA, all stakeholders will need reassurances that two other factors were fully considered: the risks of inauthenticity of work – particularly the additional challenges posed by artificial intelligence (see below); and biased or unreliable teacher assessment. The use of technology can also play a key role.

A review of current practices around NEA would be a good starting place. We need to be absolutely clear about the skills, knowledge and behaviours we are seeking to assess, which skills are most needed, and the contexts and circumstances in which they are best observed. But a manageable, rigorous and reliable approach to NEA is a glittering prize for the benefits it would bring in enriching the curriculum and giving weight to important aspects of a broad education that are not always best nurtured through exams.

A note on the use of AI by students when completing traditional coursework

- The growth in availability and use of AI has raised legitimate concerns about the authenticity of some students' coursework. A reimagining of NEA needs to reflect the arrival of AI.
- This is wholly possible. NEA can allow students to explore concepts, express ideas and create artefacts that are personal to them and to the unique context of their own lives – things which no AI machine can ever know about. And NEA should be about the process at least as much as the outcome – the skills displayed along the way and how a thing was gone about. It is more than possible to design assessments where it is more than legitimate for students to take full advantage of what AI can do to assist them in the process. Increasingly, we shouldn't be asking students 'did you use AI?', but 'how did you use AI?'

Using a modular[24] approach to spread the burden of assessment across a longer time period

There are multiple ways of doing this on a spectrum from simply moving an existing exam to an earlier date, to generating a series of assessments to be taken progressively from the beginning of Key Stage 3, which might culminate in a final consolidated certificate of achievement.

Assessments could include a traditional exam, a short on-screen test, or some form of NEA such as assignments, projects, 'vivas', or presentations. The use of NEA is discussed as a separate option. Some might be relatively simple to introduce while others would require considerable development and trialling followed by the training and support of teachers (and exams officers) in new approaches. Again, the applicability of this approach may vary from subject to subject and solutions would need to reflect this.

Advantages of modular approaches

A modular approach to assessment reduces the stress associated with an intense period of exams at the end of Key Stage 4. It diminishes the jeopardy of final assessments – students know how well they are doing and there are fewer chances of unexpected results. Clearly, this alleviates some of the mental health issues that can be triggered by a single summer exam series.

This 'smoothing out' of assessment also reduces the impact of 'having a bad day' and, for schools, it means that results will be less volatile and easier to predict. At A Level, one of the impacts of the near-extinction of the AS Level, typically taken at the end of the first year of an A Level programme, is that it is much harder to predict final A Level results – predictions that are needed as part of the university application process.

At GCSE, schools can be more confident of the final outcomes for their students; they can see how well they are doing in relation to accountability measures and can intervene, if necessary before it is too late. Effectively, progress tracking is built into the process as students bank their achievements along the way.

In later chapters on maths and English we consider issues relating to formative and diagnostic assessment across the full 11–16 phase. Having no formal national assessments for five years, and then conducting them all at the very end is not ideal. Sometimes, the tools used by schools to assess progress and predict potential are of mixed quality or are not used to best effect.

Furthermore, the linear approach has driven a huge rise in the number of times students are required to sit mocks. It is as though the whole GCSE is being treated as one big module to be taken over and over. Increasingly we see GCSE assessment objectives being applied to internal assessments during Key Stage 3. As an Ofsted report puts it: "Some schools *use a GCSE mark scheme throughout key stage 3* as well as key stage 4… assessing pupils against criteria that ask them to carry out complex tasks, requiring skills and knowledge that they have not yet been explicitly taught or have not practised in different contexts and knowledge that they have not yet been explicitly taught or have not practised in different contexts."[25]

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24 We have adopted the term 'modular' as it is one that is commonly understood. In the context of qualifications, we often use the term 'units' for the components of a qualification which can be separately assessed and certificated. Qualifications with this feature are therefore 'unitised'.

25 Ofsted. (2024, March 5). *Telling the story: the English education subject report*. GOV.UK. https://www.gov.uk/government/publications/subject-report-series-english/telling-the-story-the-english-education-subject-report

In contrast, modularisation allows for structured sequencing of learning and assessment and helps to plot a path through the curriculum. This is particularly useful for maths mastery where the sequencing and consolidation of learning is key.

Modularisation reduces the 'cognitive load' required of terminal exams. There is less cramming, and it feels less like an enormous memory test. The current History GCSE is crammed with content spread across a wide period of history. Students have told us they find revising for history particularly demanding.

Finally, modularisation makes for a much more resilient system than a system based on linear, terminal exams. If a student, through no fault of their own, is unable to sit a module, it is still possible to either award a partial achievement based on the modules taken, or to calculate a final grade for the full qualification based on those modules that were achieved. The same applies when, for example, exams in a whole school or region are disrupted by, say, fire or adverse weather conditions. In a national crisis, like a pandemic, a modular approach would also offer greater resilience.

Disadvantages of modular approaches

Critics of modular approaches have pointed out that it doesn't reduce the overall amount of assessment and can actually increase the amount of time spent on preparing for assessments, albeit it that it is more spread out. Modular approaches can open up opportunities for multiple resits with students constantly retaking modules in an effort to improve their result. This not only increases volume of assessment but can lead to concerns about the rigour of the process. It is, however, possible to restrict or prohibit resits so this is not something inherent to modular approaches – it is more to do with the rules that are applied. We see this with the vocational qualifications that are taken at 16; these are modular, but a 'terminal rule' is applied which means the qualification can only be completed when an examined module is taken, and this final module must be taken at the end of the course.

Modular approaches can lead to an atomised approach to learning where connections between topics are not always made. However, this can be mitigated by building in a 'synoptic' element, within each module and / or at the end, which consolidates previous learning and requires students to make connections between the modules they have taken. The final exams taken at the end of Key Stage 4 vocational qualifications have this synoptic feature.

Students mature at different rates and develop skills over time and with practice, so they may perform less well if assessed at an earlier stage. This can be addressed to some extent by the careful design and sequencing of the assessments so they follow the logical order in which topics would be covered within a programme of learning.

Some conclusions about modular approaches

The benefits of a modular approach, as set out above, are compelling. However, there are risks that modularisation can lead to *increases* in the time spent sitting assessments. This doesn't have to be the case, especially if the content of a qualification is reduced. We have already pointed out that modularisation can be applied in various ways, from scheduling just one component early to a far more granular approach with multiple assessments spread over a prolonged period.

Changing a qualification from a linear approach to a modular one requires significant redesigning of the qualification and a significant upheaval for schools. New support materials and training would also be required, so we do not see modularisation as a quick fix. Any move in the direction of modularisation would need to consider the cumulative impact on the whole system.

We think that different subjects may need to be treated differently as some lend themselves more to wholesale modularisation than others. We counsel against any 'one-size-fits-all' approach whereby it is decreed that all GCSEs must have the same number of modules scheduled and taken at the same times. It is possible to prioritise some subjects over others and to have a mixed economy where some subjects are modular, and some are linear. In fact, if we take vocational qualifications into account, this is already the case.

There are issues of public perception to be considered and a need to address perceptions that modularisation makes qualifications 'easier' and there is also a deep cultural attachment to a system which relies on high-stakes terminal assessments.

The use of 'open book' approaches and exam aids

Open book approaches and the use of exam aids can reduce cognitive load, revision time and alleviate stress – although there would be no impact on the overall assessment time. It is sometimes argued that, for English literature, there is no reason why students should not be permitted to bring relevant books into the exam with them, although the logistics and benefits continue to provoke debate. It has been argued that a table of key timelines and dates could be provided in history exams – this has been tried before with mixed results as it sometimes seemed to lead to students using material from the table which was not particularly relevant to the topic covered by the exam question. The provision of formulae sheets in maths and sciences was introduced as one way of supporting students who had missed out on learning due to the impact of the Covid pandemic. Following the use of this approach in the 2023 exams, the Department for Education consulted on its use for the 2024 series. The following is taken from OCR's response to that consultation:

"OCR supports the proposal to take the same approach as was used in 2023. It was well received and perceived as supporting students to demonstrate their capability in applying formulae.

It has enabled more classroom time for teaching course content and the development of skills. The 'gain time' from not having to teach recall of equation has allowed teachers to focus on application of content and ideas using equation and has enhanced student understanding. This has been particularly helpful to cohorts that have suffered disruption to their education during pandemic related disturbances.

Whilst there may be some limited value to learning equations, interpretation of a problem and accurate application of equation is a highly valued transferable skill that benefits students in the wider world.

The ability to understand, select and manipulate equations is particularly valued in technical careers over simple recall and memorisation. It therefore makes sense to continue the inclusion of equation sheets beyond 2024 to allow students to develop these skills.

Additionally, there is evidence that supports the inclusion of course generated materials in exams, such as equation sheets, to help reduce anxiety and increase confidence for all students, therefore, allowing students to better show what they are capable of in the exam.

An undue focus, by some students, on learning equations rather than developing understanding and problem-solving skills may act as a hinderance to exam performance by shifting student focus away from understanding and towards rote memorisation."

In conclusion, there are opportunities to explore the use of exam aids to reduce stress and cut down on unnecessary revision time. **We are convinced that the inclusion of formulae sheets during post-Covid exams has proven a success and should become a permanent feature of exams in the future.**

Excessive content in GCSEs

The 'burden of assessment' is in some respects only a symptom of the fact that the current GCSEs in England are extremely content-heavy.

Teachers shared with us their concerns about content overload

Teachers tell us they are at least as concerned by the volume of content and sometimes the nature of the content they are required to teach at GCSE as they are about the volume of examinations. In our recent OCR survey of teachers we asked: *What would you say are the biggest challenges facing teachers now in education?*

Here are some typical responses:

> *"A lot of content knowledge is required and often with teacher recruitment issues, there are significant gaps in knowledge so it is squeezed in at the last minute. So much knowledge removes times to develop the enriching side of learning which is often where the love of a subject is developed."*

> *"Ridiculous amount of content to deliver to a disaffected student body with very little resources due to a practically non existing budget."*

> *"More pressure on teachers to get results, bigger class sizes, too much content to cover in insufficient time, lack of creativity due to time restraints."*

> *"Teaching skills in the time available. There is too much content and this can be overwhelming for the teacher to cover in a sufficiently detailed and engaging manner."*

> *"Time given to teach is spread too thin to give more than a snapshot of content. Developing understanding and giving independence of thought is compromised."*

Concerns about the volume of content in GCSEs are widely reported

Our report is far from an outlier in arguing that there is too much content in the current range of GCSEs in England. This is a key argument in the substantial House of Lords report, also on 11–16 education, published in December 2023.[26] In particular, it singles out knowledge acquisition as the culprit:

> *"Evidence suggested that the emphasis on knowledge acquisition means that 'covering content at pace' has to take precedence over developing pupils' understanding of the core concepts that underpin subject knowledge. We heard that this is especially the case at key stage 4, where the increase in the size of GCSE curricula following the 2015 reforms has led to 'complete content overload'."*

The report goes on to cite data from the survey platform Teacher Tapp which found that 76 percent of teachers felt there was too much content to cover in their GCSE classes and that 57 percent were unable or only "just about" able to complete teaching their course prior to exam season.

A review by the Social Market Foundation[27] covers similar territory and concludes that "the curriculum is 'overloaded with content', with an excessive amount of content to be taught and learned in relation to the time available for instruction".

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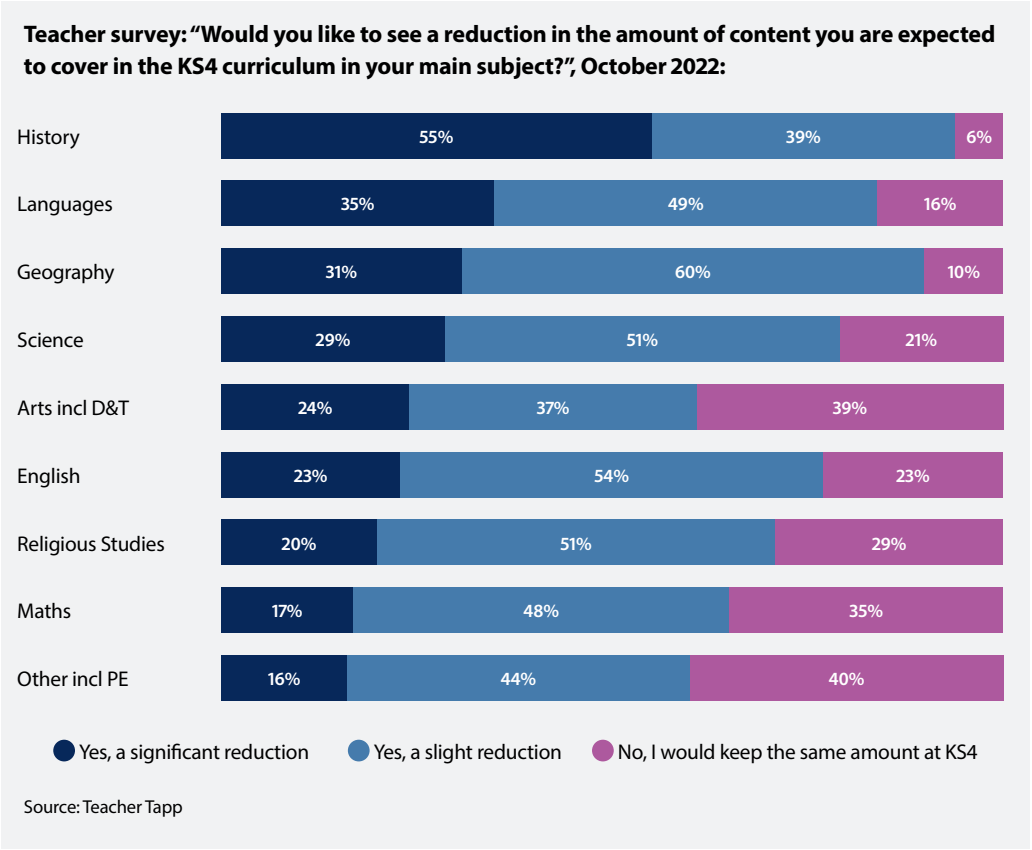
26 House of Lords Education for 11-16 Year Olds Committee. (2023, December 12). Requires improvement: urgent change for 11-16 education. https://committees.parliament.uk/publications/42484/documents/211201/default/

27 Asthana Gibson, J. (2024, May). Testing patience: Reducing the burden of the English school curriculum. Social Market Foundation. https://www.smf.co.uk/wp-content/uploads/2024/04/Testing-patience-May-2024.pdf

It supports this conclusion with the following survey finding from Teacher Tapp (**figure 5**):

Figure 5: Surveying teachers about content in the Key Stage 4 curriculum



Excessive content in history – an extreme example

In a 2019 Schoolzone survey, conducted for OCR, GCSE History teachers, using a range of different exam boards, fed back their views. One teacher said: "The content is too much – it is impossible to teach within two years." Another said: "The amount of content needs to be reduced by about a quarter. There is not enough time to deliver the course effectively and promote deep thinking and practise written communication due to the amounts of content to deliver." One teacher set out the impact this had on students' understanding: "the level of content and units required is too heavy, this results in high-speed lessons in order to cover the extensive course content in 2 years at KS4. This has resulted in superficial understanding in all but the most able, putting many students off the study of history. History has become a subject only suitable for the most able in any cohort."

In a survey by the Historical Association[28] only 20 percent of respondents thought the amount of GCSE content was manageable, and only 30 percent of schools claimed they were able to fit all the content they had to cover into the time available.

28 Historical Association. (2020). *HA Secondary History Survey 2019*. https://www.history.org.uk/secondary/categories/409/news/3826/ha-secondary-history-survey-2019

How we got here and why

First formulated by the author and one-time civil servant GK Chesterton, Chesterton's Fence is a cautioning principle for reformers **stating that change should not be made until the reasoning behind the status quo is fully understood**. Much of the assessment and curriculum system we have now has been hugely successful and provides us with a strong foundation for moving forward. In proposing change, it is important to understand some of the reasoning behind the last reforms and appreciate the risks of making ill-considered changes.

The phased introduction of the reformed GCSE, from around 2015, intentionally led to an increase in the volume of GCSE examinations.

The reforms can be characterised as including:

- An increase in the knowledge-base to be studied
- A strong preference for exams over any formal use of coursework or teacher assessments
- A preference for linear, 'terminal' assessment in the form of exams taken all in one go in a single summer series

Many of the ideas that underpinned these reforms, and the way they have been implemented, are drawn from a sound evidence base. We do, after all, want our young people to have a strong knowledge of our culture, our literature, our history and our geography. We also want them to understand how language, especially English, is constructed and we want them to learn the fundamentals of maths to appreciate the patterns and logic of number and to be able to apply them to whatever comes up.

Linear assessment also supports learning that is 'holistic' allowing students to make connections between different topics, whereas the risk with modular learning is that students study a topic and then move on, never to return to it and fail to make connections between topics.

Also, although the current system is frequently characterised as requiring the memorisation and regurgitation of facts and is sometimes described as being 'Gradgrindian',[29] the truth is that from the outset there was a determination to use exams to assess young people's ability to apply and critically evaluate the knowledge they have acquired.

This is important. Skills without knowledge is, in a very literal sense, vacuous. Keir Bloomer, one of the architects of the Scottish, 'skills-based' curriculum – which took a very different path to the GCSE reforms in England – accepted that the Scottish curriculum may have gone too far in reducing its emphasis on knowledge when he said: "The problem is we did not make sufficiently clear that skills are the accumulation of knowledge. *Without knowledge there can be no skills.*"[30]

We do want young people to acquire knowledge, and to be able to use that knowledge creatively, critically and confidently. The current system has features in the form of rigour, accountability, reliability and validity, that any future changes in policy should be wary of eradicating entirely. Nevertheless, **there is a growing consensus that things have gone just a bit too far – there is too much content in most GCSEs and there are too many exams**. What is needed however, is **not a demolition of the whole system but some considered and warranted adjustments**.

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29 Gradgrindian definition: Having a soulless devotion to facts and figures.

30 Puttick, H. (2023, November 12). What went wrong with the Scottish education system? *The Times*. https://www.thetimes.com/uk/article/what-went-wrong-with-the-scottish-education-system-7qq8hbzlm

Recommendations

- **Reduce the length and number of assessments used at GCSE.** The number of hours spent sitting GCSEs is currently unnecessarily high and needs to be reduced while still retaining standards and rigour. It is evident that there is considerable scope for doing this without impacting on the reliability and validity of exams. This could be done without reducing the content of GCSEs but it would be better to reduce content and assessment time in parallel.

- **Reduce the amount of content in GCSEs.** There is nothing fundamentally wrong with the content of GCSEs other than that there is too much of it. The potential for reducing content varies from subject to subject, with the sciences, maths and history standing out as subjects where the volume of content is most commonly described as excessive.

- **Schedule some exams early or make limited use of modular exams or Non-Exam Assessment (NEA) in some subjects.** There is scope to look at opportunities, at subject level, for spreading assessments over a longer period of time so that not all exams are taken in a concentrated period at the end of Key Stage 4. The advantages and challenges associated with modularisation are set out on page 25.

- **Require the exam boards and the regulator to conduct a thorough but urgent review of existing NEA models.** This should be with a view to making them more reliable, clearer about the skills being assessed, more manageable for teachers, and less subject to misuse through AI. This would provide future opportunities to introduce a more balanced mix of exams and NEA such as we see in other high-performing jurisdictions.

- **Make greater use of examination aids** such as formulae sheets and open book approaches to reduce the revision burden. This can be done relatively quickly, as we saw with experiences post-Covid where formulae sheets were used.

The maths curriculum and assessment for 11–16 year olds

Maths, like English, is core to the curriculum and essential for effective living, work and study. We have already argued that there is too much content and too much assessment at GCSE. GCSE Maths is a case in point. The impact is rushed learning, and too many students being left behind. There are other aspects of the treatment of maths across the 11–16 phase, particularly at Key Stage 3, that need addressing. The grading scale, as with all reformed GCSEs, leaves about a third of students' achievements undervalued, its 'double weighted' status in performance tables sometimes drives undesirable behaviours and there are perennial issues with the tiered approach to examinations.

There are wider questions, too, about how we conceive of maths and where it sits across the whole curriculum.

"Big Fat Maths": a brief overview of the current GCSE

When the new, reformed Maths GCSE was unveiled in 2015 it was referred to by some commentators as 'Big Fat Maths' because of the increase in content compared to its predecessor. It is characterised by both the volume of assessment and content.

Schools responded to the increase in size by increasing the hours of classroom study allocated to maths:

> *"Prior to the changes in the GCSE qualification in 2015, Edexcel found that in GCSE mathematics 'teaching time per week ranged from two hours to over five hours, but the vast majority delivered the GCSE using between three and four hours per week' (Pearson Edexcel 2015). They recommended an extra hour per week of teaching time to account for the changes to the new GCSE."* [31]

Michael Gove, speaking as Education Secretary in 2013, was unapologetic about plans to increase content and demand:

> *"The new mathematics GCSE will be more demanding and we anticipate that schools will want to increase the time spent teaching mathematics. On average secondary schools in England spend only 116 hours per year teaching mathematics, which international studies show is far less time than that spent on this vital subject by our competitors. Just one extra lesson each week would put England closer to countries like Australia or Singapore who teach 143 and 138 hours a year of mathematics respectively."* [32]

Clearly, increasing the amount of content to drive up the numbers of hours spent on a subject proved effective, but some of the benefits of increased teaching time are lost if the number of individual things to be taught is also increased. The evidence is that those not achieving grade 4 are failing in elementary maths – which supports the need for better mastery of fundamentals and means more time is needed, but on the consolidation of core content.

Table 2 below shows the content to be covered when teaching GCSE Maths, in line with DfE requirements. Many teachers regard the amount of content that needs to be covered in two years as problematic.

Table 2: GCSE Maths Content[33]

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31 Dr Stone Maths. (n.d.). *Maths timetabled hours part 1*. Retrieved August 19, 2024, from https://drstonemaths.wordpress.com/2020/08/01/maths-timetabled-hours-part-1/

32 Department for Education. (2013, November 1). *Reformed GCSEs in English and mathematics*. GOV.UK. https://www.gov.uk/government/speeches/reformed-gcses-in-english-and-mathematics

33 OCR. (n.d.). *GCSE Mathematics (9-1) - J560*. Retrieved August 19, 2024, from https://ocr.org.uk/qualifications/gcse/mathematics-j560-from-2015/

Number operations and integers	Fractions, decimals and percentages	Indices and surds
– Calculations with integers – Whole number theory – Combining arithmetic operations – Inverse operations	– Fractions – Decimal fractions – Percentages – Ordering fractions, decimals and percentages	– Powers and roots – Standard form – Exact calculations
Approximation and estimation	**Ratio, proportion and rates of change**	**Algebra**
– Approximation and estimation	– Calculations with ratio – Direct and inverse proportion – Discrete growth and decay	– Algebraic expressions – Algebraic formulae – Algebraic equations – Algebraic inequalities – Language of functions – Sequences
Graphs of equations and functions	**Basic geometry**	**Congruence and similarity**
– Graphs of equations and functions – Straight line graphs – Transformations of curves and their equations – Interpreting graphs	– Conventions, notation and terms – Ruler and compass constructions – Angles – Properties of polygons – Circles – Three-dimensional shape	– Plane isometric transformations – Congruence – Plane vector geometry – Similarity
Mensuration	**Probability**	**Statistics**
– Units and measurement – Perimeter calculations – Area calculations – Volume and surface area calculations – Triangle mensuration	– Basic probability and experiments – Combined events and probability diagrams	– Sampling – Interpreting and representing data – Analysing data

In a paper, *Understanding and Addressing the Deficiencies in UK Mathematics Education: Taking an International Perspective*, Skipp and Dommett argue that the maths curriculum in England is too content-heavy and go on to say:

> *"It has been suggested that a strong curriculum, which is essential for facilitating high-quality learning, should focus on only fundamental concepts and principles. By employing a more focused curriculum, material can be taught in a way that supports deeper learning allowing students to engage with material in a way that creates a deeper understanding. This can facilitate longer term retention of key concepts, and the development of critical and analytical skills, which are essential for mathematics and employability… The result of a shallow and broad curriculum is that no individual topic or concept can be explored in depth. Thus, the focus of lessons becomes the memorisation of facts, associated with surface learning, rather than teaching students to adopt the thoughts of a mathematician, an outcome that can be achieved by giving them the opportunity to work through and solve mathematical problems by themselves."* [34]

Examination time

The volume of assessment is demotivating for those already struggling. GCSE Mathematics qualifications require students to sit **exams totalling 4½ hours** (over three papers). See the chapter on adjusting the balance of assessment for **how exam time in England compares with other jurisdictions**.

It is also questionable whether this volume of assessment is necessary. As discussed in Section 1, the OCR GCSE Maths paper 1 (lasting 1 hour and 30 mins) is **99.7 percent accurate in predicting, within one grade, what a candidate's final grade** will be after completing all three exams.[35]

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34 Skipp, C. S., & Dommett, E. J. (2021). Understanding and Addressing the Deficiencies in UK Mathematics Education: Taking an International Perspective. *Education Sciences*, 11(3), 141. https://doi.org/10.3390/educsci11030141

35 Gill, T. *How reliable are component grades as predictors of qualification grade?* Cambridge internal report.

Double weighting in accountability measures

The introduction of reformed GCSEs saw the introduction of the 'EBacc' performance measure. This means that achievement of maths carries a double weighting in the accountability measures – double that of any other GCSE except English Language/Literature – and makes good achievement in Maths GCSE a significant priority for schools when it comes to maintaining or enhancing their position in the school league tables.

Grading

Reforms to GCSEs also brought with them a new grading scale, with 9–1 replacing the previous A*–G scale and, alongside this, the EBacc introduced and formalised a new language about the value of achievements at different grades. Since then, a grade 4 is to be regarded as a 'standard pass' and a grade 5 as a 'strong pass'.

By implication, this renders achievements at grade 3 and below of little or no value. The change in wording minimises the achievement of those students, particularly those with special educational needs, for whom a grade 2 or 3 is a good and positive accomplishment.

Tiering

GCSE maths students can be entered for one of two tiers: foundation and higher. Each tier is targeted at a range of numerical grades: 9 to 4 on the higher tier (with a 'safety net' grade 3 for students scoring a small number of marks below grade 4), and 5 to 1 on the foundation tier.

Students can achieve grades 5 to 3 on both tiers, and exam papers include some questions that are the same on both tiers, which is intended to help exam boards ensure that it is no more or less difficult to achieve the same grade on different tiers.

This two-tier model removed a third, intermediate tier from the qualification in 2008. The three-tier model was perceived as problematic due to the limitations it placed on a student's ability to achieve a grade C on foundation tier.

Problems with tiering include:

- Choosing which tier to enter students for
- The demotivating experience for students on the higher tier who can only answer a very small number of questions
- The face value of a pass mark in the higher tier which is extremely low

Low pass marks at the higher tier

Taken at face value, the 'pass mark' of grade 4 for the higher tier is extremely low (around 20 percent of the maximum mark) and is sometimes the cause for comment in the media. An extract from an Ofqual blog provides a strong justification for why this is so. More concerning is the impact on less able students sitting the higher tier who find the experience of being unable to answer a large proportion of the questions extremely demotivating.

"In a higher tier paper, half of the marks should be targeted at grades 9, 8 and 7 and the other half of the marks should be targeted at grades 6, 5 and 4.

In a foundation tier paper, half of the marks should be targeted at grades 5, 4 and the top of grade 3 and the other half of the marks should be targeted at the bottom of grade 3 and grades 2 and 1.

Targeting questions is always tricky, but this means that higher tier papers now contain more demanding questions and only about a sixth of the marks on those papers are designed for students working at grade 4. In that context, **it's not surprising that the grade boundary for a grade 4 on the higher tier papers was around 20 percent of the maximum mark**. But that doesn't mean there is anything wrong with the papers. Rather, it's a consequence of having to discriminate more at the top end but also provide sufficient challenge across the ability range.

If there were more marks targeted at grade 4, grade boundaries might be higher, but exam boards would be criticised for making their papers too easy, and it would mean fewer marks available to differentiate the very good students at the top end." [36]

The left-behind

A common concern about the current maths system in England is that it leaves too many students out in the cold – **nearly one-third of GCSE students fail** to achieve what the government describes as a 'pass'[37].

Achievement rates at Maths GCSE

- In 2023, the number of 16 year olds failing to achieve a grade 4 or above in England was 29 percent[38]
- Many students who struggle with GCSE content at 16 do no better post-16. Of the maths resits taken in November 2023, only 22.9 percent of entries were marked at grade 4 or above, condemning 77.1 percent to re-experience their past failure.

A disproportionate impact on disadvantaged pupils

According to UCL:

> *"Just 1 in 10 disadvantaged pupils in England achieve a high score in GCSE maths of grade 7 to 9. The attainment gap between disadvantaged pupils and their peers in England is equivalent to one whole GCSE grade. On this measure of educational disadvantage, England ranks in the bottom half of developed nations, standing 27th out of 44 nations."* [39]

Not only do roughly one-third of students 'fail' the Maths GCSE but there is also strong evidence that they are **reaching 16 without the basic foundations** in number skills that they need for life, work and study.

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36 Jadhav, C. (2017, November 3). GCSE maths grade boundaries. *The Ofqual Blog*. https://ofqual.blog.gov.uk/2017/11/03/gcse-maths-grade-boundaries/

37 The proportion of students being awarded different grades is to some extent determined by the process of 'comparable outcomes'. This doesn't mean that the proportion of 'passes' is baked in – as our research colleagues put it: "GCSE awarding is a complex process and, even if the philosophy of comparable outcomes implies that results won't rise, in reality they may do." The seminal exploration of the advantages and disadvantages of comparable outcomes can be found in our Research Division's report: Benton, T. (2016, September 12). *Comparable Outcomes: Scourge or Scapegoat? Cambridge Assessment Research Report*. https://www.cambridgeassessment.org.uk/Images/346267-comparable-outcomes-scourge-or-scapegoat-.pdf

38 Joint Council for Qualifications. (n.d.). *Examination Results*. Retrieved August 19, 2024, from https://www.jcq.org.uk/examination-results/

39 UCL. (2018, April 19). *England behind other countries in maths performance of disadvantaged pupils*. https://www.ucl.ac.uk/news/2018/apr/england-behind-other-countries-maths-performance-disadvantaged-pupils

Too many young people reach 16 without the basics in maths

There is evidence that, not only are many students 'failing' GCSE maths, they are also disengaging with the subject altogether and leaving Key Stage 4 without the fundamental maths skills to equip them fully for life, work and further study. Our own work, backed up by Ofsted and others, supports this view. Critically, once people are disaffected with the subject it is very difficult to bring them back as the post-16 resits data shows. This has a cost for both the individual and for the economy.

The Assessment Research Division at Cambridge University Press & Assessment conducts routine and frequent reviews of individual candidates' responses to OCR GCSE exam scripts. The reviews are based on exam scripts at mid-grade point and grade boundaries – recent reviews for policy work on 'Maths to 18' examined particularly the maths scripts at GCSE grade 3 and grade 2. What these reviews all reveal is that these candidates are falling short in basic maths understanding at a fundamental level.

The review also examined what increase in score and therefore grade would come from mastery of basic functions: elementary algebra, simple trigonometry and data interpretation – that is, mastery of fundamentals included in the primary and Key Stage 3 curriculum. These attainment increases would take a substantial number of students from scoring below grade 4 to scoring grade 4 and above. To emphasise the point, those getting 4 and below are failing in basic maths which they should have attained in primary school. Our study of scripts and papers shows that if they were secure in just these fundamentals, they would most likely achieve a grade 4. In particular, this highlights failings at Key Stage 3.

According to a recent Ofsted report, **not all those achieving a pass at GCSE have a secure mathematical knowledge**:

> *"A high quality of education leads to strong pupil outcomes, but this isn't necessarily true in reverse. Strong exam outcomes do not, necessarily, indicate a high-quality mathematics education because, in some schools, pupils are taught a narrowed curriculum that allows them to be successful in exams without securing the mathematical knowledge they need to be successful later. These decisions are made because leaders and teachers are acutely aware of the impact of pupils achieving certain threshold grades in terms of post-16 opportunities, and implications for school accountability."* [40]

The impact of 'failing' at maths on young people and the economy

Struggling students don't just grow to resent sitting in lessons where they can't quite get the gist of what is being taught. In many cases they come to hate the whole subject of maths – a well-known and prevalent phenomenon brought to life in *'I would rather die': reasons given by 16-year-olds for not continuing their study of mathematics*.[41]

All existing research points to the fact that failure to achieve a 'pass' at GCSE Maths has a long-lasting and very negative impact on people's progression through education and their earnings in adult life.

Research from Pro Bono Economics[42] estimates poor numeracy skills cost the economy £20.2 billion every year. That cost is borne jointly by individuals, employers and the public purse. The UK needs a numerate population in order to build a strong economy and compete

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40 Ofqual. (2023, December 19). *GCSE (9 to 1) Qualification Level Conditions and Requirements*. GOV.UK.https://www.gov.uk/government/publications/gcse-9-to-1-qualification-level-conditions/gcse-9-to-1-qualification-level-conditions-and-requirements

41 Brown, M., Brown, P., & Bibby, T. (2008). "I would rather die": reasons given by 16-year-olds for not continuing their study of mathematics. *Research in Mathematics Education, 10(1), 3–18*. https://doi.org/10.1080/14794800801915814

42 National Numeracy. (2018, July 19). *Cost of outcomes associated with low levels of adult numeracy in the UK (2014)*. https://www.nationalnumeracy.org.uk/research-and-resources/cost-outcomes-associated-low-levels-adult-numeracy-uk-2014

globally – especially with those countries which outstrip us in numeracy performance.[43] Amore recent report has that figure at £25 billion.[44]

In conclusion, there is a strong case for reviewing the volume of content and assessment associated with GCSE Maths and a need to consider what further approaches might be needed to ensure a curriculum that serves all students, whatever their ability – but in particular, to do more for 'the left-behind'.

How maths education in England is performing – some international comparisons

In assessing the mathematical skills of young people since the new GCSE and current national curriculum were introduced, it is useful to use data from **the Trends in International Mathematics and Science Study (TIMSS)**. TIMSS is an independent worldwide research study, taking place every four years. It assesses the knowledge and skills of pupils aged 9–10 and 13–14 in over 60 countries and provides data about trends in mathematics and science achievement over time.

Ages 9–10 and the mastery approach – a success story

TIMSS shows that England saw very positive improvements in maths skills in pupils aged 9–10 up to 2019.

Figure 6: TIMS scores for maths in England Grade 4 (9–10 year olds)

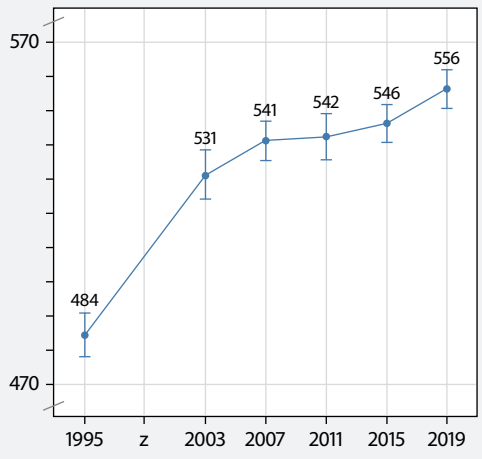
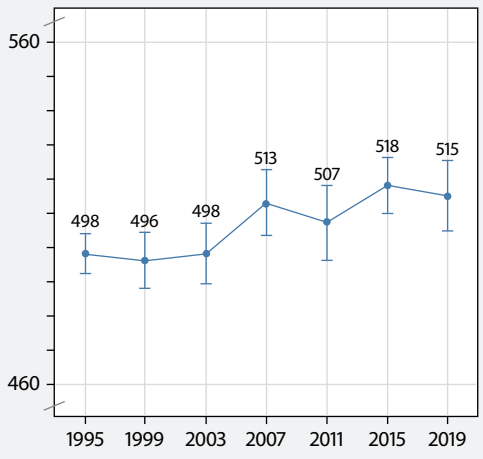


Figure 7: TIMSS scores for maths in England Grade 8 (13–14 year olds)



Maths mastery in primary schools

It is highly plausible to link this improvement to policy interventions at primary school level where SATs and the introduction of a directed approach to **maths mastery**, initially rolled out to 8,000 English primary schools in 2016, have been key features.[45]

In her book, *Mastering Mathematics: Teaching to transform achievement*, Dr Helen Drury describes maths mastery by saying, "a mathematical concept or skill has been mastered when, through exploration, clarification, practice and application over time, a person can represent it in multiple ways, has the mathematical language to be able to communicate related ideas,

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43 Schleicher, A. (n.d.). *Why is numeracy important?* National Numeracy. Retrieved August 19, 2024, from https://www.nationalnumeracy.org.uk/what-numeracy/why-numeracy-important

44 National Numeracy. (2021, April 13). *New research: "Numeracy crisis" could be costing the UK up to £25 billion a year.* https://www.nationalnumeracy.org.uk/news/counting-on-the-recovery?

45 Department for Education. (2016, July 12). *South Asian method of teaching maths to be rolled out in schools.* GOV.UK. https://www.gov.uk/government/news/south-asian-method-of-teaching-maths-to-be-rolled-out-in-schools

and can think mathematically with the concept so they independently apply it to a totally new problem in an unfamiliar situation".[46]

The Department for Education's guidance on teaching at Key Stage 3 reinforces this point:

> *"A fundamental principle of teaching effectively in mathematics is that key ideas need to be understood deeply before moving on. A curriculum which encourages teachers to move on to the next topic too quickly, before key ideas are deeply understood, results in superficial learning. While such an approach to 'covering' the curriculum at a rapid pace may seem to work in the short term, in the long term it is an inefficient use of precious curriculum time, because it leads to the same key ideas being retaught year after year."* [47]

It is important to emphasise why maths mastery has proven successful. Firstly, it is based on solid research about which aspects of the curriculum are fundamental, the order in which they are best learned and reinforced and the associated pedagogical approaches.[48] Crucially the programme has been supported by high-quality textbooks and other support materials and there has been systematic training and support for teachers through the Maths Hubs (managed by the National Centre for Excellence in the Teaching of Mathematics (NCETM)).[49]

Despite the undoubted success in maths teaching at primary school level, the Key Stage 2 SATs tests have, at best, a mixed reputation in measuring the performance of young people, as this Civitas survey suggests:

- 90 percent of secondary school teachers surveyed have found the Key Stage 2 SATs results to be inconsistent with pupils' true abilities
- 79 percent of secondary school teachers have found that up to a third of their Year 7 year-group's abilities have been lower than their Key Stage 2 SATs results[50]

The success at Key Stage 2 diminishes at Key Stage 3

Despite the improved outcomes at Key Stage 2, it is a different story at Key Stage 3. Here, the TIMSS measure shows an overall decline in maths performance between 2015 – when the reformed Maths GCSE was introduced – and 2019 (see **figure 7**, above).

This decline from 2015 is relatively slight but enough to be statistically significant. The next TIMSS results are due in December 2024, although, when they are available, the impact of Covid may create some difficulty in drawing direct year-on-year comparisons.

There are a number of potential causes for this decline, which will be explored in more detail later, but the evidence is clear enough **that what looks like success at Key Stage 2 is diminishing by the end of Key Stage 3**.

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46 Drury, H. (2014). *Mastering Mathematics: Teaching to Transform Achievement*. OUP Oxford.

47 Department for Education. (2021, September). *Sample Key Stage 3 Mathematics Curriculum Framework: Non-statutory guidance for the national curriculum in England*. https://assets.publishing.service.gov.uk/media/6151d81bd3bf7f71919a7f9a/Sample_Key_Stage_3_Mathematics_Curriculum_Framework.pdf

48 The Cambridge Mathematics Framework is a key example: We have constructed the Cambridge Mathematics Framework; a flexible digital framework that maps out the full mathematical landscape for learners 3–19, showing developmental pathways and connections based in evidence and practice. Cambridge Mathematics. (n.d.). *Curriculum development*. Retrieved August 19, 2024, from https://www.cambridgemaths.org/our-services/curriculum-development/

49 National Centre for Excellence in the Teaching of Mathematics (NCETM). (n.d.). *Maths Hubs*. Retrieved August 19, 2024, from https://www.ncetm.org.uk/maths-hubs/

50 Civitas. (n.d.). *Survey reveals that 90% of secondary schools find Key Stage 2 Sats results do not reflect pupils' true abilities*. Retrieved August 18, 2024, from https://www.civitas.org.uk/press/survey-reveals-that-90-of-secondary-schools-find-key-stage-2-sats-results-do-not-reflect-pupils-true-abilities/

A mixed picture at Key Stage 4

PISA 2022 results – some positive signals

The Programme for International Student Assessment (PISA) involves schools and students in 85 countries around the world, providing internationally comparable data on countries' performance in maths, reading and science education. The findings here relate to 15 year olds.

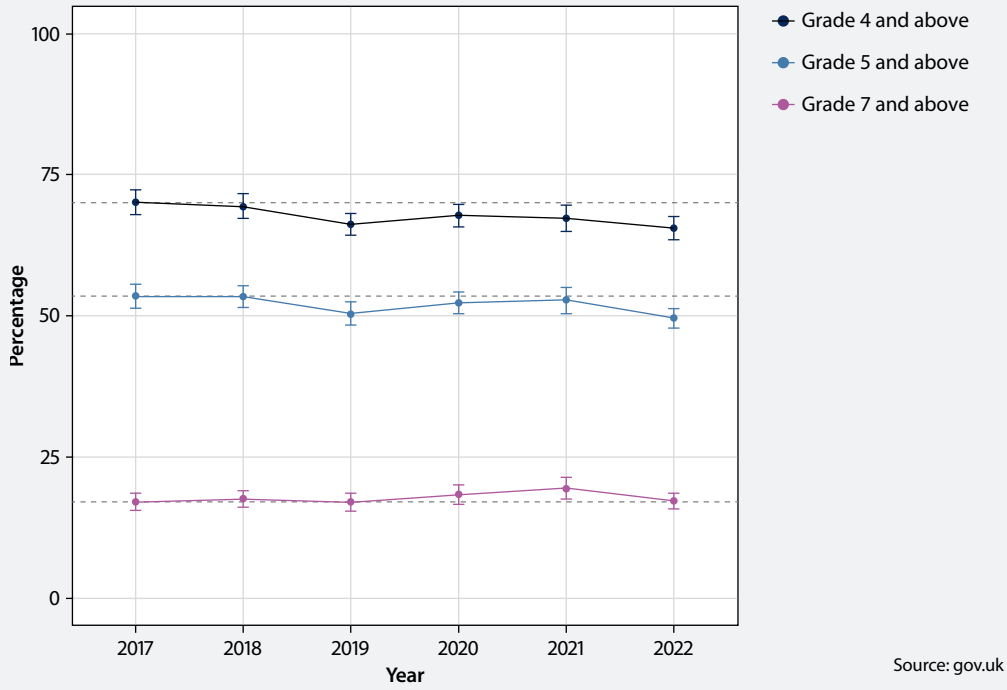
For maths, in 2022, English students' average PISA score was **492**, *significantly* above the 472 Organisation for Economic Co-operation and Development (OECD) average. This is lower than the 504 average score in 2018, but all countries experienced a decline post Covid. Just eight countries had significantly better scores in maths than England.

This has been seen by some as a positive testament to the resilience of teaching of maths in England during the pandemic and it is certainly encouraging. However, there is an important caveat in that too few English schools took part in the study, meaning that England's response rate fell below the PISA sample standards. According to the PISA report, for England, this meant that "higher performing pupils may be overrepresented" and some results "may therefore be somewhat higher than they might otherwise be".[51]

National Reference Tests – a plateau

Ofqual's National Reference Test (NRT) was introduced to provide additional information to support the awarding of GCSEs. The NRT is designed to provide national data on student ability in a specific year as well as evidence of how performance has changed over time. The graph below shows that there may have been a very slight improvement in the equivalent to GCSE grade 5 and above, year on year, up to the point where Covid impacted. Performance at grade 4 was flat after some initial, slight, growth. Normally we would expect to see some evidence of the 'Sawtooth Effect'[52] – this is *where cohort performance on high-stakes assessments drops after assessment reform, and then improves over time as test familiarity grows*, but there is no evidence in this case.[53]

Figure 8: Long term changes in NRT maths over time from 2017 baseline



Source: gov.uk

51 OECD. (2023). *PISA 2022 Results (Volume I): The State of Learning and Equity in Education*. https://doi.org/10.1787/53f23881-en.

52 Newton, P. E. (2020, November). *What is the Sawtooth Effect? The nature and management of impacts from syllabus, assessment, and curriculum transitions in England*. Ofqual. https://assets.publishing.service.gov.uk/media/5fb4fbb88fa8f54ab81d89aa/What_is_the_Sawtooth_Effect.pdf

53 Ofqual. (2022, August 25). *National Reference Test results digest 2022*. https://www.gov.uk/government/publications/the-national-reference-test-in-2022/national-reference-test-results-digest-2022

What is going wrong (for some) at Key Stage 3 and 4?

In this section we look at some of the issues relating to: weaknesses in the transition from primary to secondary, weaknesses at Key Stage 3 including the use of progress tests, and the backwash of GCSE into Key Stage 3. We also consider wider issues relating to a lack of specialist teachers, the availability of training and support, and the limited use of textbooks and other support materials.

Weaknesses in the transition from primary to secondary education

> "The primary-secondary transition is 'a crucial point in the maths pipeline,where attainment and attitudes drop." [54]

We have already referenced the lack of trust in Key Stage 2 maths tests, with one survey suggesting that 90 percent of teachers believe they are not a reliable reflection of their newly enrolled students' ability. The same Civitas survey claims that:

> *"One remedial measure increasingly adopted by secondary schools is to do their own testing. Directly related to misleading primary Sats results, nearly two-thirds of the secondary schools surveyed (62 percent) tested pupils on entry into secondary school this last academic year."*[55]

Diagnostic tests developed for this purpose are widely available but, like Key Stage 2 tests, they are not always perceived as reliable and are sometimes used in ways which are broad brush and do not dig deeper into the abilities, attitudes and potential of each of the young people being tested. Our own experience reveals that diagnostic tests, if not carefully applied and supplemented with other information, can lead to students being lumped together because they have achieved the same performance outcome without taking into account more individual, underlying issues. For example, a test may not reveal whether a student is disaffected but has strong potential or if they are highly engaged but still struggling, whether a student has undiagnosed Special Educational Needs, or whether a student is suffering from 'maths anxiety'.

This point about maths anxiety has been raised before in this report but it is important to understand the impact that unsophisticated testing can have on those whose confidence in maths is already low:

> *"High-stakes assessments may be a potential trigger for maths anxiety. This is particularly concerning because once an individual has maths anxiety, it is difficult to tackle, manifesting as a vicious cycle whereby anxiety leads to poor performance, but also poor performance increases anxiety. Therefore, triggering a student's maths anxiety with one high-stakes assessment is likely to disadvantage them in all further tests, as the condition that stops them from demonstrating their true abilities would persist."*[56]

That diagnostic tests are high stakes is something that many students are aware of. How they perform can set the trajectory for their learning and how their maths ability is regarded for the rest of Key Stage 3 and beyond. It can influence target setting and tracking so that what is counted as progress for them lacks aspiration or challenge. It can also inform decisions about setting and streaming and, ultimately, whether a student is entered for a higher or foundation tier GCSE.

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54 Written evidence submitted by Protect Pure Maths to the Education Select Committee's inquiry into Teacher recruitment, training and retention, April 2023. https://committees.parliament.uk/writtenevidence/120416/pdf/

55 Civitas. (n.d.). *Survey reveals that 90% of secondary schools find Key Stage 2 Sats results do not reflect pupils' true abilities*. Retrieved August 18, 2024, from https://www.civitas.org.uk/press/survey-reveals-that-90-of-secondary-schools-find-key-stage-2-sats-results-do-not-reflect-pupils-true-abilities/

56 Jerrim, J. (2022). Test anxiety: Is it associated with performance in high-stakes examinations? *Oxford Review of Education, 49*(3), 321–341. https://doi.org/10.1080/03054985.2022.2079616

It would be wrong to suggest that such problems are endemic and there are many examples of schools with excellent practice. Where tests are used appropriately and are aligned with other information and engagement with students they can provide information, not just about a student's current performance but, crucially, their *potential*.[57] However, Ofsted's chillingly titled report, *Key Stage 3: The Wasted Years?* does highlight a problem:

> *"A number of headteachers interviewed expressed misgivings about the robustness of their own assessment procedures in Key Stage 3."*[58]

And, in another report:

> *"… leaders had not prioritised assessment at Key Stage 3.*[59] *Monitoring and evaluation of the quality of teaching and pupils' work tended to be focused on Key Stage 4 in these schools."*

Teaching to the test is not without its wider risks:

> *"Teachers should not let the 'assessment tail wag the curriculum dog' by teaching to a test. Teaching to a well-designed curriculum and using assessments to give students the opportunity to demonstrate their understanding of the ideas and concepts taught is preferable. This will help to retain the coherence of the curriculum and give useful pointers to where it could be improved."*[60]

A recent report by Ofsted highlights some of the weaknesses in the use of internal assessments:

> *"Leaders' application of GCSE grade thresholds to internal assessments gives false assurance about pupils' learning. As a result of teachers and leaders accepting this level of achievement in internal assessments, some pupils are progressing through the mathematics curriculum with significant, and growing, gaps of knowledge."*[61]

The dominance of the GCSE and how it 'backwashes' into Key Stage 3

Given the pressure on schools to get GCSE 'passes' and the size of the reformed maths curriculum, many schools succumb to the understandable temptation of beginning preparation for the GCSE early, in the final year of Key Stage 3 or even earlier. Although there are strong arguments for doing this, it leads to a truncated Key Stage 3 and risks students missing out on some of the foundational skills they need to acquire before moving on to Key Stage 4:

> *"Without a coherent, connected curriculum there is a danger that students will perceive the mathematics they learn as a bewilderingly large set of separate topics, each one with its own rules and techniques to remember. Students who have this view of mathematics often see it as a hard, impenetrable subject which they find difficult to learn. In contrast, students who experience the subject as a coherent set of connected ideas tend to find learning mathematics achievable, enjoyable, and stimulating."*[62]

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57 There are many tests available but only some of them assess performance rather than potential. While declaring an interest, as this is an assessment developed by Cambridge, the CEM MidYIS test provides an assessment of students' aptitudes and potential. https://www.cem.org/midyis?gad_source=1&gclid=EAIaIQobChMIzaH8mpvMhwMV4IhQBh24LDYVEAAYASABEgIZbPD_BwE

58 Ofsted. (2015, September). *Key Stage 3: the wasted years?* GOV.UK. https://www.gov.uk/government/publications/key-stage-3-the-wasted-years

59 Ofsted. (2015, March). *The most able students: an update on progress since June 2013*. GOV.UK. www.gov.uk/government/publications/the-most-able-students-an-update-on-progress-since-june-2013

60 Department for Education. (2021, September). *Sample Key Stage 3 Mathematics Curriculum Framework: Non-statutory guidance for the national curriculum in England*. https://assets.publishing.service.gov.uk/media/6151d81bd3bf7f71919a7f9a/Sample_Key_Stage_3_Mathematics_Curriculum_Framework.pdf

61 Ofsted. (2023, July 13). *Coordinating mathematical success: the mathematics subject report*. GOV.UK. https://www.gov.uk/government/publications/subject-report-series-maths/coordinating-mathematical-success-the-mathematics-subject-report#secondary

62 Department for Education. (2021, September). *Sample Key Stage 3 Mathematics Curriculum Framework: Non-statutory guidance for the national curriculum in England*. https://assets.publishing.service.gov.uk/media/6151d81bd3bf7f71919a7f9a/Sample_Key_Stage_3_Mathematics_Curriculum_Framework.pdf

For other schools, the structured content at Key Stage 3 breaks down and they find themselves in a cycle of repeating content but without students securely learning what they are studying. This is clearly described in a 2023 Ofsted evaluation of maths teaching in schools [our emphasis]:

> *"Pupils who are learning mathematics more slowly than their peers frequently receive a mathematics education that does not meet their needs. They are often **rushed through the study of new content, in order to 'complete the course'**, without securely learning what they are studying. This frequently results in pupils **repeating content, in key stage 4 that they have already studied, but not learned, in key stage 3 (and 2)**. Often the curriculum for these pupils is narrowed with little teaching of how the facts and methods learned can be used to solve problems mathematically. Many of these pupils develop **a negative view of mathematics**."*[63]

All of the above reveals weaknesses in how assessment is used at Key Stage 3. Clearly there is a need to revisit diagnostic testing at that critical, sometimes perilous, moment of transition from primary to secondary education. It isn't simply about the quality of the assessments being used, but how they are used. Teachers, who are often not specialist maths teachers, and school leaders would benefit from **systematic advice and training on the best approaches**.

The same applies to ongoing, low-stakes assessments used to monitor progress and confirm understanding. These should be used, as quoted above, to give students the opportunity to demonstrate their understanding of the ideas and concepts taught. Crucially, they should be used to confirm mastery so that students are never "rushed through the study", as the Ofsted report put it.

We have already highlighted concerns about the 'left-behind' – the third of young people who don't achieve a 'pass' at GCSE. Our aim should be to ensure that no one reaches 16 without the level of maths required of them to use mathematics confidently where it is needed in their further studies, employment and life. Alongside this, we have shown there is clear and concerning evidence of weaknesses in delivery of the Key Stage 3 curriculum.

Paradoxically for a report that largely argues for a reduction in exams, we are convinced that there is a need for a maths examination for young people aged 14. This would provide a much-needed anchor and a focus to aim for at the end of the Key Stage 3 phase and support a more coherent, connected curriculum. The assessment should cover the basic functions that underpin Key Stage 3 including mastery of elementary algebra, simple trigonometry and data interpretation – those very areas our analysis of GCSE scripts showed many students had failed to grasp by the end of Key Stage 4. Teachers should be supported to show how these fundamentals will be 'useful' in future life but care should be taken when considering how much emphasis is given to 'real-life' scenarios in the actual assessment, avoiding contrived questions that require a high level of reading and comprehension or cultural capital. This issue is explored in more detail later in this chapter, in'What is maths anyway?'

The assessment should be taken by all and provide information about a learner's preparedness to go on to study GCSE as well as acting as confirmation that a benchmark attainment in maths has been reached. Our view is that the assessment should lead to certification, with an emphasis on capturing and rewarding what students can do. Where students do not pass the assessment, they should have the opportunity to resit it during Key Stage 4 rather than simply going on to fail a GCSE. Some may choose to sit the assessment early. Ideally the assessments would be on-screen, available to be taken by individuals when ready, and provide instant results with detailed feedback. This will help when making decisions about which tier of GCSE maths to enter students for.

It would be possible to create a coherent set of tests to be taken during the three years of Key Stage 3 that would confirm readiness for a final, overarching assessment at 14. In time these could be developed as small modules which could contribute to the final achievement. It would also be possible to develop an approach which involved adaptive testing.

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63 Ofsted. (2023, July 13). *Coordinating mathematical success: the mathematics subject report*. GOV.UK. https://www.gov.uk/government/publications/subject-report-series-maths/coordinating-mathematical-success-the-mathematics-subject-report#secondary

Lack of specialist teachers

Only around 44 percent of secondary teachers of mathematics have a maths-related degree, compared with 65 percent of English teachers who have a degree in English.

Senior school leaders are likely to manage teacher shortages by placing more experienced and better qualified teachers with GCSE and A Level students where the stakes are higher. This means that the shortage of qualified teachers has a particular impact at certain points of the mathematics pipeline, for students aged 11–14.

Much has been done to support the recruitment of maths teachers. The Maths Graduate Incentive Scheme supported the recruitment of 280 teachers to 178 providers across the Further Education (FE) and Skills sector between 2014 and 2016, while Now Teach recruited 850 teachers primarily to STEM subjects between 2017 and 2023. However, in 2023 the number of new maths teachers was insufficient, with just 63 percent of the targeted number being recruited.

There also exist strong programmes to support teachers of maths, such as the NCETM Maths Hubs Programme[64] which brings together maths education professionals from across England to develop excellent practice. However, the support available for non-specialist teachers at Key Stage 3 remains patchy. We recognise the new government's intention to increase the number of teachers in the system, however, it would be pragmatic to recognise that this will take time, if successful, and, in the meantime, support for non-specialist maths teachers should be a priority.

Textbooks and a coherent approach to support

Support, in the form of professional development, especially at Key Stage 3, should build on that provided by the successful Maths Hubs Programme, already referenced, and should maintain its focus on maths mastery. A critical element of teacher support is also the quality and availability of textbooks and other materials.

In his policy paper, *Why Textbooks Count*, Tim Oates sets out the important role textbooks can play in supporting a maths curriculum and emphasises the need for textbooks to be part of a coherent package of professional development, a proven pedagogical approach, assessment and the curriculum. The foreword, by Nick Gibb, sums up some of the main points:

> *"The international research work accompanying the curriculum review threw into sharp relief the role of high-quality textbooks in realising the aims of national curricula and supporting effective teaching. The paper shows that the use of high-quality textbooks is key to ensuring schools in England teach the National Curriculum to a standard that matches the education systems of the countries that top the international league tables. There should, [Tim Oates] argues, be coherence between the National Curriculum, the content of textbooks and the approach to teaching in schools. It is the textbooks that provide the detailed knowledge implicit in the national curriculum programmes of study which, by their very nature, are succinct and broad descriptions of the content that needs to be taught.*
>
> *Having seen the high quality of textbooks in key nations and examined the way in which they provide support to teachers, the paper concludes that the fact that in England only 10% of students' teachers use maths textbooks as the basis for their teaching compared to 70% in Singapore and 95% in Finland is a contributory factor in England's poor performance in maths compared to those countries."*[65]

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64 National Centre for Excellence in the Teaching of Mathematics (NCETM). (n.d.). *Maths Hubs*. Retrieved August 19, 2024, from https://www.ncetm.org.uk/maths-hubs/

65 Oates, T. (2014, November). *Why textbooks count*. Cambridge Assessment Policy Paper. https://www.cambridgeassessment.org.uk/Images/181744-why-textbooks-count-tim-oates.pdf

What can be done to reduce the size of the maths curriculum?

Less crowding of content; more breathing space for sensemaking

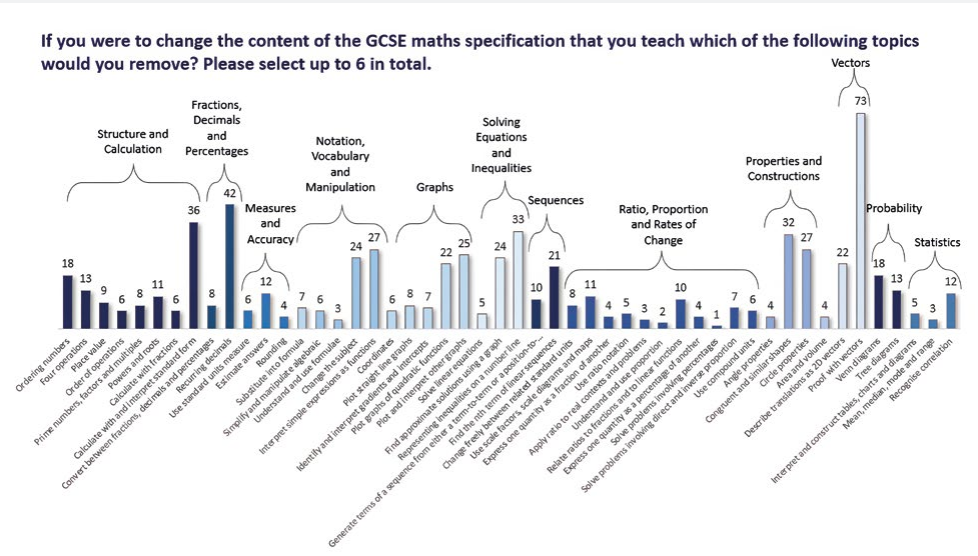
*"Many people seem to think that **our mathematics national curriculum in England is overcrowded**… What are the things that are of less importance? Unless we can answer this, we will be **trying to prioritise everything**, which is the same thing as prioritising nothing … We need to give a good amount of time to the really important things, and that cannot be everything. **It is better to do some topics properly than to just end up rushing through everything, doing nothing in depth**."*[66] Colin Foster, The Mathematical Gazette

Reaching a consensus about what to take out

If we accept the prognosis that there is too much content in the current maths curriculum, especially in the GCSE at Key Stage 4, then we need to consider what could be removed.

OCR focus groups with maths teachers revealed strong agreement for a reduction in content to allow for teaching of depth over breadth. They suggested the removal of "defunct" topics such as constructions, exact trigonometric values and transformations. However, it is not simple to achieve agreement over what is and isn't important. In an OCR commissioned survey, teachers were given the main topic groupings and the subtopics that are currently found in the Maths GCSE and asked which ones they would recommend for removal. The resulting graph (**figure 9**) shows some areas of wide agreement, especially around removing proof with vectors, recurring decimals and interpreting standard form. But there were a wide range of differing views and there wasn't a single topic that at least one person thought dispensable.

Figure 9: Asking maths teachers what they would remove from the GCSE specification



Source: Schoolzone online survey, commissioned by OCR, of 206 Maths teachers in England in March 2024

Moving maths topics to other Key Stages and other qualifications

There is a wide disparity in ability between different students in mathematics. While the 'forgotten third' struggle with the foundations of maths there are many who are well served by the current curriculum and seek out *more* maths.

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66 Foster, C. (2023). Less is More: Improving by Removing (The 2023 Presidential Address). *The Mathematical Gazette, 107(570), 385–398.* https://www.doi.org/10.1017/mag.2023.90

Students demonstrating strong ability in maths can gain additional breadth and challenge through the availability of further and additional maths qualifications (Free Standing Mathematics Qualifications (FSMQs)). OCR's introduction to its FSMQ in Additional Maths explains that it "targets learners who will take GCSE (9–1) Higher tier Mathematics. Many learners will go on to study AS and A Level Mathematics and, for these learners, this qualification provides an introduction to the subject at that level, with the possibility of subsequent, accelerated progress into AS and A Level Further Mathematics."[67]

Qualification developers for FSMQs have told us that there is content in the current GCSE which would be more appropriately included in the FSMQs. For example, it was suggested that circle theorems could be moved to an FSMQ and that some trigonometry could be moved so that it is covered in Key Stage 5. This would help provide additional stretch and challenge for the most able mathematicians, while enabling some reduction in GCSE content.

In conclusion, reducing content will require some tough choices, but it is possible to agree that a) there is too much content and b) it is in everyone's interest to make some tough choices to reduce the number of topics covered or to move them elsewhere. This can be achieved by consensus, informed by a notional agreement of the amount to be cut, and by scrutiny of curricula from other high-performing jurisdictions. As Colin Foster puts it, it is better to do some topics properly than to just end up rushing through everything, doing nothing in depth.

What is maths anyway?

Some of the maths we want everyone to study pre-16 might be better placed in other curriculum subjects such as the sciences or outside the context of GCSE Maths (like financial literacy). This leads to some fundamental questions about what maths education is for, where you should find it, how maths skills such as problem solving are best nurtured, the use of digital maths, and the use of maths in contexts.

This question of what maths *is* and what it is for kept coming up in our research and discussions for this report. In particular, we had some incredibly useful and interesting discussions with the Royal Society and with National Numeracy. It is far beyond the scope of this report to produce a definitive answer to such a question and we eagerly await the publication of the Royal Society's report on Maths Futures, which will dive much deeper into some of these issues as well as take a strategic long-term view of the future of maths education well beyond the next 10 years. We have, nevertheless, endeavoured to capture the flavour of some of the issues raised with us during our engagement with many teachers and stakeholders about the nature and treatment of maths, and this is provided in Appendix 1.

The priority, we conclude, must be that almost nobody reaches the age of 16 without the basic mathematics that they need for education, work and life. Assessment of these basic mathematical competencies should be simple and not overcomplicated by elaborate attempts at assessing maths skills in 'functional' contexts.

Recommendations

Any strategy for reforming maths at 11–16 must focus on the goal that no young person completes this phase of learning without gaining the fundamentals of maths that are needed to equip them for life and further study.

- **Reduce the length and number of assessments used in GCSE Maths.** The assessment burden at GCSE is currently unnecessarily high and needs to be reduced to free up more curriculum and teaching time. It is evident that there is considerable scope for doing this without impacting on the reliability and validity of exams. This could be done without reducing the content of GCSEs but it would be better to reduce content and assessment time in parallel.

- **Reduce the amount of content in GCSE Maths.** Although there are always tough choices to make it is critical that the amount of content in the GCSE is reduced to enable students

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67 OCR. (2024). *Level 3 Certificate Specification. Free Standing Mathematics Qualification: Additional Mathematics.* https://www.ocr.org.uk/Images/457916-specification-from-2018-.pdf

to acquire a deeper understanding and mastery of the fundamentals. It isn't possible to prioritise everything. Some of the more demanding content could be moved into additional maths qualifications already taken by higher achievers at 16, and some could be covered post 16.

- **Take a more systematic and coherent approach to Key Stage 3.** This should include:
  - An expansion of the Maths Hubs Programme, building on the mastery approach embedded at Key Stage 2
  - A coherent and integrated use of formative tests during Key Stage 3, and support for better use of diagnostic tests at the point of transition from primary to secondary education
  - A concerted effort by publishers, policymakers, teachers and researchers to develop textbooks in tandem with curriculum reform

- **Develop and introduce a maths qualification, mainly to be taken at 14**, which provides a structured focus to Key Stage 3, benchmarks the maths needed by all young people by the age of 16, which is on-screen, can be taken when ready and generates a profile of achievements.

The English curriculum and assessment for 11–16 year olds

Concerns about the English Language GCSE

The most striking thing about the GCSE in English Language is the widespread criticism of it we heard in all the roundtable discussions, focus groups and surveys we held. People were not enthusiastic about the English literature GCSE either, but English stands out as being almost universally unpopular. Teachers argued that the content and criteria, which must be used by all exam boards, wasn't just narrow and uninspiring, but that it was causing harm.

The National Association for the Teaching of English (NATE) put it like this: "We believe that **the current GCSE offer is damaging young people's perception of the subject** as well as adversely affecting students' subsequent choices at post-16 and beyond."[68]

NATE points out that recent years have seen a significant and continued decline in the number of UK students choosing to study English subjects at A Level – **a total of 35 percent decrease**.[69] Stakeholders from universities that we spoke with also expressed concern about a decline in the numbers of students applying for degree courses in English.[70]

There may be many reasons for the decline in young people wanting to study English, but the teachers we spoke to were passionate in claiming that the GCSE was impacting negatively on students' interest in the subject. This is what some of those teachers said:

> *"A soul sapping drudge through the way words are used."*
>
> *"The current GCSE English Language examination is desperately in need of a revamp."*
>
> *"English language used to be to teach students how to read, understand how to use language, write clearly and practise comprehension. It is not anymore."*

These sentiments need to be considered in the context of the growing crisis in recruitment and retention of teachers of English.

About the English Language GCSE

The current GCSE in English is assessed via two exams, each lasting up to two hours (there are slight variations between exam boards). Students are asked to read and analyse unseen non-fiction and literary texts, which must include at least one 19th century text. They are required to show comprehension and to make observations about structure and use of language, drawing on wider examples that show a breadth of reading.

Students are also asked to write a non-fiction and a creative writing essay, stimulated by the unseen texts, for a specified audience. The relevant assessment objectives (AOs) for these

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68 NATE. (2021). GCSE English Language: Time for Change. *Teaching English, 27*. https://www.nate.org.uk/wp-content/uploads/2021/10/NATE-GCSE-English-Language-survey-report-1.pdf

69 NATE. (2020). The Decline in Student Choice of A Level English. A NATE Position Paper. *Teaching English, 24.* https://www.nate.org.uk/wp-content/uploads/2020/06/NATE-Post-16-position-paper.pdf

70 This is spelled out in findings by the British Academy (2023, June): between 2012 and 2019, English Studies undergraduate students fell by 20 percent, with a further decrease of 3 percent between 2019 and 2021. However, the rate of this decrease was not the same across higher education institutions or across the UK devolved administrations (Key Findings). The British Academy. (2023, June 13). *English degrees becoming more popular among students from Scotland but experiencing decade-long decline elsewhere in the UK, British Academy finds*. https://www.thebritishacademy.ac.uk/news/english-degrees-becoming-more-popular-among-students-from-scotland-but-experiencing-decade-long-decline-elsewhere-in-the-uk-british-academy-finds/

exams are set by Ofqual and are provided in the footnote below.[71] They are the same across all GCSE English Language specifications for all exam boards.

In addition, students are required to undertake a spoken language assessment in the format of a formal presentation. This does not count towards the student's final grade and, according to most teachers and students, is treated with nominal importance.

GCSE English Language is a mandatory qualification, in which students must obtain a grade 4 or above if it is to be regarded as a 'pass'. **The current qualification structure leaves a 'forgotten third' which never attain this standard. In summer 2023, 35.8 percent of GCSE English candidates failed to secure a grade 4 or above.**[72]

Why teachers are unhappy with GCSE English

> "We have killed this subject with the new, terribly boring GCSE."
>
> **Teacher of GCSE English**

A 2017 survey from the English and Media Centre, an educational charity, found that teachers "commented that the new GCSEs were 'narrow and dull', that 'students really dislike them'… and that they fail to engage students because 'everything is performance-focused'. Others made the point that 'too much emphasis on testing has destroyed any creativity in this subject'." [73]

Teaching to the test

> "We spend 30 percent of the time on exam technique."[74]

It is striking how often teachers refer to 'drilling' their students to prepare for English examinations. Arguably this is an issue of pedagogy but the assessment objectives (AOs) for English seem to drive teachers towards certain practices which optimise a student's exam performance in a narrow way – this is particularly true when teachers are trying to get weaker students 'over the line'.

Practices include priming students with references to a limited set of quotes to demonstrate wider reading, learning a range of terminology to apply to any author's use of language

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71 Ofqual Assessment Objectives, English Language GCSE:

AO1:
- identify and interpret explicit and implicit information and ideas
- select and synthesise evidence from different texts

AO2: Explain, comment on and analyse how writers use language and structure to achieve effects and influence readers, using relevant subject terminology to support their views

AO3: Compare writers' ideas and perspectives, as well as how these are conveyed, across two or more texts

AO4: Evaluate texts critically and support this with appropriate textual references

AO5: Communicate clearly, effectively and imaginatively, selecting and adapting tone, style and register for different forms, purposes and audiences. Organise information and ideas, using structural and grammatical features to support coherence and cohesion of texts

AO6: Candidates must use a range of vocabulary and sentence structures for clarity, purpose and effect, with accurate spelling and punctuation. (This requirement must constitute 20% of the marks for each specification as a whole.)
https://www.gov.uk/government/publications/gcse-subject-level-conditions-for-2022/gcse-subject-level-guidance-for-english-language-2022

72 Joint Council for Qualifications. (n.d.). Examination Results. Retrieved August 19, 2024, from https://www.jcq.org.uk/examination-results/

73 English & Media Centre. (n.d.). EMC Survey: Significant drop in numbers taking A Level English subjects. *EMC Blog*. Retrieved August 19, 2024, from https://www.englishandmedia.co.uk/blog/emc-survey-significant-drop-in-numbers-taking-a-level-english-subjects/

74 Comment from a GCSE English teacher during an OCR-held focus group.

and structure, and memorisation of complex vocabulary and imagery to be shoehorned into creative writing tasks, as well as instructions to use every punctuation mark possible to demonstrate the 'range' required to achieve top spelling and grammar marks. There is widespread use of formulaic, acronym-heavy approaches for structuring an answer, ranging from PEE to PEAL to PETAL[75] and beyond.

NATE argues the recent student experience of English "… tends to be a microcosmic analysis of textual features and their alleged 'effects' rather than on reading for meaning". This 'microcosmic analysis' is seen as militating against a more personal and authentic response.

In conclusion, the assessment objectives and other aspects of the design of the qualification encourage an atomised approach to teaching and learning. This doesn't need to start from scratch – many long-standing teachers expressed a yearning to return to the current GCSE's predecessor. Whereas we should be careful to avoid a certain element of nostalgia, it seems that there is much to be gained from revisiting previous GCSE approaches to English.

A heavy emphasis on heritage texts

The requirements to analyse extended texts, both literary and non-fiction from across three centuries characterises the English GCSE. It leads to criticisms that the texts are neither contemporary nor a reflection of the diverse backgrounds and cultures of our school population. A teacher from a NATE survey wrote that the curriculum "misses the opportunity to engage students in the issues that are shaping their lives today". The Working Group on GCSE English Reform speaks of students feeling "a lack of ownership, connection and purpose. Teachers tell us that the types of texts used do not adequately engage with students' identities or our increasingly diverse global world". [76]

The use of 'ephemeral texts' (such as those that feature in blogs or social media channels) is prohibited by the current GCSE, yet understanding of media, digital and other non-literary, non-fiction and 'multi-modal' texts is vital for contemporary life and, crucially, for the world of work today.

We should, however, be reminded of why ephemeral sources using, for example, textspeak and emojis were ruled out of the current GCSE. It was felt that there was a risk of a loss of focus on the importance of being adept in the use of formal English and the correct use of grammar, and there are societal issues relating to the use of inappropriate examples of social media.

While this needs consideration, the most obvious conclusion is that young people can benefit from lessons which include discussions about the differences between formal and informal language, the impact of social media on the development of the English language, a sense of what is appropriate language use according to context, and what values should underpin interactions in any media. There is scope to include this in other subjects such as PSHE or digital literacy and computing. Within the subject of English, language study is an important element in making students aware of how language works in the world and workplace as well as every type of 'text' they might create or encounter.

The narrow range of purposes and audiences required of written communication

Many of the stakeholders we consulted with argued for a qualification that develops a student's ability to master a wider range of forms of writing than feature in the GCSE. This includes the use of digital modes and writing for business purposes. There was a strong view that the treatment of creative writing was 'inauthentic' – creative writing is something that requires drafting across many iterations supported by reflection and discussion – all of which cannot be replicated under exam conditions. One teacher commented that the only real target audience for written work in the GCSE was the examiner. Or as Ofsted put it:

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75 For more on the use of such acronyms, see : English & Media Centre. (n.d.). PEE? PEAL? PETAL?. *EMC Blog*. Retrieved August 19, 2024, from https://www.englishandmedia.co.uk/blog/pee-peal-petal/

76 The English Association. (n.d.). *Working Group on GCSE English Reform: Report and recommendations*. Retrieved August 19, 2024, from https://englishassociation.ac.uk/working-group-on-gcse-english-reform/

> *"There are too few opportunities for pupils to draft and edit or to write in forms other than those used in tests and exams."*[77]

A return to coursework?

Many, though not all, teachers wanted to see a return to coursework for the creative writing component, as was the case in GCSEs (and O Levels) before the reforms of 2015. The Working Group for reform recommended in its report to the Education Select Committee that there should be "more appropriate ways of including and assessing creative and professional writing, to reflect the ways in which fiction and non-fiction texts are planned, drafted and written in the wider world".[78]

Removal of the spoken language study

Many English teachers who began their career before 2015 told us that they regretted the removal of the spoken language study from the GCSE. The spoken language study was teacher assessed and was dropped in part because of the policy desire to have an entirely externally examined GCSE.

Language study is an important element in making students aware of how language works in the world and workplace as well as every type of 'text' they might create or encounter. Spoken language coursework also allowed students to explore further areas of interest like dialect and idiolect, language and power, and use of language in the media. Students investigated and debated current, real-world examples of language use, which also helped with their oracy more broadly.

The removal of language study means that A Level and GCSE English Language have very little in common, which means that A Level teachers have to do a lot more 'groundwork' to establish a baseline of knowledge with their students.

In conclusion, we think that language study is more important than ever given the dynamic impact of technology, social media and globalisation. Understanding some of the origins of English language is also important when understanding the diverse origins of the people that evolved the English language. The dimension provided by language study is valuable and some consideration should be given to its return, while making sure that it does not add too much to the content of the overall qualification.

Treatment of speaking and listening

Although there is a formal spoken 'presentation' component in the current GCSE, this does not contribute to a student's overall grade, so is not seen as a priority by teachers and is treated as irrelevant by students. Furthermore, the assessment has a prescribed and formulaic approach.

There are, of course, some skills demonstrated by this formal delivery style, but something more akin to oracy requires a much more varied approach than the presentation allows for. More valuable are, for example, the debates, discussions, and participation in verbal analysis of any given text studied in class. Nearly every English teacher we have spoken to or surveyed agrees there is a need to move away from this model of a formal presentation.

Ofqual set out some of the rationale for why it decided, as the regulator of qualifications, that the presentation component should no longer contribute to the overall grade:

> *"There is no way that the exam boards can make sure these assessments are administered and marked sufficiently consistently across all schools and colleges. That means unfairness: results are not fair between one student and another and it is not right that we allow that to continue when we can do something about it."*
> Glenys Stacey, Ofqual blog September 2013[79]

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77 Bleiman, B. (2023, February 14). *A Historical Overview of English Assessment at Age 16*. English & Media Centre. https://www.englishandmedia.co.uk/blog/a-historical-overview-of-english-assessment-at-age-16/

78 UK Parliament. (2023, April 2023). *Working Group on GCSE English Reform - Written evidence (EDU0059)*. https://committees.parliament.uk/writtenevidence/120830/html/

79 Stacey, G. (2013, September 4). Our announcement on speaking and listening assessments. *The Ofqual Blog*. https://ofqual.blog.gov.uk/2013/09/04/our-announcement-on-speaking-and-listening-assessments/

This points to some of the problems with the form of teacher assessment being applied and we have already argued how Non-Exam Assessment (NEA) needs review.

A wider picture: Measuring England's performance in reading in international tests, and performance in English in the National Reference Test

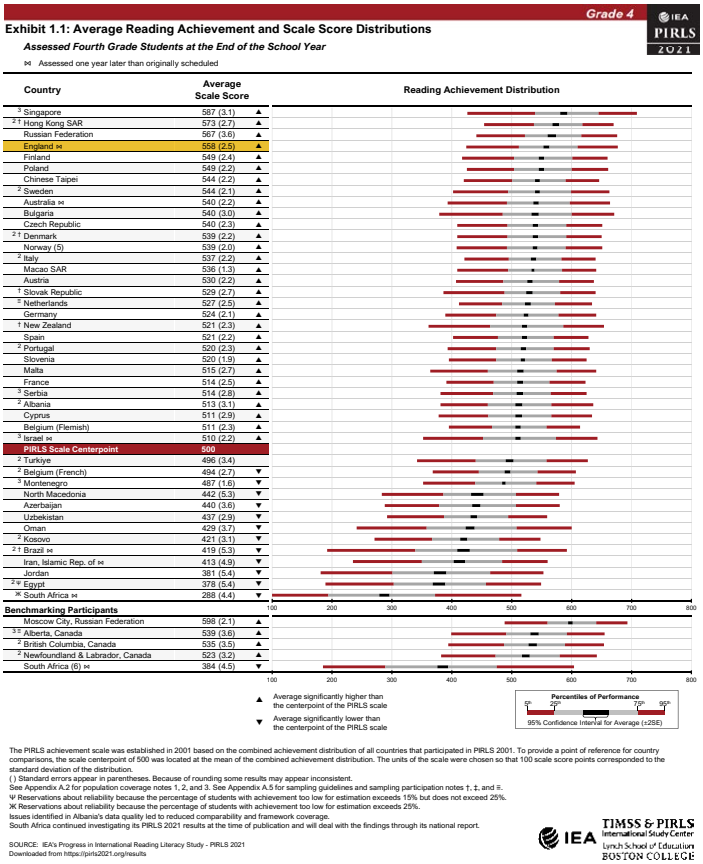
Progress in International Reading Literacy Study (PIRLS)

Although there are concerns about the current English GCSE, there appears to be much to celebrate about England's success in developing reading in primary schools. This is emphatically demonstrated in the PIRLS 2021[80] international measure of reading which assesses pupils in Grade 4 (ages 9–10).

England came fourth out of the 43 countries that tested children of the same age. The PIRLS rankings are widely regarded as the international benchmark for primary reading capability and are typically carried out every five years.

England's score of 558 was well above the international average of 520 and the European average of 524.[81]

Figure 10: PIRLS 2021 ranking of reading achievement



Much of this success is widely attributed to the systematic introduction of the use of synthetic phonics, supported by a Phonics Screening Check (applied at age 6) and the introduction of an

80 The Progress International Reading Literacy Study (PIRLS) provides internationally comparative data on how well children read by assessing students' reading achievement at the fourth grade. The International Association for the Evaluation of Educational Achievement's (IEA's) PIRLS 2021 is the fifth cycle in the PIRLS assessment. For more information visit https://www.iea.nl/studies/iea/pirls

81 Boston College, TIMSS & PIRLS International Study Center. (2021).. https://pirls2021.org/results/download/

English Hubs programme.[82] Not all educationalists are in favour of the heavy emphasis placed on the use of phonics, arguing that it should be subordinate to an approach that focuses on comprehension more broadly, and the joy of reading stories rather than the decoding of individual words and short sentences.[83] Nevertheless, ongoing improvements in reading as measured by PIRLS remain impressive and something to celebrate.

PISA and performance in reading at 15

The Programme for International Student Assessment (PISA)[84] is a study of 15-year-old pupils around the world organised by the Organisation for Economic Co-operation and Development (OECD).

When the use of phonics-led teaching was made statutory in 2013 many schools had already adopted this approach. Nevertheless, it is reasonable to argue that the universal use of phonics was at a relatively early stage when the 15 year olds tested by PISA in 2022 were at primary school. The cohort will have also been impacted by the Covid pandemic.

The Department for Education, in its report on the PISA 2022 findings,[85] concluded that, in relation to reading, performance in England and the other UK nations had not changed significantly in either direction since 2012:

> *"When considering the longer-term comparison between the average scores in 2012 and those in 2022, none of the differences in any nation reached the threshold for statistical significance – scores in 2022 were not significantly different to scores in 2012 or 2015 for any of the UK nations."*[86]

In conclusion, the PISA results in reading show England's 15 year olds are performing well compared to their peers in many other education systems. They do not, however, perform as well, relatively, as 9–10 year olds performed in the 2021 PIRLS tests.

Performance over time in the Ofqual National Reference Tests in English

Ofqual's National Reference Tests (NRT) were introduced to provide additional information to support the awarding of GCSEs. The tests in English and maths are designed to provide national data on student ability in a specific year as well as evidence of how performance has changed over time. The test is designed to reflect the structure and content of the relevant GCSE and as such assesses English skills beyond those of reading.

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82 Department for Education. (2023, October 12). Everything you need to know about phonics in schools. *The Education Hub Blog*. https://educationhub.blog.gov.uk/2023/10/12/everything-you-need-to-know-about-phonics-in-schools

83 For a counter argument to the use of phonics see: Macrory, G., Hollmann, W., & Wallace, C. (2024, April 10). *Phonics isn't working - for children's reading to improve, they need to learn to love stories*. Manchester Metropolitan University. https://www.mmu.ac.uk/news-and-events/news/story/phonics-isnt-working-childrens-reading-improve-they-need-learn-love

84 The Programme for International Student Assessment (PISA) is a study of 15-year-old pupils around the world organised by the Organisation for Economic Co-operation and Development (OECD). PISA assesses knowledge and skills that are considered necessary for participation in social and economic life, specifically in mathematics, reading and science. Although PISA is typically carried out every three years, PISA 2022 was undertaken four years after the previous assessment in 2018 because of the global Covid-19 pandemic. OECD. (2023, December 5). *PISA 2022 Results (Volume I and II) - Country Notes: United Kingdom*. https://www.oecd.org/publication/pisa-2022-results/country-notes/united-kingdom-9c15db47/PISA 2022

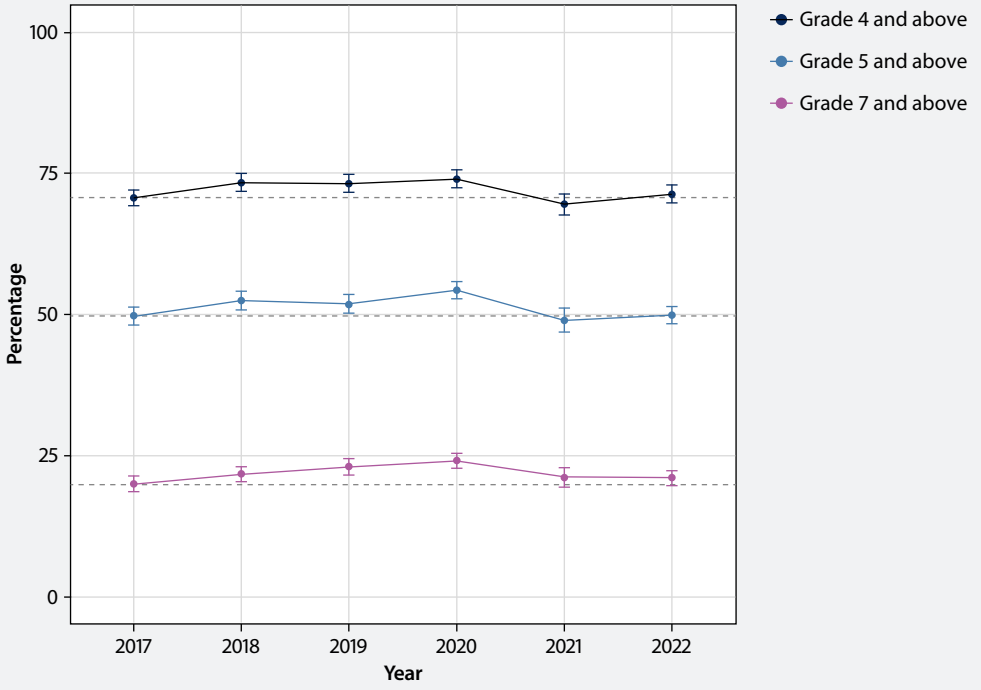
85 Ingram, J., Stiff, J., Cadwallader, S., Lee, G., & Kayton, H. (2023, December). *PISA 2022: National Report for England*. OUCEA, Pearson, & Department for Education. https://assets.publishing.service.gov.uk/media/656dc3321104cf0013fa742f/PISA_2022_England_National_Report.pdf

86 For PISA 2022, England's average score in reading was 496, significantly above the OECD average of 476. Five education systems had average scores that were not significantly different to England's, eight were significantly above, leaving the remaining 65 participating jurisdictions with an average score significantly below that of England.

The DfE report, cited above, states that: "England's average score in reading for PISA 2022 was significantly below the average score in 2018 (505). However, this was a pattern that was observed in many education systems, and the OECD trend average was also significantly lower in 2022 (477) than in 2018 (488). England's score in 2022 was not significantly different from scores achieved between 2006 and 2015, while the OECD trend average has declined."

The graph below (**figure 11**) shows a slight decline in the equivalent to 'GCSE grade 4 and above' in English, year on year. The decline in 2022, while concerning and significant, is likely to be attributable to the effects of the Covid pandemic.[87]

Figure 11: Long-term changes in NRT English over time from 2017 baseline



Source: gov.uk

Although, statistically, the decline is barely significant, it does suggest that the new GCSE, introduced in 2015, has not led to any annual improvements. Improvement might have been expected if we take into account the 'Sawtooth Effect', where cohort performance on high-stakes assessments drops after assessment reform, but then improves over time as test familiarity increases and teachers improve and develop their teaching approaches.[88]

Why is there a dip in performance in English over the 11–16 phase?

Many of the reasons for this dip in performance have been laid at the design and content of the current GCSE in English. In addition, the GCSE casts a long shadow over Key Stage 3, and, as with maths, formative assessment and progress measures are not always effectively applied. We explore this in a little more detail below.

An overview of how English is assessed throughout the 11–16 phase and the importance of breadth

We have seen evidence of excellent approaches to the use of formative assessment[89] in schools. These assessments are often informal and include activities such as quizzes and classroom discussions as well as written tasks. More and more teachers are using digital tools to design and deliver assessments – something we return to in the chapter on digital assessment and learning. In the best examples teachers target identified learning objectives,

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87 Burge, B., & Benson, L. (2022). *National Reference Test Results Digest 2022*. NFER. https://www.gov.uk/government/publications/the-national-reference-test-in-2022/national-reference-test-results-digest-2022

88 Newton, P. E. (2020, November). *What is the Sawtooth Effect? The nature and management of impacts from syllabus, assessment, and curriculum transitions in England*. Ofqual. https://assets.publishing.service.gov.uk/media/5fb4fbb88fa8f54ab81d89aa/What_is_the_Sawtooth_Effect.pdf

89 For a definition of formative and summative assessment and an overview of their uses, see : Skillshub. (n.d.). Formative and Summative Assessments: Examples and Differences. *Skillshub Blog*. Retrieved August 19, 2024, from https://www.skillshub.com/blog/formative-summative-assessments

so they can pinpoint students' misconceptions and gaps in learning, and students are given good feedback leading to agreed actions for further study.

But we have seen that this isn't always the case. While acknowledging that there have been improvements in recent years, Ofsted puts it like this:

> *"Few schools use formative assessment effectively. Current assessment practices do not readily identify whether pupils have learned the knowledge they need in the lesson or for the next part of the teaching sequence. This means that teachers do not swiftly identify and address misconceptions and errors."*[90]

The quality of design and application of *summative* assessment can also be patchy. The best examples we have seen draw together what has been taught at key points in the curriculum to provide a more synoptic assessment of a combination of skills and knowledge using strong links between the summative and formative assessments. The focus is on supporting students to understand how they are progressing and feedback remains an important element.

However, this isn't always the reality. The main purpose that some schools give to summative assessments is the tracking of whole-school performance rather than supporting each student's learning. It is revealing that these assessments are referred to as 'data drops' and the focus is on whether or not students are likely to achieve the target grade which has been assigned to them. The English and Media Centre (EMC) described some of the effects of this in a blog about its project on rethinking assessment in secondary English:

> *"…the dominant model of English assessment organised around a half termly or termly unit of work culminating in a final piece – which generally feeds into whole school data reporting – remains. A final piece showcasing all that students have learnt across a unit is often a logical and sensible end point to a unit, but because of accountability measures, the way it's implemented in some settings is problematic. When the data, not the learning, becomes the most significant assessment focus, the final piece is over-emphasised and has a serious backwards impact on the learning of the unit. What students are doing, then, from lesson to lesson and unit to unit becomes a much-reduced version of what the curriculum might otherwise be, as it is tailored precisely to the assessment, rather than the assessment emerging from the more expansive work of the curriculum."*[91]

In fairness we have seen a move away from the relentless capturing of data and the 'dip sticking' of school performance every half term. Changes to the Ofsted inspection framework mean that it is far more focused on the *use* of internal data in schools:

> *"Inspectors will not look at non-statutory internal progress and attainment data on inspections of schools. That does not mean that schools cannot use data if they consider it appropriate. Inspectors will, however, put more focus on the curriculum and less on schools' generation, analysis and interpretation of data."*[92]

Furthermore, back in 2018, the *Making Data Work*[93] report recommended a maximum of three 'data drops' per year.

There is plenty of guidance available to schools. This includes the Assessment Reform Group's *Assessment for Learning: 10 Principles. Research-based principles to guide classroom practice*

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90 Published in March 2024, *Telling the story: the English education subject report*, is Ofsted's detailed analysis of how the subject is treated in England's schools. We have quoted this report heavily in this section and recommend reading it. https://www.gov.uk/government/publications/subject-report-series-english/telling-the-story-the-english-education-subject-report

91 English & Media Centre. (2023, September 18). Re-thinking Assessment in Secondary English Part 1. *EMC Blog*. https://www.englishandmedia.co.uk/blog/re-thinking-assessment-in-secondary-english-part-1/

92 Ofsted. (2019, May 14). *Education inspection framework (EIF)*. GOV.UK. https://www.gov.uk/government/publications/education-inspection-framework

93 Department for Education. (2018). *Making data work: Report of the Teacher Workload Advisory Group*. https://www.gov.uk/government/publications/teacher-workload-advisory-group-report-and-government-response

Assessment for Learning[94] which provides 10 fundamental and enduring principles, summarised in a handy graphic. The use of assessment by schools is enshrined in the Ofsted *School Inspection Handbook*:

> *"Inspectors will consider how the curriculum developed or adopted by the school is taught and assessed in order to support pupils to build their knowledge and to apply that knowledge as skills (we call this 'implementation')…This includes the use of assessment to check pupils' understanding of what the curriculum intent says they should know, and to identify and correct misunderstandings and inform teaching."*
> School Inspection Handbook, para 235

All the indications are that the use of assessment for learning in schools is becoming more expert. However, it remains the case that the full dimensions of English and the knowledge and skills that underpin them are sometimes narrowed by the content and nature of assessments used. English, in *all* its breadth, must be taught, avoiding the narrowing effect that can occur when teaching is geared towards limited assessment objectives. This is a point we return to below as we look at the effect of the GCSE 'backwash' into Key Stage 3.

The backwash of GCSE into Key Stage 3

The importance of getting strong GCSE English results means that many schools are, quite understandably, tempted to begin preparation for sitting GCSEs early. Matt Bromley sets out some of the reasons for this approach and highlights the dangers in his book, *The Problem with the Key Stage 3 Curriculum*:

> *"It's not difficult to understand why school leaders prioritise Key Stages 4 and 5 over Key Stage 3 because this is where external accountability sits and it takes a brave, perhaps foolish, headteacher to focus on Key Stage 3 at the possible expense of – in the short-term at least – GCSE and A Level outcomes. But putting all your eggs in one GCSE basket – including starting Key Stage 4 in Year 9 and using GCSE assessment criteria from Year 7 – is clearly short-sighted and makes a mockery of Key Stage 3."*[95]

And Ofsted concludes:

> *"In some primary and secondary schools, preparation for external assessments distorts the curriculum. For example, at key stage 3, schools often encourage excessive practice of a narrow range of writing structures to prepare pupils for GCSEs."*[96]

As shown earlier, we see the occurrence of acronym-laden approaches designed to bolster exam technique:

> *"In the schools that build their curriculum around GCSE assessment objectives and outcomes, pedagogy often focuses on getting pupils to practise* ***answering exam-style questions from the start of Year 7****. While it is important to know how to approach questions in an exam, pupils at these schools are given a narrow view of the subject. They are limited to completing PEE or point, evidence, terminology, analyse and link (PETAL) paragraphs or writing texts that are purely designed around exam tasks. Some pupils say that this limits their enjoyment of the subject, because so much of their time is devoted to crafting these types of responses."*[97]

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94 Broadfoot, P., Daugherty, R., Gardner, J., Harlen, W., James, M., & Stobart, G. (2002). *Assessment for Learning: 10 Principles. Research-based principles to guide classroom practice Assessment for Learning*. https://www.researchgate.net/publication/271849158_Assessment_for_Learning_10_Principles_Research-based_principles_to_guide_classroom_practice_Assessment_for_Learning

95 Bromley Education Enterprises. (2018, July 10). *The problem with the Key Stage 3 curriculum*. https://autus.group/2018/07/10/the-problem-with-the-key-stage-3-curriculum/

96 Ofsted. (2024, March 5). *Telling the story: the English education subject report*. GOV.UK. https://www.gov.uk/government/publications/subject-report-series-english/telling-the-story-the-english-education-subject-report

97 Ofsted. (2024, March 5). T*elling the story: the English education subject report*. GOV.UK. https://www.gov.uk/government/publications/subject-report-series-english/telling-the-story-the-english-education-subject-report

Preparing students early for GCSE is not wrong per se. But it must not be done at the expense of the wider English curriculum. As we have already shown, the current English GCSE is exceptionally narrow in what it measures. But even the best designed GCSE cannot assess all elements of the English curriculum. It only samples the curriculum and infers competencies in areas that are not explicitly assessed. A curriculum that only focuses on the elements assessed by the GCSE leads to an underrepresentation of the broader curriculum. As Charles Clarke points out in his introduction to this report, we must recognise the full breadth of 'English':

> *"…the concept of 'English' should be defined more widely to include the range of language and presentational skills which are of central importance in the modern wider world. These include reading and writing, spelling and grammar, comprehension and interpretation, oracy and articulation, active listening and media comprehension. And these should all understand the context of our modern diverse society, including the interconnected, globalised world in which we live."*

Furthermore, there are risks that GCSE-based assessments are introduced before the content being assessed has been taught. What is assessed must be based on what has been taught, not on what might be coming up later:

> *"Schools expect pupils to repeatedly attempt complex tasks that replicate national curriculum tests and exams. This is at the expense of first making sure that pupils are taught, and securely know, the underlying knowledge they need."*[98]

The impact here is that student learning is not fully developed and, in the end, risks them performing poorly when they finally sit their GCSE. A formative assessment point at the end of Key Stage 3 could go some way to mitigating this.

A new qualification benchmarking competence in English

In the chapter on maths we talked about the 'forgotten third' of young people who don't achieve a good pass at GCSE. A similar proportion of young people are reaching 16 without developing the fundamental skills in English. It is a long stretch from the start of Key Stage 3 to the formal assessment of English at GCSE and many of the contributors to our discussions expressed an interest in a summative assessment at 14 that would provide a much-needed reference point at the end of Key Stage 3.

As with our maths proposals, we recommend the introduction of a qualification in the basic use of English, normally to be taken at age 14, but which can be taken whenever a student is ready. This would form a benchmark of the skills in English we would want every young person to achieve before the age of 16. We think it should be taken on-screen and that it should provide feedback on what the student has achieved and where there may be weaknesses. What can be assessed in such a qualification will inevitably be narrower than the wider construct of English referred to by Charles Clarke and it must not be allowed to displace the teaching of that broader curriculum. For this reason we do not advocate using the qualification as part of any school accountability measure.

Our recommendation, though different in some respects, is in sympathy with the Association of School and College Leaders' (ASCL) proposals to introduce an alternative to GCSE assessment through the introduction of a 'passport qualification' as part of its forgotten third initiative. In its published policy statement, ASCL advocates "new assessments in literacy and numeracy, which can be taken when learners are ready, showing future employers or educators that they meet these requirements."[99]

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98 Ofsted. (2024, March 5). T*elling the story: the English education subject report*. GOV.UK. https://www.gov.uk/government/publications/subject-report-series-english/telling-the-story-the-english-education-subject-report

99 Association of School and College Leaders. (n.d.). *Curriculum and Assessment: ASCL position statements*. Retrieved August 19, 2024, from https://www.ascl.org.uk/Our-view/Position-on-policy/Curriculum-and-Assessment

A word about Key Stage 3 SATs

When advocating the creation of an English qualification to be taken at 14 or when ready, we should reflect on any lessons that might be gleaned from the history of the ill-fated Key Stage 3 SATs in maths and English which were statutory tests for 14 year olds.

Key Stage 3 SATs were introduced by the then Conservative government in 1995 and were intended to measure school performance at the end of Key Stage 3. They became a defining feature of the subsequent Blair and Brown governments until 2008 when the Secretary of State for Education announced their abolition.

The SATs were widely disliked by schools and teachers for the significant pressure and resource requirements they placed on schools in preparing for them and the significant consequences of poor results because of their direct link to accountability measures. There were also concerns about the impact of the tests on young people, with the University of Cambridge publishing research that pointed to evidence that SATs were feeding a "pervasive anxiety" in children's lives.

But the main reason for this U-turn could well be that the delivery of the tests earlier in the same year suffered a disastrous failure under a £156 million contract with the American firm ETS. When the SATs were cancelled there was a promise of a review and the creation of more sophisticated performance measures, but the government of the time ran out of road.

We are not advocating a return to Key Stage 3 SATs. We believe our proposals for a qualification that can be taken when ready, is on-screen and concentrates on what a student can do is a much better prospect.

However, much of what we have discussed earlier in this chapter does point to a vacuum in assessment at Key Stage 3. There have been various calls for the reintroduction of Key Stage 3 SATs ever since their abolition, including from Sir Michael Wilshaw (then Chief Inspector of Schools in England) in 2016.

In late 2021 it was reported that the Conservative government was considering the reintroduction of these tests because, in the words of the *Guardian* [our emphasis]:

> *"Ministers were worried that key stage 3, which covers the first three years of secondary school, had 'got a bit lost' because there is no assessment at the end of it, and children can end up losing focus.* ***Some schools have started teaching GCSE courses a year early, in year 9."***[100]

The treatment of oracy in the curriculum

One of the dimensions of English that is not independently assessed and certificated in a school setting is oracy. An in-depth discussion of oracy is beyond the scope of this report and, at the time of writing, we await the findings of the Oracy Commission which we know from discussions with its chair, Geoff Barton, is conducting a much deeper dive into the subject.

The treatment of oracy within the curriculum is a significant issue and there is a groundswell of opinion that oracy needs a higher profile and more explicit treatment than is currently the case. In our response to the Call for Evidence by the Oracy Commission[101] we noted that:

> *"Survey findings have revealed that in excess of 80 per cent of business leaders and parents support more time being spent on the development of young people's spoken language and listening skills at school. A YouGov poll of more than 4,200 parents and 1,007 business*

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100 Weale, S., & Adams, R. (2021, October 1). DfE considering return of Sats at 14 and axing teaching hours limits. *The Guardian*. https://www.theguardian.com/politics/2021/oct/01/dfe-considering-return-of-sats-at-14-and-axing-teaching-hours-limits

101 OCR (2024). *Call for evidence on Oracy Education: OCR's response*. https://cambridge.org/sites/default/files/media/documents/OCR%20response%20commission%20on%20future%20of%20oracy%20education.pdf

> *decision makers also revealed that more than 71 per cent of business leaders back the introduction of oral examinations counting towards young people's qualifications."*[102]

Oracy itself is a very broad concept and it certainly shouldn't be left to the subject of English to bear the full weight of the teaching and assessment of it. And it is, after all, the case that the aims statements for all national curriculum subjects in the revised 2014 national curriculum emphasise oracy – and this constitutes a legal duty for those schools obliged to deliver the national curriculum, albeit an obligation that is frequently honoured in the breach.
The statement for maths reads:

> ***"Spoken language***
> *The national curriculum for mathematics reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof. They must be assisted in making their thinking clear to themselves as well as others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions."*[103]

We are not convinced that an assessed formal presentation or similar oracy-related component should be part of the English GCSE, certainly not in its current narrow format. Oracy needs to feature throughout the curriculum, as was intended, from primary through to Key Stage 4 and beyond. Certainly, an assessment of presentation skills near the end of Key Stage 4 would be too little too late and something of a 'bolt on'.

Oracy is ultimately a cross-curricular matter, and we should find ways of building it into pedagogical approaches – as with the example of the use of language in maths given above. Oracy in a school setting depends on students speaking the vocabulary and the language they are expected to use in written work, including exam responses. It involves creating a classroom atmosphere that hears that vocabulary, those ideas being communicated out loud – in individual, paired and group work, from a range of diverse voices around the classroom, all in a supported, structured and celebrated way.[104]

There are ways in which schools can promote the confident use of oracy to emphasise and celebrate its importance through activities such as drama and debating. The issuing of relatively low-stakes affirmations of achievement through badging[105] or the use of locally assessed portfolios would be one way forward, and one which could be inclusive, offering a range of achievements that can reward every student according to their efforts (neurodiversity and SEND should also be clearly considered in any approach).

This doesn't rule out the formal, independent assessment of oracy, perhaps leading to a qualification. Certainly, there are digital solutions that help point the way. But this would require a clearly defined 'construct' of what oracy is. As we have said, the concept of oracy is very broad and includes physical, linguistic, cognitive, and social and emotional dimensions.[106]

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102 YouGov poll funded by the British Council: Oracy Education Commission. (2024, March 15). *Parents and employers united in demand for more focus on speaking skills in schools*. https://oracyeducationcommission.co.uk/parents-and-employers-united-in-demand-for-more-focus-on-speaking-skills-in-schools

103 Department for Education. (2013, September). *Mathematics programmes of study: key stage 3 National curriculum in England*. GOV.UK. https://assets.publishing.service.gov.uk/media/5a7c1408e5274a1f5cc75a68/SECONDARY_national_curriculum_-_Mathematics.pdf

104 For more on this topic, see: Cambridge Assessment International Education. (n.d.). *Getting Started With Oracy*. This outlines what we can consider to be best practice. It also cites School 21 and Oracy Cambridge as places that communicate / research / facilitate best practice in oracy education. https://www.cambridge-community.org.uk/professional-development/gswor

105 For more on badges, see our chapter on digital assessment.

106 For a representation of the skills used in oracy, see : University of Cambridge Faculty of Education. (n.d.). *The Oracy Skills Framework*. Retrieved August 19, 2024, from https://www.educ.cam.ac.uk/research/programmes/oracytoolkit/oracyskillsframework/Oracy%20Skills%20Framework%202020.pdf

We discussed some of this with our colleague Tim Oates.[107] Would the assessment of speaking and listening cover the requirements for assessing oracy? While recognising that it might contribute, he warned that the assessment of speaking and listening alone might run the danger of 'construct underrepresentation' – assessing limited dimensions of oracy. If speaking and listening were to be the main feature in a formal assessment of oracy, other dimensions – such as the social aspects of oral interaction – might be neglected, and thus be less developed. Formal assessment of oracy is something for further consideration following the publication of the Oracy report and there are already robust digital solutions, powered by AI, and used in the testing of ESOL students to support this – an example being Cambridge Linguaskill tests.[108]

The transition from primary to secondary education

In the chapter on maths, we talked about the point of transition where "attainment and attitudes drop". We highlighted some of the weaknesses in Key Stage 2 tests and in the importance of good-quality diagnostic testing at age 11. Many of the issues highlighted in relation to maths are mirrored in English. The following quote focuses on one aspect:

> *"…most schools do not carefully consider what pupils have learned in the primary phase and do not check and revisit key knowledge and skills. This is particularly evident in grammar and writing, where it is often assumed that pupils know or can do things, but schools fail to identify when these should be revisited, practised and developed over time."*[109]

One issue we described is how diagnostic testing at the start of Key Stage 3 can be imprecise, lumping together students with similar performance but without looking deeper into their characteristics. A more sophisticated approach is critical where diagnostic tests are used to set GCSE targets which, if inaccurate, can cap the aspirations of the student and the school alike.

Training and support for teachers and school leaders

> *"In secondary schools, much of the professional development time focuses heavily on exam practices and moderation... While this clearly improves teachers' knowledge of the exam criteria, it does not always give them a clear understanding of what pupils need to learn in the subject or the pedagogical knowledge of how best to teach this. This is especially notable in key stage 3, where the components of writing and spoken language are not well understood."*[110]

There is a chronic shortage of qualified teachers of English[111] and we have seen that where a school is short of specialist teachers it will most likely assign its best teachers to Key Stage 4 because of the importance of GCSE attainment. This makes the provision of good support materials, well-curated and quality-assured assessments, and access to quality training more necessary than ever. There is a specific need for training targeted at school leaders in the design, selection and use of diagnostic tests.

The evidence suggests that where there is a shortage of professional development taking place this is caused by schools and teachers not having time or resource to access CPD rather than there being a lack of quality provision, but it is a significant issue, and not just in relation to the teaching of English: "On average, teachers in England now spend just four days per year

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107 Cambridge University Press & Assessment. (n.d.). *Tim Oates CBE*. Retrieved August 19, 2024, from https://www.cambridgeassessment.org.uk/our-research/our-research-team/tim-oates

108 Cambridge English, Linguaskill. https://www.cambridgeenglish.org/exams-and-tests/linguaskill

109 Ofsted. (2024). *Telling the story: the English education subject report*. https://www.gov.uk/government/publications/subject-report-series-english/telling-the-story-the-english-education-subject-report

110 Ibid.

111 Schools in England are struggling to recruit English teachers, with hundreds still trying to fill vacancies in time for September, as headteachers warn they have reached crisis point. Fazackerley, A. (2023, June 17). Schools across England face unprecedented struggle to hire English teachers as recruitment crisis grows. *The Guardian*. https://www.theguardian.com/education/2023/jun/17/schools-across-england-face-unprecedented-struggle-to-hire-english-teachers-as-recruitment-crisis-grows

on CPD, which is significantly below the average of 40 days in Shanghai, and the OECD average of ten and a half days."[112]

Recommendations

- Given that so many teachers have reported that it is not fit for purpose, **the English GCSE should be redesigned as a matter of urgency**. Policymakers should not wait for the conclusion of a full review of all subjects, curriculum and assessment before such a redevelopment. Areas for consideration should include:
  - **Including more media, non-fiction and multi-modal texts**, including film, TV, drama and digital texts as part of English while recognising that these should also be part of the wider curriculum as they will be encountered within other subjects.
  - **Increasing the diversity of literary texts available for study within GCSE.** The literary canon should better reflect the range of cultures and experiences of all young people.
  - **Restoring the study of spoken language** to the GCSE. This is an important element of studying English at Key Stage 4, but also supports better preparation for study at A Level and beyond.
  - **Considering how Non-Exam Assessment (NEA) can be used to provide more appropriate ways of assessing creative and professional writing.** This should reflect the ways in which fiction and non-fiction texts are planned, drafted and written for a range of purposes, but also needs to be part of a wider review of NEA constructs and take account of the emergence of AI.
- **Trial the assessment of speaking and listening, using models developed for the for ESOL students.** We recognise that speaking and listening are only one dimension of oracy and other less formal, teacher-assessed approaches should also be trialled.
- **Make the treatment of oracy a greater focus of school inspection in line with national curriculum requirements.**
- **Develop and introduce an English qualification, mainly to be taken at 14**, which provides a structured focus to Key Stage 3, benchmarks the English competences needed by all young people by the age of 16, which is on-screen, can be taken when ready and generates a profile of achievements.

112 Skipp, C. S., & Dommett, E. J. (2021). Understanding and Addressing the Deficiencies in UK Mathematics Education: Taking an International Perspective. *Education Sciences*, 11(3), 141. https://doi.org/10.3390/educsci11030141

Digital assessment and learning

In this chapter we start by looking at the current situation and plans in relation to digital assessment and move on to consider digital learning more widely. The potential for 'EdTech' is such that in the future the distinctions between assessment and learning will become increasingly blurred so this is something of an artificial divide. The prospects offered by digital assessment and learning are exciting and potentially transformative. They can also be daunting, chaotic and incredibly diverse, and not surprisingly there is some resistance to change. We need to create an environment where experimentation is encouraged, expertise is nurtured and there is oversight and co-ordination underpinned by optimism and vision.

Digital assessment

Many predict a future that unleashes whole new approaches to assessment and learning. But, in relation to high-stakes assessment the approaches so far and those planned for the medium term are surprisingly cautious. This is understandable given the critical nature of qualifications and tests which are, by definition, high stakes, but these moves do not embrace the transformative potential of digital assessment.

Digital developments in the 'back office'

There are many examples of exam boards adopting technology to support the behind-the-scenes administration and awarding of exams. This encompasses the way candidate entries are made, the way handwritten student 'scripts' are systematically scanned and distributed to examiners for on-screen marking, how consistency of marking between examiners is tracked and monitored in real time, the way large data sets are manipulated through the process for awarding grades, and in the way feedback on individual student performance and the sharing of marked scripts takes place. These changes are not always visible but have contributed significantly to the efficiency and rigour of the *current* system. In much the same way, schools are adopting technology to support the way they manage and run their schools from timetabling to security systems.

Moving to on-screen assessments – is this transformative?

The pen and paper approach is set to change in the medium term, as exams will increasingly be taken on-screen. In England, the exam boards have plans in place to roll out on-screen exams over the coming years, albeit in parallel with paper-based alternatives. The timescales and plans for moving GCSEs on-screen are set out in the box below which shows that 2030 might be something of a watershed, although it may well take longer for on-screen assessments to become the norm, let alone the only mode of assessment.

Digital assessment timelines

OCR
OCR is developing a fully digitally assessed option for its **GCSE in Computer Science**. **Also, a major pilot**, run by OCR and Cambridge International Education, allowed thousands of students to take **digital mock exams** in the UK and five other countries across a range of subjects.

AQA
In summer **2026**, the reading and listening components of **GCSE Italian and Polish exams will go digital**. Our ambition is to implement **digital exam components in a major subject by 2030**.

Pearson Edexcel
Up to 125,000 students will have **the option to take GCSE English Language and English Literature exams on-screen** for the first time with Pearson Edexcel in summer **2025**. By **2030, our ambition is for all GCSEs** to have **both paper-based and on-screen** formats.

The process of moving 'exam papers' on-screen is sometimes described as 'lift and shift' or a 'migration' and much remains the same as it always has – the exams will still be sat in exam halls, they will be more or less in the same format as a traditional exam paper, and each will be taken on a single, timetabled moment in time. Largely, exams will be marked by human examiners.

Part of the limitation of the approach is encompassed by the commitment to retain paper formats alongside an on-screen option. As long as this is the case, in the interests of fairness and comparability the on-screen version has to follow that of the paper version as closely as possible. Students must demonstrate the same knowledge and understanding, answering the same questions, and be marked to the same standard, whether they choose to sit the exam on-screen or on paper. The dilemma here is described in a Cambridge blog:

> *"Paper assessment has limitations which have influenced what is assessed by high stakes exams and how for decades. On-screen assessments also have limitations. But if we try and replicate paper exams by moving them on-screen, we are taking on the limitations of both paper AND screen and so not delivering the potential opportunities from using technology."*[113]

Fairness and access for all

A key focus of implementing dual running of paper and on-screen versions of exams has to be to make sure that there is absolute parity for students regardless of which option they select or is available to them. This is not straightforward and explains some of the caution in the rollout of this approach and the large amount of trialling and ongoing research that is taking place. Some of the challenges are set out here from the same blog quoted above:

> *"Some subject areas are more impacted by the risks of migration than others. Subjects with a lot of diagrams, annotation, graphs, and equations are most vulnerable. Research on migrating high stakes exams to screen has found:*
> - *learners perform slightly differently in different modes*[114]
> - *the gap between performance on paper and on-screen is largest for questions which require annotation, are visual or graphical*[115]
> - *the gap between paper and screen is bigger for lower ability learners"*[116]

However, careful parallel testing in relatively low-stakes assessments (mocks) has allowed exam boards to iron out many of these disparities and colleagues are confident that this cautious approach will provide us with a level playing field for students, whichever mode of assessment they use.

Assessment of GCSEs on-screen *is* an important milestone for public exams

Getting 'dual running' of paper and on-screen versions right is something the English exam boards are working on in conjunction with the regulator. The benefits of on-screen assessment in a world where the use of paper and pen is increasingly rare is an important benefit to many students and a signal that the system is being modernised and keeping up with the times. As the House of Lords report on 11–16 education put it:

> *"Paper-based exams that require pupils to write for extended periods are increasingly out of alignment with the experiences and tasks young people will encounter in their education, life and work. Onscreen testing represents a more modern approach and offers huge*

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113 Hughes, S. (2022, January 6). Why don't we just put our high stakes exams on screen? *Cambridge University Press & Assessment Blog*. https://www.cambridgeassessment.org.uk/blogs/high-stakes-on-screen

114 Threlfall, J., Pool, P., Homer, M., & Swinnerton, B. (2007). Implicit aspects of paper and pencil mathematics assessment that come to light through the use of the computer. *Educational Studies in Mathematics, 66(3), 335–348.* https://www.doi.org/10.1007/s10649-006-9078-5

115 Hughes, S., Green, C., & Greene, V. (2011). *Report on current state of the art in formative and summative assessment in IBE in STM - Part II*. ASSIST-ME Report Series Number 2.

116 Ofqual. (2020). Online and on-screen assessment in high stakes, sessional qualifications. A review of the barriers to greater adoption and how these might be overcome. Ofqual/20/6723/1. GOV.UK. https://www.gov.uk/government/publications/online-and-on-screen-assessment-in-high-stakes-sessional-qualifications

> *potential to enhance the assessment experience for learners. We welcome Ofqual's initial investigatory work in this area and support its future vision of a mixed model combining on-screen and paper-based assessment."*[117]

But what many have told us is that this change is far from the last word in digital assessment. Yes, it might open up opportunities for further, more dynamic transformations, but of itself it is but a very tentative first step.

What is happening elsewhere – an international perspective

A cautious approach to the digitisation of high-stakes public examinations is not unique to England. A series of reports by the OECD looking at all aspects of digital education across a range of countries includes an overview of digital assessment which makes the following observation:

> *"Even the most innovative digital features, such as the use of digital assessment environments or proctoring systems, are usually deployed to replicate the conditions of traditional, paper-based assessments taken in class. As of 2024, the advantages of digitising assessments have mainly lied in the simplification of the administration, data management and sometimes grading processes."*[116]

The report provides a round-up of where different countries are with the migration of their exams from paper to on-screen:

> *"Out of 29 education systems for which we have comparative information, 7 (24%) countries (Denmark, Estonia, Finland, Italy, Latvia, Lithuania, and New Zealand) have partly digitised some of their high-stakes student examinations. In five of them, high school graduation exams are concerned. In other countries and jurisdictions, only subjects that would typically be taken on a computer, such as coding, may be digitised …*
>
> *Other countries and jurisdictions plan to digitise their student examinations in the near future. As of 2024, Austria was piloting a digital matriculation exam (Digitale Reifeprüfung) in federal schools at the upper secondary level (including VET). The digitalisation of the matriculation exam will accompany the imminent launch of a digital credential system. In England (United Kingdom), all main exam boards were piloting digital exams for the GCSE and A-levels."*[118]

So, England is far from an outlier in its approach to digital assessment in public examinations – the vast majority of education systems are treading a similar path. There are some exceptions, however; Singapore is pump priming EdTech in all its forms, encouraging a panoply of different initiatives and Estonia is driving innovation with a national curriculum that places an unrelenting emphasis on digital competencies. These are countries with different infrastructures and relatively small populations but we should pay close attention to what they are doing and what is being discovered.[119]

The future is already here

There are established, sometimes high-stakes, assessments that make use of digital technology in ways that go far beyond a migration of paper exams to screen. Cambridge Linguaskill tests which assess speaking and listening via computer, powered by artificial intelligence is a case in point.[120]

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117 House of Lords Education for 11-16 Year Olds Committee. (2023, December 12). *Requires improvement: urgent change for 11-16 education* https://committees.parliament.uk/publications/42484/documents/211201/default

118 OECD. (2023). OECD Digital Education Outlook 2023: *Towards an Effective Digital Education Ecosystem*. https://doi.org/10.1787/c74f03de-en

119 For more about developments in Singapore and Estonia, see: Education Estonia. (n.d.). *Digital competence: teaching 21st-century skills*. Retrieved August 19, 2024, from https://www.educationestonia.org/digital-competence

120 Cambridge English. Linguaskill https://www.cambridgeenglish.org/exams-and-tests/linguaskill

As you would expect, the Higher Education sector provides many examples of the adoption of digital assessments and this example from **Oxford University** provides a flavour of the innovations taking place:

> *"Every year, the Medical Science Division's Learning Technologies (MSDLT) team supports teaching staff to run more than 160 online assessments for over 17,000 participants – everything from quizzes and open-book tests to assessments sat under exam conditions, including formal University exams. But it's not just this scale and reach that's impressive. Online assessments can also be incredibly rich, incorporating audio, video, simulations and visualisations to put students through their paces. And they can be versatile enough to process algebra and other complex mathematical elements.*
>
> *Computer marking gives students instantaneous feedback, and collates real-time data so that teaching staff can spot problem questions quickly and redesign any elements of assessment that are not up to scratch."*[121]

University entrance tests have adopted digital approaches on an international level, such as the GMAT which is described in Wikipedia as follows:

> *"The **Graduate Management Admission Test (GMAT)** is a computer adaptive test (CAT) intended to assess certain analytical, quantitative, verbal, and data literacy skills for use in admission to a graduate management program, such as a Master of Business Administration (MBA) program. Answering the test questions requires reading comprehension, and mathematical skills such as arithmetic, and algebra. The Graduate Management Admission Council (GMAC) owns and operates the test, and states that the GMAT assesses critical thinking and problem-solving abilities while also addressing data analysis skills that it believes to be vital to real-world business and management success."*

In a very different sphere, the Curriculum for Wales Reading and Numeracy Assessments provide digital on-screen tests. The assessments are mandatory; this means that learners in Years 2 to 9 in maintained schools (including community, voluntary-aided, voluntary-controlled and foundation) must take the personalised assessments in reading and numeracy at least once during the school year. Numeracy is taken in two parts: Numeracy (Procedural) and Numeracy (Reasoning):

> *"The online reading and numeracy assessments provide an individualised assessment experience that dynamically adjusts the level of challenge for each learner.*
>
> *The assessments are 'adaptive' which means that questions are selected based on the learner's response to the previous question or questions. When learners answer questions correctly they will receive more challenging questions, and when learners answer incorrectly they will receive easier questions. This personalisation means that every learner will see a different set of questions, and the number of questions will vary...*
>
> *Responses are marked automatically and feedback is usually available to staff the day after an assessment is taken.*
>
> *Schools have the flexibility to schedule the personalised assessments at any point during the academic year…"*[122]

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121 University of Oxford Centre for Teaching and Learning. (n.d.). *Better, faster: cutting-edge online assessments in MSD*. Retrieved August 19, 2024, from https://www.ctl.ox.ac.uk/better-faster-cutting-edge-online-assessments-in-msd

122 Welsh Government. (n.d.). *National Reading and Numeracy Personalised Assessments: administration handbook*. Retrieved August 19, 2024, from https://hwb.gov.wales/curriculum-for-wales/reading-and-numeracy-assessments/personalised-assessments/national-reading-and-numeracy-personalised-assessments-administration-handbook

In the UK and beyond there are also on-screen proprietary tests which schools can use to diagnose students, track and monitor student progress and predict examination outcomes. A well-established example is the Cambridge CEM **MidYIS** baseline tests.[123]

Alongside such baseline tests and progress measures, there are a whole spectrum of formative, low stakes assessment tools available to teachers to support learning; to illustrate the sheer number and variety of tools available to schools, one blog lists out 75 digital tools and apps that teachers can use to support classroom assessment (and this claims to be a curation of just some of the best).[124] There is a lot out there, some of it phenomenally useful, some of it less so.

In contrast to mainstream, regulated assessments, these kinds of developments focus on an extremely close merging of teaching approaches and formative assessment. Examples include tools that support the creation of quizzes, polls and surveys, collaborative learning exercises which support students to mind map their thinking processes, and platforms which enable students to use their work in presentations which record audio and video performances and support ways of assessing them. Such tools vary in quality, and while many are developed to the highest standards there is no assurance that they are all up to scratch.

The use of artificial intelligence (AI) in assessment

We are already seeing the transformative impact of AI in many walks of life. Our society and economy will need people who are able to use AI discerningly. More important than the latest large language models themselves will be the critical skills and thinking that underpin their use: from data science, public health and education to politics, culture and green tech. It is far beyond the scope of this report to expound in any detail on the multiple ways in which AI might power many future and existing approaches to assessment.

AI can be used in assessment in a variety of ways, including:

- To support tasks relating to a wide range of administrative and management activities within schools and colleges
- To create live assessment questions / papers
- To allow automation of marking or to assist human marking
- To improve quality of mark schemes in offering alternative responses
- To allow students to spend more time on higher order skills (interpreting rather than generating)
- To assist teachers in generating class materials and tests
- To provide alternative research avenues for students
- To support students in refining and improving work
- To support teachers with workload, with auto marking, and auto generation of learning material

Within OCR and across Cambridge University Press & Assessment we are developing a range of applications for generative AI. Some are still at an experimental stage, with the technology still very much in its infancy. Others, like those in English language learning, build on decades of AI and machine learning application. We are continually developing key principles and practices to govern robust and ethical deployment of AI, and have published some on AI and assessment,[125] and the use of AI in academic research publishing.[126] Schools, teachers and students face practical questions that can impact on access, equity and integrity. In a previous chapter we touched on the use of AI in Non-Exam Assessment and argued that rather than asking students whether they have used AI we should be asking them *how* they used it.

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123 Education Estonia. (n.d.). *Digital competence: teaching 21st-century skills. Retrieved August 19, 2024*, from https://www.educationestonia.org/digital-competence

124 Dyer, K. (2024, February 29). 75 digital tools and apps teachers can use to support formative assessment in the classroom. *NWEA Blog*. https://www.nwea.org/blog/2024/75-digital-tools-apps-teachers-use-to-support-classroom-formative-assessment

125 Cambridge University Press & Assessment. (2023, March 27). *The Cambridge approach to generative AI and assessment*. https://www.cambridge.org/news-and-insights/news/The-Cambridge-approach-to-generative-AI-and-assessment

126 Cambridge University Press & Assessment. (2023, March 14). *Cambridge launches AI research ethics policy*. https://acquiabigstaging.cambridgedev.org/news-and-insights/news/cambridge-launches-ai-research-ethics-policy

The potential for AI to develop assessments and 'mark' them is huge. However, care needs to be taken, especially in high-stakes examinations, and Ofqual has outlined its precautionary approach:

> *"Ofqual wrote to all awarding organisations in September 2023 to confirm that the use of AI as a sole marker of students' work does not comply with our regulations. Ofqual reached this view partly because such use does not meet requirements for a human based judgement to be used in marking decisions. But it is also our view – by virtue of taking a precautionary principle – that the potential for bias, inaccuracies and a lack of transparency in how marks are awarded could introduce unfairness into the system. This would be unacceptable in the marking process. There are opportunities for AI to complement and quality assure human marking, though further information and evidence will be needed to be assured the use of AI as a sole marker is appropriate in such a high stakes process."*[127]

Digital learning

The use of digital technology in the classroom to support learning is driving global changes – this has been called the "Fourth Industrial Revolution."[128] The use of education technology, or EdTech, is the application of technology to support teaching. Research reported by the Department for Education (DfE)[129] found that during the pandemic "64 percent of schools introduced, increased or upgraded their technology, with 80 percent of schools using either new tools or a mix of new and old." EdTech can involve tools and platforms that include AI-powered learning environments, augmented and virtual reality, and automated and adaptive learning platforms to support formative and summative assessment. Digital learning is any type of learning that includes digital technology and can include online learning, E-learning and blended learning (a mixture of face-to-face teaching and online learning). A particular and common application of digital learning is in the use of 'assessment for learning'.

The wider potential uses of digital assessment and learning – a new world awaits

Some digital approaches to assessment, including assessment for learning

There are many digital tools available that claim to support assessment, learning and assessment for learning. An analysis of these tools gives us an inkling of some of the wider potential of new technology to enhance and transform traditional approaches. They are not all new in themselves, but they are powered by increasingly intelligent technology. Here are some examples:

The capture and curation of student performance through video, audio and textual media

> *"[Digital approaches enable] new forms of representing knowledge and skills. The rapid expansion in the available media and modalities that digital technologies offer include text, image, video, audio, data visualisations and haptics (touch). Such new tools provide opportunities for new forms of representation and the use of multiple modalities to demonstrate achievement."*

This allows the creation and storage of portfolios of evidence or records of achievement in a curated way which can be subject-specific or drawn from across the whole curriculum. There are tools which allow teachers to provide feedback and grade performance against set criteria and, increasingly opportunities for AI to set and assess tasks are apparent.

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127 Ofqual. (2024, April 24). *Ofqual's approach to regulating the use of artificial intelligence in the qualifications sector*. GOV.UK. https://www.gov.uk/government/publications/ofquals-approach-to-regulating-the-use-of-artificial-intelligence-in-the-qualifications-sector

128 Department for Business, Energy and Industrial Strategy. (2019, June). *Regulation for the Fourth Industrial Revolution*. GOV.UK. https://www.gov.uk/government/publications/regulation-for-the-fourth-industrial-revolution/regulation-for-the-fourth-industrial-revolution
Schwab, K. (2016). *The Fourth Industrial Revolution: what it means and how to respond*. World Economic Forum.

129 Department for Education. (2022, November 24). *Education technology for remote teaching*, p2. GOV.UK. https://www.gov.uk/government/publications/education-technology-for-remote-teaching

On-screen tests and bite-sized achievements

From quizzes to more formal approaches, there are a wide range of assessments already available which give students opportunities to test themselves and provide teachers with opportunities to see how their students are progressing. Notable features of these approaches are that they bring together learning and assessment – the student completes some reading and then takes a test – and that they often cover a single topic within a much broader subject.

The provision of immediate and detailed feedback

Many on-screen tests provide immediate results together with a breakdown of areas of strength and weakness. Such tests can often be taken multiple times and support students in developing skills and retaining knowledge. The effect is often motivational, demonstrating and rewarding progress.

Adaptive testing

> *"computer adaptive test (CAT) is an assessment administered on a computer that matches the difficulty level of each question or item to the ability level of the candidate. CATs have potential benefits over conventional fixed-form assessment, whether delivered via pen and paper or in an on-screen format."*

There are already examples of the use of adaptive testing in mainstream assessments, including some of the examples included above. Adaptive testing has many benefits and could be used, for example to address some of the problems associated with tiered exams at GCSE.

Anytime, anywhere

Learning activities and assessments can be taken at any time and in any setting, including at home.

Micro-credentialling

> *"Micro-credentials, sometimes referred to as digital badges, take an idea long used by scouts, guides and other informal youth organisations and bring it into the digital age. Aspects of a larger concept, such as a disposition, are reduced to a small number of skills and 'badged' up to enable students to acquire credential in bite sizes."*
>
> *"The badge system is an alternative accreditation system that uses communities to validate the skills and knowledge of its members who are then awarded virtual badges (or online visual icons) that recognise skills or achievements. Mozilla is developing an Open Badges Infrastructure."*

This points to the opportunities for capturing achievements that sit outside more knowledge-based domains, and the potential to collect badges that can be accumulated to demonstrate a wide range of achievements.

Gamification

> *"Gamification of education is a strategy for increasing engagement by incorporating game elements into an educational environment. The goal is to generate levels of involvement equal to what games can usually produce. The main goals of gamification are to enhance certain abilities, introduce objectives that give learning a purpose, engage students, optimize learning, support behaviour change, and socialize."*[130]

Gamification is not usually associated with high-stakes assessment but some of its features, particularly in relation to simulations and immersive environments, are likely to have an impact

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130 Smiderle, R., Rigo, S. J., Marques, L. B. et al. (2020). The impact of gamification on students' learning, engagement and behavior based on their personality traits. *Smart Learning Environments, 7*(3) https://doi.org/10.1186/s40561-019-0098-x

on future developments in digital assessments. There is a link in approaches between the use of scores and levels in some games and the use of marks, grades and levels in assessment.

Simulations and immersive environments

This can cover a wide range of applications from the assessment of complex problem solving through to assessing dexterity in practical tasks. Examples could include a virtual geography fieldtrip or conducting a science experiment. The application of virtual or extended reality to assessment is very appealing. However, apart from the development costs, there are technical assessment considerations as brought out in a Cambridge paper on the use of extended reality (XR) in the assessment of maths:

> *"While XR offers immersive and interactive experiences, there is a risk of overstimulation or distraction, as test-takers might focus more on the novelty of the technology rather than the mathematical topics and skills being assessed. Against this background, it is important to ensure content validity, which could be achieved if assessment items are well aligned with both the subject matter and the required cognitive skills. Therefore, it is crucial to balance the technical engagement with educational objectives when adopting XR technologies in mathematics assessment."*[131]

The same paper also observes that some students may experience motion sickness!

Crowd sourcing, use of big data and question validation

This covers a wide range of applications. Digital technologies offer ways of combining different datasets at both local and national levels allowing for the analysis and comparison of achievements across designated cohorts to assist with judgements about relative performance. Also, many teachers and others can contribute questions of their own making which can then be used with a wider range of students in a low-stakes approach to test their validity and reliability. An example of this is Cambridge's **Project Quantum**:

> *"Teachers will be able to direct pupils to specific quizzes and their pupils' responses can be analysed to inform future teaching. Teachers can write questions themselves and can create quizzes using their own questions or questions drawn from the question bank. A significant outcome is the crowd-sourced quality-checked question bank itself, and the subsequent anonymised analysis of the pupils' responses to identify common misconceptions."*[132]

The new world of digital learning

Although assessment opportunities are never far away, there are many activities where the use of technology can enhance and organise the learning experience.

Adaptive learning

Just as adaptive testing can tailor the questions it asks of a student according to their performance on previous questions, an adaptive learning platform can provide tailored resources, reading, suggested activities and quizzes that are pitched at the appropriate level for the student. This can effectively integrate assessment and learning. This is linked to further potential of technology to curate and provide packages of resources in many formats.

Simulations and immersive environments

These can be used to turn learning into experiences, with huge potential for interactive activities bringing to life all manner of subjects from history (e.g. visit a battlefield) to science (conduct a very lively experiment) and geography (visit that oxbow lake!).

Collaborative learning platforms

Teachers and students, and if desired appropriate other experts, enthusiasts, parents, grandparents… can join in and support each other in collaborative projects, sharing of knowledge and big problem solving – all in an inclusive and interactive way. Such platforms

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131 Li, X. (2024). Extended Reality (XR) in mathematics assessment: A pedagogical vision. *Research Matters: A Cambridge University Press & Assessment publication, 37*, 6–23. https://doi.org/10.17863/CAM.106031

132 Computing at School. (2023, January 25). *Project Quantum: tests worth teaching to*. https://www.computingatschool.org.uk/resources/2016/april/project-quantum-tests-worth-teaching-to

break down the need for proximity and can provide access to tutors and experts from almost anywhere and open up collaborative activities with, say, a network of local schools, a national employer, or a school in a different part of the world. Nor are there many limits on the number of participants – other than in relation to online safety – and crowd sourcing might be used to solve a particularly tricky problem.

Large Language Model platforms

Notwithstanding all the caveats about authenticity of work, copyright, biases and inaccuracies, students do use AI and it provides them with summaries and explanations at the drop of a hat. Teachers use AI, too as a new and exciting support for designing lesson plans and even marking low-stakes tests. AI is here to stay and with the right practice and policies it can be a powerful force for good.

This report has identified many areas of change where teachers and school leaders would benefit from **professional development** and support. It is important to remember that all of these forms of digital learning aren't just for students.

An article published to promote this autumn's EdTech World Forum 2024 sets out what it describes as the Top 10 EdTech Startups in London UK. We have provided a sample of them below, not by way of endorsement – we have not evaluated them in any way – but to illustrate the range of tools and functions on offer.

From the Top 10 EdTech Startups in London UK in 2024: Driving Innovation with Educational Technology Solutions[133]

Satchel, formerly known as Show My Homework, is a leading EdTech startup providing digital solutions for school management and communication.

TeachPitch is an AI-powered learning platform that connects educators with curated educational resources and professional development opportunities.

MEL Science combines physical science kits with virtual reality (VR) experiences to make science education engaging and immersive.

Firefly Learning offers a comprehensive digital learning platform designed to enhance collaboration and communication in schools.

Tute offers online tutoring services connecting students with qualified tutors for personalized learning experiences.

Sparx utilizes AI to deliver personalized math learning experiences, providing students with targeted exercises and tutorials.

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133 EdTech News. (2024, April 20). *Top 10 EdTech Startups in London UK in 2024: Driving Innovation with Educational Technology Solutions*. https://edtechconferences.london/top-10-edtech-startups-in-london-uk-in-2024-driving-innovation-with-educational-technology-solutions

Readiness of the sector – is it ready for change and does it want it?

> "The future is already here - it is just not evenly distributed."
>
> **William Gibson**

Much attention has been paid to the pace at which schools and colleges are adopting technology in all its forms. There is a general consensus that the use of technology by schools has increased vastly in recent years and continues to do so. There remain concerns that it is patchy, with some schools far in advance of others, along with concerns as to whether the required resources and infrastructures are always available. Wider issues such as cyber security, ethical use of data and staff training also need consideration.

The DfE published a survey on the use of technology in schools[134] which found that:

> *"In terms of supporting teaching and learning, technology was most commonly being used to support homework and collaborative learning (90% and 80% of teachers involved in these activities said they used technology to some extent for these tasks).*
>
> *Leaders were using technology across the range of their school management activities. For example, almost all leaders across primary and secondary schools alike reported that they used technology for pupil / student data management (99%), parental / carer engagement (99%), communication with and delivery of governance and financial management (95%).*
>
> *Overall, technology was used to a wider extent to support school management activities in secondary schools compared with primary schools, in particular for timetabling (100% of secondaries compared with 65% of primaries)."*

However, it went on to say that:

> *"In contrast, education technology was rated less well in terms of supporting formative assessments, summative assessments or supporting pupils with SEND ([special educational needs and disabilities)."*

A House of Lords review of technology in schools stated:

> *"Technology was least used for both formative and summative assessments, though with summative assessments this is not surprising as paper-based exams and tests remain the norm in schools."* [135]

Figure 12 below shows the comparative amount of investment schools claim they are making in the use of technology:[136]

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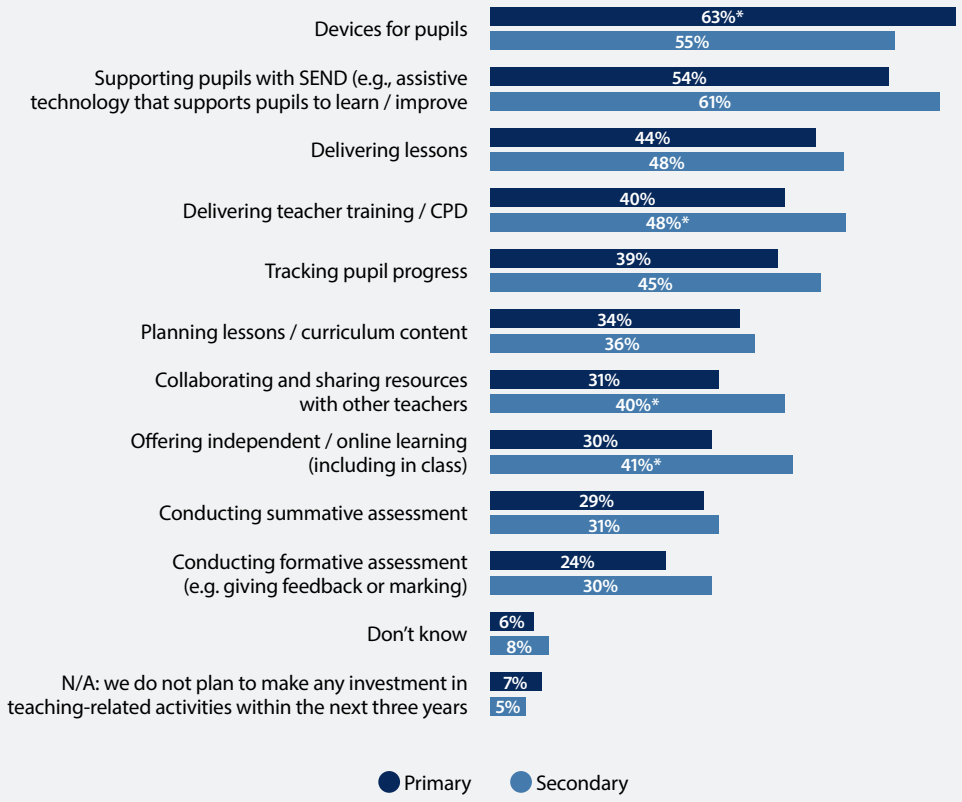
134 Department for Education. (2023, November 28). *Technology in schools survey report: 2022 to 2023*. GOV.UK. https://www.gov.uk/government/publications/technology-in-schools-survey-report-2022-to-2023

135 Tobin, J. (2023, November 20). *Educational technology: Digital innovation and AI in schools*. UK Parliament. https://lordslibrary.parliament.uk/educational-technology-digital-innovation-and-ai-in-schools/

136 IFF Research. (2023, November). *2022-23 Technology in Schools Survey*. Department for Education. https://assets.publishing.service.gov.uk/media/655f8b823d7741000d420114/Technology_in_schools_survey__2022_to_2023.pdf

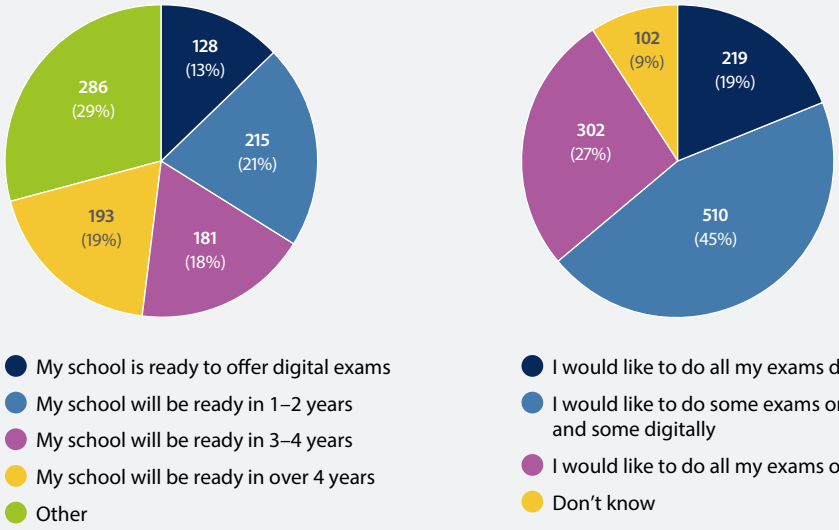
Figure 12: Where schools say they are investing in technology



F7B. Base: Primary leaders (n=526); Secondary leaders (n=244). *Indicates significant difference between primary and secondary. Other not charted as <5%. Source: Technology in Schools Survey 2023–24

In our own survey of over 1,000 teachers, only 13 percent felt their school was ready to adopt digital exams, with many suggesting it would take some years before they were able to do so:

Figure 13: Asking teachers (left) and students (right) whether they think their school is ready for digital exams



Source: 2024 OCR online survey of 1,074 teachers and 1,143 students aged between 16 and 22. Teachers were from a mixture of schools, year groups, and qualifications.

This patchy adoption of digital assessment highlights the importance of adopting a strategy of providing exams in both digital and paper formats for the medium term and for ensuring that there are no disadvantages facing students because they have sat the exam in one medium rather than the other. It does mean, however, that for as long as schools can access exams in paper format, there are understandable reasons why some schools may not choose to invest in the changes needed to make on-screen assessment available.

Demand from students

Demand for on-screen assessments from students could be a driving force but, as yet, the demand from students is also mixed, as our own survey suggests (see **figure 13).**

FutureLearn's[137] *The Future of Learning Report* states that, in ways, Generation Z is leading the way to the future of digital learning: 24 percent of them already use X (formerly Twitter) to educate themselves about environmental issues and 37 percent of them learn about diversity and inclusion on Instagram. Thirty percent of Gen Z also said that their preferred form of education technology is augmented reality – something not quite accessible in every school in the UK at the moment but some schools are already using this as a new way of catching the interest and engagement of their students.

But when we consider the interests of young people we must remember that not all of them have access to the latest technology and its increased use can exacerbate digital poverty gaps. And, sometimes we overestimate the digital competencies of young people. As a contributor to one of the roundtable discussions we held as part of this review said:

> *"We expect young people to be good at technology but that may not extend beyond using their phones. Skills are accidental rather than professional. We need to caution a little bit about how many of our pupils are digital natives, we bandy that around but it hides a lot of different skills and different approaches and different attitudes towards digital knowledge and digital skills."*

Conclusions

We found it extremely difficult to evaluate the extent to which schools are embracing digital assessment and learning. The DfE's Technology in Schools survey quoted above indicates that schools are investing heavily in technology, although less so in digital assessment and progress is being made. The promoters of the EdTech industry say the UK is leading the way and that schools are a hotbed of innovation. Some of the individual schools and teachers we spoke to were less optimistic but there are certainly schools out there doing remarkable things with EdTech. We tentatively conclude that it is a mixed picture and while it is certainly true that we are blessed with innovative and forward-looking schools, not everyone is going at the same speed.

In the interests of equity for students it will be necessary to ensure that some schools don't get left behind. Many teachers lack confidence in new technology and will need support and development if they are to engage with new approaches. We note that some larger schools and colleges are employing digital coaches to support teachers in engaging with EdTech.[138]

What we also observe is that while exam boards are moving cautiously to phase in on-screen assessments still to be run in tandem with pen and paper versions in a heavily regulated environment, the wider applications of assessment and learning are moving at a pace with new products and innovations coming into a free market.

It is possible that at some point the traditional end-of-year exam will be replaced, or at least supplemented, by taken-when-ready digital tests. Modularisation seems an inevitable feature of such a transformation.

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137 FutureLearn. (2022). *The Future of Learning Report 2022*. https://cdn-wordpress-info.futurelearn.com/info/wp-content/uploads/The-Future-of-Learning-Report-2022.pdf

138 Ellis, F. (2024, May 14). *Digital coaching: helping teachers make the most of edtech*. TES Magazine. https://www.tes.com/magazine/analysis/general/digital-coaching-help-teachers-benefit-edtech-learning-artificial-intelligence

If we are to see genuine innovation in our exams system to support curriculum change, the exams regulator, Ofqual, will need to provide clarity for awarding organisations on acceptable approaches to digital and non-digital piloting and innovation. Ofqual has already recognised the need to review regulation to enable digital innovation and has engaged with awarding organisations about this. However, clear regulation and guidance around innovation is needed to balance a range of factors around readiness, fairness, equality of access and maintenance of standards. This requires:

(a) a clear policy landscape around curriculum change and

(b) clarity of funding that will be available to upskill teachers and improve school and college infrastructure. It is critical that approaches to innovation are joined up across government, Ofqual and awarding organisations.

In contrast, in that parallel unregulated world of EdTech a thousand flowers are being left to bloom or wither as the market decides. Many huge benefits can accrue from such a model, but there is an unease that the best solutions won't always be the most successful and that the spending of public money and trying out of new approaches needs to be more co-ordinated.

We also need to be clear about the reasons for adopting digital technology. Ultimately we need to be clear about how it supports learning and the ultimate test should be evidence of improved learning outcomes. It can also provide a better learning experience and better access to learning for some and it can be used to make teaching and the organisation of it less efficient.

The role of government and the regulator in ensuring that our schools are supported with a framework of principles and rules for the development and rollout of digital assessment and learning is open for debate. But currently things seem a little out of balance.

Many years ago there was an organisation, set up by government, called Becta (originally known as the British Educational Communications and Technology Agency). Foremost among the Becta strategic objectives were "to influence strategic direction and development of national education policy to best take advantage of technology" and "to develop a national digital infrastructure and resources strategy leading to greater national coherence."[139] It fell victim to a bonfire of quangos in 2008, but we have been struck by the fondness with which so many in the sector recall it. The creation of another quango may not be the answer, but at the very least we believe there is a need for these objectives to be revived.

Recommendations

We have only two recommendations at the end of this chapter but they are substantial and vital to how England's EdTech infrastructure develops:

- Government should ensure there are mechanisms in place to:
  - **Influence strategic direction and development of national education policy to best take advantage of technology**
  - **Develop a national digital infrastructure and resources strategy leading to greater national coherence**

- The exams regulator, Ofqual, must work with awarding organisations, schools and government to **develop a clear framework in which the trialling of new digital approaches to formal assessment is encouraged**.

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139 Becta - About Becta - Strategic objectives (archive.org)

Evolving the curriculum

The curriculum is in need of some change. In this chapter we identify some of the change required including a lack of balance in subjects covered and some glaring omissions such as the urgent requirement to address the lack of systematic climate change education. We go on to discuss how change might be brought about, arguing for an incremental approach and that there is a need for mechanisms to ensure the oversight and maintenance of the curriculum and its relationship with assessment.

The decline or absence of some subjects

Some subjects are in serious decline

There is particular concern about the creative subjects, but there are other subjects which struggle to find enough space in the curriculum such as many vocational subjects, physical education (PE) and citizenship.

Another important aspect of the evolution of the curriculum is the teaching of religion and belief in schools. This remains a statutory requirement often honoured, outside faith schools, in the breach rather than the observance. The subject is beyond the scope of this report but we draw attention to the report *A New Settlement Revised: Religion and Belief in Schools* published by Charles Clarke and Professor Linda Woodhead after widespread consultation, which suggests that the subject should be renamed 'Religion, Belief and Values' and that the current process for determining the religious education (RE) curriculum should be reformed.[140]

Here are a few headlines:

Design and technology take-up has halved in a decade
"Think tank warns subject will continue to decline if ministers don't take action to encourage take-up."[141]

Cultural Learning Alliance highlights long-term falls in music exam entries, teacher recruitment and extra-curricular engagement
"Data gathered by the Cultural Learning Alliance has identified that 42% of state-funded schools in England 'no longer enter any pupils for Music GCSE.'"[142]

Citizenship
"The decline in citizenship education has a number of causes: the revision of the national curriculum in 2013, the fact that academies are in any case not required to follow it, the low esteem in which the subject appears to be held, the decrease in the numbers of trained teachers and the corresponding fall in the numbers taking citizenship GCSE."[143]

Importance of the arts
"On top of the obvious development of individual creativity and self-expression, the arts can increase young people's confidence and motivation which in turn improves well-being and school

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140 Clarke, C., & Woodhead, L. (2018). *A New Settlement Revised: Religion and Belief in Schools*. Westminster Faith Debates. https://d3hgrlq6yacptf.cloudfront.net/615b4ef7da3cc/content/pages/documents/re-newsetrevised-pdf-2018.pdf

141 Whittaker, F. (2022, March 23). *Design and technology take-up has halved in a decade*. Schools Week. https://schoolsweek.co.uk/design-and-technology-take-up-has-halved-in-a-decade/

142 Tobin, J. (2023, September 1). *Teaching citizenship and life skills in schools*. UK Parliament. https://lordslibrary.parliament.uk/teaching-citizenship-and-life-skills-in-schools/#heading-1

143 Tobin, J. (2023, September 1). *Teaching citizenship and life skills in schools*. UK Parliament. https://lordslibrary.parliament.uk/teaching-citizenship-and-life-skills-in-schools/#heading-1
Citizenship education is included in the national curriculum for secondary schools in England (and therefore compulsory in maintained schools) and forms part of a non-statutory framework in primary schools. Skills such as financial capability are also delivered through non-statutory personal, social, health and economic education. However, there have been several calls to strengthen citizenship and life skills education in schools, including from two recent parliamentary inquiries.

attendance. Hands-on learning is enjoyable and engaging, helping students learn through experimentation and making mistakes."[144]

The impact on wider activities and enrichment

Schools need to have the capacity and the time to deliver extracurricular and enrichment activities as well as providing opportunities within their subject-specific studies. These could include taking part in practical activities such as school trips, sport, science experiments, computer clubs or engaging in meaningful work experience. This requires resource and capacity and equal access for all, but it also requires freeing up formal study time and reducing the number of exams.

Learning outside the classroom in natural environments

High-quality learning outside the classroom in natural environments can deliver a very wide range of outcomes and co-benefits that support teaching and learning.Council for Learning Outside The Classroom

Fall in number of hours of PE

"Fewer than half of children in the UK currently meet 60 minutes a day of moderate to vigorous physical activity which is the Chief Medical Officers' minimum recommended level. This is contributing to a nation where too many children are missing out, have poor wellbeing and lack a sense of belonging. The evidence is clear; unhappy and unhealthy children do not learn and just this week we are seeing proof of this as high levels of persistent absence and mental ill health have been cited as undermining pupils' GCSE results."
Ali Oliver MBE, Chief Executive of the Youth Sport Trust
https://www.youthsporttrust.org/news-listings/news/fall-in-number-of-hours-of-pe

The impact on take-up of vocational qualifications and why these qualifications are important

Vocational qualifications bring something important to Key Stage 4 learning; they offer something different and are rich in providing relevant and practical experiences and learning beyond the narrowly academic while remaining challenging and rigorous. We believe the take- up of these has been constrained by the dominance of what is regarded as the core curriculum. In Appendix 4 we offer an overview of some of the benefits of OCR's Cambridge National vocational qualifications. Other vocational qualifications are available with similar features and benefits.

The impact of accountability measures on subject choices

A decline in the study of some subjects is often blamed on the impact of accountability measures which incentivise schools to take a range of specified subjects (the EBacc subjects). Secondary schools are measured on the number of pupils that take these core subjects and on how well their pupils do in these subjects. The core subjects are:

- English language and literature
- Maths
- Chemistry, biology and physics
- Geography or history
- A language

Depending on whether a student takes single sciences or combined science, they are likely to take either seven or eight EBacc subjects at GCSE. Schools are not mandated to make all students take the full range of EBacc subjects but accountability measures provide a very strong incentive for schools to deliver these subjects to as many students as possible.

We have provided some data in Appendix 2 of this report which shows some of the impact of accountability measures on subject choice.

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144 Arts Award. (n.d.). *The importance of arts education for students and how to get your subject noticed*. Trinity College London. Retrieved August 19, 2024, from https://learn.artsaward.org.uk/importance-arts-education

The reasons for incentivising the EBacc subjects are sound enough. The DfE explains that the EBacc is a set of subjects at GCSE that keeps young people's options open for further study and future careers.[145] Research suggests that studying subjects included in the EBacc provides students with greater opportunities[146] and contributes to narrowing the attainment gap.[147]

A decline in some wider subjects may, therefore, be an unintended consequence of the EBacc, but the dominance of the EBacc subjects shows that the policy intention of using an accountability measure to prioritise a preferred bundle of qualifications works. Performance measures are a powerfully effective and low-cost tool that governments can use to drive the uptake of whichever subjects they choose to prioritise.

But it is a tool that must be used wisely and sparingly as there are always unintended consequences. For example, adding a new group of qualifications in, say, creative subjects to the EBacc could result in students being given a fixed menu with little opportunity to go à la carte. Effectively, schools would require them to study *nothing but* EBacc subjects. There would be little option to take statistics, citizenship studies or a vocational qualification and take-up of these subjects could dwindle further as a result.[148]

Moreover, if the state is to determine what subjects are to be studied, and there are good arguments for this, there has to be a quid pro quo. The **subjects available must be engaging, and not too content-heavy**; there must be **variety in approaches, relevance, and opportunities** to take part in a full range of activities. There must be enough in the curriculum to serve everyone and enough reasons for all students, each with their differing abilities and interests, to engage with their schooling.

Finally, we must acknowledge the widespread resentment we encountered towards the current approach to school accountability measures. School leaders and teachers alike often expressed a strong feeling that the emphasis was on punitive measures, that the measures undermined professional autonomy, skewed the allocation of resources in unhelpful ways, drove too much emphasis on exam results, and generated inordinate levels of stress.

Are young people studying too many subjects?

When considering what we mean by a broad curriculum, we also need to reflect on what is the optimal number of subjects most students should be studying. What really struck us from our survey of young people was the number of subjects they wanted to study. When asked if they thought taking nine subjects was excessive or not, they largely said it was about right; a significant proportion told us that they wanted to take even more. Yet these were the same students who told us they were bogged down with too many exams and far too many things to learn. What they were telling us was that they didn't want to solve the problem of the burden of assessment and too much content by studying fewer subjects. Far from it. They wanted variety and were hungry to study lots of different subjects. What they didn't want was quite so much to learn within *individual* subjects.

They strongly resisted the idea of only studying EBacc subjects, and at a time when absenteeism is rising retaining limited choice would be ill-advised. Young people want more choices, and we need to have something for everybody so that all young people have opportunities within the curriculum that play to their interests and strengths, and which they see as relevant to the world they live in.

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145 Department for Education. (2019). English Baccalaureate (EBacc). GOV.UK. https://www.gov.uk/government/publications/english-baccalaureate-ebacc/english-baccalaureate-ebacc

146 Anders, J., Henderson, M., Moulton, V., & Sullivan, A. (2017). *Incentivising specific combinations of subjects: does it make any difference to university access?* Centre for Longitudinal Studies Working paper 2017/11. UCL Institute of Education. https://cls.ucl.ac.uk/wp-content/uploads/2017/09/CLS-WP-201711-Incentivising-specific-combinations-of-subjects-does-it-make-any-difference-to-university-access.pdf

147 Burgess, S., & Thomson, D. (2019). *Making the Grade*. Sutton Trust. https://www.suttontrust.com/our-research/making-the-grade/

148 For more on this see :AQi. (2024, January 18). Progress 8 – How much can it flex? *AQi Blog*. https://www.aqi.org.uk/blogs/progress-8-how-much-can-it-flex

The importance of breadth in supporting SEND students

Breadth is important for all students, especially those with identified special educational needsand disabilities (SEND). As ASCL puts it:

> *"Too often, and for too long, decisions about curriculum and assessment have been made without these pupils in mind. Any changes must be as inclusive as possible. For example, there is evidence that the curriculum is often narrower for pupils with SEND or for those who have lower levels of literacy and numeracy. Broad provision for all children must be funded by government, beyond the urgent priority to bridge the gap between current higher needs funding levels and current need."*

Competencies, values and behaviours in the curriculum – the teaching and assessment of 'skills'

Any conversation about broadening the curriculum invariably leads to a consideration of the place of 'skills' in the curriculum. This is both complex and contentious and this report does not claim to have definitive answers, but there are things we can learn from past and present initiatives, numerous reports and discussions that we wanted to capture. We have provided this in Appendix 3 of this report, along with some tentative conclusions and some exemplar skills frameworks.

Two glaring omissions

This report does not set out to identify everything that should be contained in a modern, relevant curriculum but we have chosen to highlight two glaring omissions. A modern curriculum should be one that:

- Reflects the biggest existential threat of our age – **climate change**[149]
- Systematically develops **digital competencies**

Digital literacy

Many students cease all study of computing at the end of Key Stage 3 and leave school with no recognition of their digital literacy.

> *"A 2017 report by the Royal Society highlighted that 1 hour a week of computing teaching was not adequate to teach the key stage 3 curriculum. A recent report using government census data showed that the amount of curriculum time allocated to computing in key stage 3 fell from an hour to just over 45 minutes between 2012 and 2017. The same report suggested that pupils in key stage 4 who are not studying a computing qualification receive little timetabled computing education. These findings suggest that not all pupils are receiving sufficient curriculum time to learn the computing subject content set out in the national curriculum."*[150.]

It is a myth that, as 'digital natives' young people are adept in all uses of digital technology. This is not the case:

> *"The need for digital skills is not lost on young people, 88% realise that their digital skills will be essential for their careers. However, nearly 75% of young people do not feel they have the digital skills that they need to thrive."*

The use of digital technology isn't just about technical skills – young people need support in the ethical use of technology, how to use it safely and securely, and how to discern bias and inaccurate information.

In a discussion document, the British Computer Society has proposed the following definition of digital literacy:

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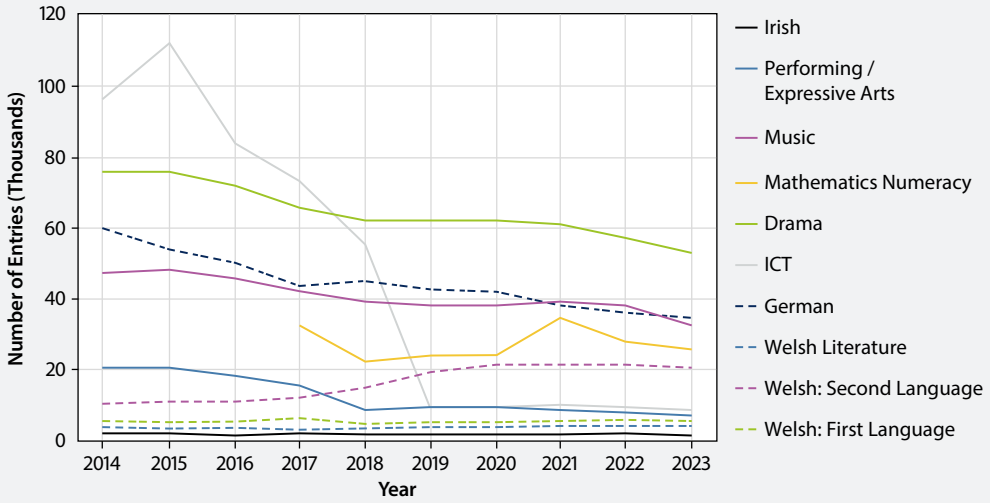
149 We had chosen to highlight these areas long before the House of Lords Education for 11–16 Year Olds Committee report was published, but we were reassured to find that they had identified the self-same areas as a priority. UK Parliament. (n.d.). *Education for 11-16 Year Olds Committee*. Retrieved August 19, 2024, from https://committees.parliament.uk/committee/647/education-for-1116-year-olds-committee

150 Ofsted. (2022, May 16). *Research review series: computing*. GOV.UK. https://www.gov.uk/government/publications/research-review-series-computing/research-review-series-computing

"Digital literacy encompasses the knowledge, skills and attitudes that underpin the ability to:
- *make confident, creative, and effective use of technologies and systems, and*
- *make well-informed critical judgements about the implications and impact of how digital technology is used. It equips them to thrive across successive waves of technology reducing retraining costs."*[151]

Currently there are few up-to-date, contemporary qualifications for 11–16 year olds which embrace the broader use of digital technology. There is a strong case, therefore, to create a GCSE in Digital Literacy to signal and establish its importance in the curriculum and to ensure that young people reach 16 with the digital literacy they need for life, work and further study.

Figure 14: Top GCSE full course subject decreases, 2023



Climate change education

Climate change is the biggest existential threat to the planet we face and, as such, we would expect to see a curriculum that supports young people in understanding the science behind it, the political dilemmas involved, and the role they can play as citizens and as the employees and academics of the future.

Climate education matters in tackling the climate crisis because it:
- Helps people understand the root causes and consequences of climate change
- Shifts behaviour and attitudes towards more sustainable lifestyles; it not only enables shifts in those receiving that education but also the families and communities around those in education
- Builds the knowledge, competencies and skills necessary to adapt and innovate to save our planet, transforming economies, and improving health and security
- Benefits vulnerable groups that are disproportionately affected by climate change
- Gives young people a sense of hope and agency in relation to tackling climate change

Furthermore, we need to establish in young people foundational science knowledge and understanding, build the critical and evaluative skills for students to engage with emerging new knowledge and thinking, and enable them to challenge unsustainable ways of thinking. Climate change education is not an explicit part of the curriculum or assessment. The thorough and methodical analysis by Teach the Future of GCSE Science and Geography exam papers illustrates this:

151 BCS. (2023, January). *Discussion paper: Digital literacy for all.* https://www.bcs.org/media/10255/digital-literacy-for-all-discussion-paper.pdf

> *"Depending on the exam board and tier, it would be possible for a student to have sat an entire set of science qualifications without having to have answered more than one question on climate change, sustainability or the environment."*[152]

This doesn't have to be the case. Extensive work has been carried out to map opportunities for teaching climate change to the existing national curriculum and associated examinations. A synthesis of all these mappings is presented in the impressive and expert work of a National Climate Education Action Plan Group (NCEAP) report.[153] It shows there are ample opportunities to teach and assess climate change education throughout the curriculum. The formal assessment of climate change topics must be integrated within GCSEs and in vocational qualifications. The workforce of today and the future needs to be 'carbon literate'[154] at every level, as do all our citizens.

Schools are making progress in bringing climate education into the curriculum, with the support of a strong network of important and committed stakeholders. Young people are interested and engaged in climate change and sustainability issues – Teach the Future,[155] a campaign group powered by young people, has made this very clear. What has been lacking is leadership at governmental level to drive forward the implementation of climate change education with the absolute urgency it needs.

There is much more that needs to be said about the importance of climate education. We have expanded on some of this and provided some recommendations in Appendix 5.

Supporting a more inclusive curriculum

There is a fundamental duty to ensure that curriculum content and how it is presented to young people is inclusive and relevant to them regardless of their gender, ethnicity, sexuality, disability, neurodivergence, or socioeconomic background. All of the curriculum should be rich with relevant content that speaks directly to students. There are ways in which the curriculum reflects biases in society as a whole by using texts, contexts and role models that lack diversity. But steps can and are being taken to create more inclusive curriculum materials and assessments. These include the Stemettes movement[156] to promote the take-up of science subjects by girls, and the 'Visualise'[157] initiative by the Runnymede Trust to improve the representation of Black, Asian and ethnically diverse artists in teaching and assessment.

There are strong legislative frameworks and codes of practice in place that support equality, and the qualifications regulator, Ofqual, as a public body, is required under the Equality Act 2010 to meet the Public Sector Equality Duty. This means it must give due regard to "the need to eliminate discrimination, advance equality of opportunity and foster good relations between those who share a relevant protected characteristic and those who do not."[158] Ofqual has consulted on and produced guidance to support its regulatory requirement, Condition D2, Accessible Qualifications.[159] We do not advocate further legislation but would be interested in

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152 Teach the Future. (2023, May 15). *Failing the climate test: exam boards and the climate emergency*. https://www.teachthefuture.uk/blog/failing-the-climate-test-exam-boards-and-the-climate-emergency

153 Knight, S., & McQuaid, S. (n.d.). *Climate Education in the Curriculum: From Early Years to Further Education in England*. University of Reading. https://static.reading.ac.uk/content/PDFs/files/Planet/climate-education-in-curriculum.pdf

154 Carbon Literacy®: "An awareness of the carbon costs and impacts of everyday activities, and the ability and motivation to reduce emissions, on an individual, community and organisational basis."The Carbon Literacy Trust. https://carbonliteracy.com

155 Teach the Future website: https://www.teachthefuture.uk

156 Stemettes website: https://stemettes.org To see how OCR has supported this initiative with resources about diverse role models, see Davies, A. (2023). *STEM Contributors resource – recommendations and ideas for users*. https://www.ocr.org.uk/blog/stem-contributors-resource-recommendations-and-ideas-for-users

157 Begum, S., Wylie, M., Anwari, H., & Hood, S. (n.d.). *Visualise: Race & Inclusion in Secondary Schools Art Education*. Runnymede Trust & Freelands Foundation. http://www.runnymedetrust.org/visualise

158 Ofqual. (2023, March 27). *Equality Objectives 2023 to 2025*. GOV.UK. https://www.gov.uk/government/publications/equality-objectives-2023-to-2025

159 Ofqual. (2021, November 1). *Consultation on designing and developing accessible assessments*. GOV.UK. https://www.gov.uk/government/consultations/consultation-on-designing-and-developing-accessible-assessments

what strategies those tasked with any curriculum review would adopt to ensure equality is a core consideration when meeting these duties.

Keeping assessment and the curriculum under review

Almost nothing has been done to the content and design of existing GCSEs since the last reforms were introduced in 2015. This is concerning, partly because any assumption that the changes could be right first time in every aspect seems optimistic, but also, because there have been considerable changes in technology, the economy and society since then, while the curriculum has effectively stood still. It is fair to say that Covid may have stalled any plans for a review, but Covid itself has wrought changes on society, the way technology is used in education, contributed to 'lost learning', and had an impact on the attitudes of young people to attending school. All this means that the need to make some adjustments is overdue.

Many of the stakeholders we spoke to were impatient to see at least some changes. In particular, teachers wanted some respite from what they described as the treadmill of exam preparation and subject content overload. They wanted something done now to mitigate the burdens they faced and to stem the flow of people leaving the profession. They were wary of any 'Royal Commission' approach that would take years to report and might never be implemented.

At the same time people were not in favour of wholesale change – they felt there was neither the capacity nor the appetite for massive disruption in a sector already stretched to breaking point.

Change in education takes time. The process for developing a new GCSE, for example, requires: formal public consultation; a submission process for regulatory approval which often leads to further redesign and resubmission; and support materials, the qualification specification, and training being developed and made available at least one academic year before first teaching. Once an exam has been introduced, it takes two years of teaching the new qualification before the first exams are taken and results issued. None of this is conducive to speed.

Change can get bogged down in policy inertia and red tape. Our experience, along with other exam boards, is that even proposals for minor changes to existing, established subjects can take many months to get regulatory and government approval, sometimes years. All this stifles innovation and investment in change.

Also, the education system is vast, complex and interconnected. Making a change in one area, even a small one, can lead to unintended consequences: driving up standards in one subject can lead to a decline in another; resources required for training and CPD can take resources away from the classroom; if the requirements of one qualification are reduced piecemeal without similar changes being made to other qualifications, this can lead to perceptions or the reality of unfairness.

For all that, a system which is frozen in aspic is not desirable, **and nor is a system which can only be changed in one seismic shift where everything gets changed at once**. There are changes that teachers definitely have an appetite for and are crying out for – for example, English teachers want to see urgent changes to the English GCSE as a priority and history teachers have petitioned for a reduction in GCSE History content.[160]

And change can and does happen on occasion. Ofqual intervened so that the assessment of presentation skills in the English Language GCSE would no longer count towards the final GCSE grade, and steps were taken to require GCSE Drama students to attend at least one live performance. The use of formulae sheets as exam aids for science and maths exams was introduced in the wake of Covid and remains in place.

We have seen that qualification content can be updated – the DfE consulted on making changes to the Computer Science GCSE to reflect developments in digital technology

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160 UK Government and Parliament. (n.d.). *Petition: Reduce the content covered at GCSE History so that only 3 Units are studied.* https://petition.parliament.uk/archived/petitions/207664

including in relation to AI because: "The current computer science GCSE subject content was published by the Department for Education in January 2015, and since that time digital technology has moved on, meaning that some content is outdated."[161] The point here, is that when there is a will to do so, incremental change can and does happen.

The system is more resilient to change than we might think. The radical overhaul that was forced upon the system by Covid is not to be held up as any kind of exemplar, but, thanks largely to the gargantuan efforts of teachers and school leaders, students still got their grades and went on to progress to their next stages of study. When there was no choice but to make radical changes on an unprecedented scale because there was no other option, the system didn't fall apart. Planned, careful and incremental change should, in contrast, be far more manageable.

'Evolution not revolution' – changing content and assessment on an incremental basis

In an ideal world it may be better to redesign a curriculum from scratch, considering every moving part within it concurrently. However, almost everyone has told us they don't want wholesale change, but something more measured and incremental. A pragmatic approach would recognise that we have solid foundations, and we don't need to flatten the building and start over.

Changing subject content

Changing the curriculum doesn't necessarily require making changes to qualifications. Some of the examples we gave relating to initiatives such as the Runnymede Trust 'Visualise' project can bring important changes to the range of contexts in which a subject is taught. The NCEAP mapping of opportunities to teach climate change within existing subjects and topics has the potential to embed climate change education across the whole curriculum or within a limited number of key subjects. Much can be achieved by adapting support materials or through providing targeted professional development.

Changes can be made on a subject-by-subject basis to the content of GCSEs or other qualifications. These could include updating content, as we have already seen with computer science. They could be relatively minor, such as adjusting a specification to explicitly include climate change contexts and to ensure these are included in exam questions. When adding to a subject, care should be taken to do so by adapting the contexts of existing topics or in parallel with removing other content. As a principle, any reduction in content should not include a reduction in demand. Exam questions should present the same level of demand, sometimes in more depth, to retain the rigour and standards expected at Key Stage 4.

New subjects can be introduced to the curriculum through the creation of new qualifications. These can be elective – available to those who choose to study them, although it would be possible to incentivise their uptake if it were thought important that they were studied by the majority. Natural history and digital literacy are two potential examples of this.

Reducing the overall content and assessment of GCSEs may create some space in the curriculum for other things but it will be important not to fill it up with new qualifications and content to the extent that we end up placing an even greater load on an already stretched teacher workforce.

Keeping the curriculum down to size is a challenge that is not unique to England. An OECD report on curriculum overload provides a global perspective through an analysis of a wide range of countries.[162] It identifies and gives advice on how to spot when a curriculum is overloaded – the most obvious being the need to monitor the burden on teachers. It also provides insight into the most common curricular themes as reported by a wide range of jurisdictions.

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161 Department for Education. (2024). *GCSE Computer Science subject content update*. https://consult.education.gov.uk/computing-policy-team/gcse-computer-science-subject-content-update/supporting_documents/Proposed%20Computer%20Science%20GCSE%20subject%20content%20Government%20Consultation.pdf

162 OECD. (2020). *Curriculum Overload: A Way Forward*. https://doi.org/10.1787/3081ceca-en

Changing assessment
We have made the case repeatedly that there is too much content in most GCSE subjects. This varies between subjects, and all subjects are different in their nature and should be treated accordingly, but we think a general review of the curriculum should include plans for reducing content from almost all subjects. There are good arguments for wanting to make these changes in one go, but there are subjects where the need to reduce content is more urgent than others. In our chapter on mathematics, we looked at some of the approaches needed when agreeing what to keep and what to remove. As one of the functions of GCSEs is to provide progression to A Level, it is necessary to reference A Level content when making changes to a GCSE and to consider any implications at Key Stage 3 and below.

The case for **reducing the exam 'burden' in England** has been made. Some changes to GCSE content can be made without changing the volume or approach to assessment. We have shown that there is potential to reduce exam time without reducing content but concluded it would be better to reduce content at the same time as reducing the volume of exams. The positive gains would be greater, and the disruption, in the medium term, less.

If the introduction of greater use of **exam aids**, such as open book or prerelease of materials were considered desirable, this could be done relatively easily as we have seen with the introduction of formulae sheets in maths and science.

The introduction of more fundamental changes to assessment models will take longer and require significant preparation.

We have outlined some of the benefits and drawbacks of **modularisation**. Previous approaches have tended to use a one size fits all approach – with all GCSE subjects being made either modular or linear, and with the same structure imposed on all. It is self-evident that this isn't necessary or desirable. Already we have vocational qualifications taken by students at Key Stage 4 which are modular in approach. There is no reason why modules should not be introduced for some subjects but not others, avoiding any big bang change for the whole system. Nor is it necessary to introduce 'pure' modularisation. For example, one assessment could be scheduled before the summer term, with the rest being taken within the usual summer series – some history teachers expressed an interest in this approach.

The use of **Non-Exam Assessment (NEA)**, including coursework and teacher assessment, offers significant benefits but comes with equally significant challenges. We have already argued for a significant rethink of the constructs that underpin NEA. We do not advocate any rush to increase the use of NEA until this work has been completed. The rethinking of NEA should be something that exam boards are tasked with, co-ordinated by Ofqual, and should involve the testing and trialling of a variety of approaches in collaboration with a limited range of schools that are interested in participating.

In the chapter on **digital assessment** we consider how a greater variety of digital assessments might be adopted in the future. We think the priority here, beyond the migration of paper-based exams to on-screen exams, should focus on formative assessments and progress tracking at Key Stage 3, but with a view of moving towards formal, independent tests. If a new GCSE in Digital Literacy were to be introduced, this would be an opportunity to develop a digital assessment from scratch, only available on-screen, in a cognate subject. We also see opportunities to develop a digital approach to the assessment of our proposed maths benchmark qualification for 14 year olds.

Comparable outcomes and protecting students through qualification change
Any change to a qualification can mean a change to the overall standard – the qualification might become less or more demanding leading to the view that one cohort has had things easier than another. To protect students against any unfair impact when changes are made, 'comparable outcomes' are used. An Ofqual blog explained this process in the year when reformed A Levels were introduced:

> *"When qualifications change, we follow the principle of comparable outcomes – this means that if the national cohort for a subject is similar (in terms of past performance) to last year, then results should also be similar at a national level in that subject. So exam*

boards will control for the impact of the changes such that this year's cohort is not unfairly disadvantaged. They will be relying heavily on the statistical evidence to do this, but also using senior examiners to check the grade boundaries that the statistics are pointing to."

Co-ordinating curriculum change – the case for an independent curriculum body

Any incremental approach will need co-ordinating. It will require a guiding vision and a lead that sets a strategic direction for change, making sure that where possible any incremental changes are steps that lead towards that vision.

We believe these functions would best be carried out by an appointed curriculum body, working in conjunction with the qualifications regulator. Such a body would identify priorities for change, including those changes that would make a significant difference relatively quickly and with relatively limited resources, but also those longer-term developments that may go beyond the period of any one Parliament. It should protect schools from the sort of massive upheavals and pendulum swings that seem to occur every decade or so and avoid the impact of too many changes at once. If there is to be incremental change this needs to be scheduled and co-ordinated, with the curriculum body taking responsibility for monitoring and regulating the cumulative impact.

When we asked teachers and stakeholders about how change should be brought about there was a strong desire for small-scale initiatives and pilots with networks of schools and other interested parties. This would foster collaboration, innovation and allow for the validation of approaches before contemplating any national rollout.

Change needs to be clearly communicated and appropriately resourced. Teachers and other stakeholders need sufficient notice to plan and prepare. Proposed changes need to be worked up in close collaboration with the teaching community and others who would be involved in implementing any changes – it is not something that should be done unto them. Again we see a role for a curriculum body in co-ordinating this.

Finally, incremental change should not just be a means for moving us towards a final destination. It is the methodology by which a curriculum can be maintained, kept up to date and rebalanced as and when needed.

Recommendations

– **Government should put in place mechanisms for the ongoing review and evaluation of curriculum and assessment.** The approach to change should be incremental – evolutionary, not revolutionary. We advocate the creation of a curriculum body, independent of government, which should take the lead on developing and maintaining a broad and balanced curriculum. It should set the long-term vision and oversee and plan for the steps that move us in that direction while regulating the pace and impact of cumulative change. It would work with Ofqual, the qualifications regulator, to introduce changes to assessment approaches.

A review of the curriculum should include:

– **A reduction in exam time and content in individual GCSE subjects.** We have said this before, but it is vital to do this if we are to ensure there is room for wider curriculum activities and to address the decline of some important subjects.

– **Recognition that climate change and sustainability topics must be made more explicit throughout the curriculum and within individual subjects and qualifications.** Topics should feature more heavily in support materials and within examination questions. A vocational qualification that looks at sustainability in business and develops carbon literacy should be introduced. In the section above on climate change we have set out some actions in more detail that would support the inclusion of quality climate change education. Above all, it is essential that the government should provide leadership and a sense of urgency in supporting the communities of interested parties in implementing climate change education.

- **The reinstatement of digital literacy in the curriculum. This should include formal assessment leading to a qualification.** It is an essential part of the curriculum that has gone missing. To ensure its prominence as a core subject a new GCSE or vocational equivalent should be introduced; this should be designed from scratch as a digital assessment. It should include content on the technical use of IT but also wider aspects such as recognising misinformation, ethical use of social media and the appropriate use of AI.

- **A review of the current EBacc measure so schools are encouraged to offer a wider range of subjects.** There are some immediate changes that might be made, such as introducing additional subjects to the 'subject pillars', notably creative and vocational subjects. However, in the longer term, it will be necessary to develop a vision that sets out how broad we want the curriculum to be and what range of choices should be made available to all. New accountability measures should then be developed which are servant to that vision.

- **Changes to curriculum and assessment materials where required to ensure that they are relevant to modern Britain and encourage diversity.** The aim should be to achieve a balance in preserving those things about our culture and history that unite us while reflecting the diversity of our society and culture, and the differing interests, talents and abilities of our young people.

Appendix 1: What is maths anyway?

There is a lot that can be done with maths, and like English, it is a core skill that can be applied in many places across any curriculum and made useful in life, work and further study. This opens up a debate about what maths is for as exemplified by the many students who ask, 'why are we learning this?'

Problem solving

One of the strengths of the current Maths GCSE is that it isn't purely about knowledge and understanding of maths. Students are asked to demonstrate the application of number to mathematical problems.

This requirement is articulated in the GCSE qualification's Assessment Objective 3 (AO3): 'Solve problems within mathematics and in other contexts'. Twenty-five percent of all foundation tier and 30 percent of all higher tier assessment in GCSE Mathematics must address this objective.

The examples show that sometimes problem-solving questions are based around a scenario or context – a bag of marbles or a line of fence panels, but these are not necessarily 'real life' scenarios (who spends their time calculating the number of differently coloured marbles in a bag?). Also, some of the questions present purely abstract mathematical problems as in the third example provided. These questions are designed to assess mathematical problem solving, rather than reading ability or related comprehension skills, so the vocabulary used and the way the questions are framed are intended to be as economical in their use of written English as possible.

'What employers want'

Often, the point about application of maths and the perceived lack of it in GCSE is linked to a view of what employers want:

> *"Employers are less interested in what they consider to be academic mathematics (e.g. algebra, calculus, etc.), but instead want applied and practical skills including approximation, mental arithmetic, capability with visual data, a solid grasp of units of measurement, the ability to check their own calculations and simple problem solving."*[163]

The need to be able to understand and work with **data and technology** features in many reports:

> *"One of the most important trends will be the continued empowerment of entire workforces – rather than data engineers and data scientists – to put analytics to work. This is giving rise to new forms of augmented working, where tools, applications, and devices push intelligent insights into the hands of everybody in order to allow them to do their jobs more effectively and efficiently."*[164]

When the last government surveyed employer views on its proposals to make the study of maths post 16 compulsory it was shown that some employers thought that Maths GCSE content was good, but that **application and problem solving** needed to be added to the curriculum.

The Royal Society's Mathematical Futures report

A far-reaching and ambitious investigation into the maths curriculum for the future is evidenced in the work of the Royal Society through its ambitious **'Mathematical Futures' programme.**[165] With a 20-year time horizon, the Royal Society's Mathematical Futures Board were asked to consider:

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163 The Education & Training Foundation. (2015, March). *Making maths and English work for all*. https://www.et-foundation.co.uk/wp-content/uploads/2015/03/Making-maths-and-English-work-for-all-25_03_2015001.pdf

164 Marr, B. (2022, October 31). *The Top 5 Data Science And Analytics Trends In 2023*. Forbes. https://www.forbes.com/sites/bernardmarr/2022/10/31/the-top-5-data-science-and-analytics-trends-in-2023

165 Royal Society. (n.d.). *Mathematical Futures programme*. Retrieved August 19, 2024, from https://royalsociety.org/news-resources/projects/mathematical-futures

- What mathematical competences will be needed for future citizens and society to thrive?
- How should education systems develop these mathematical competences?
- What changes can be put in place to move towards that future?

These investigations go well beyond the scope of this report. The Royal Society's Mathematical Futures final report and investigations have not yet been published but its preliminary and high-level conclusions include a recommendation that maths itself should be renamed:

> *"The nature of the mathematical education that is needed is changing from 'mathematics' to a fusion of mathematics, statistics, data science and computer science; what we have called mathematics and data education (MDE), is divided broadly into three categories:*
>
> ***3.** Foundational and Advanced mathematics*
> ***4.** General Quantitative Literacy (GQL)*
> ***5.** Domain-Specific Competencies (DSCs)."*[166]

Given our primary concern in relation to curriculum and assessment reform of maths is to address the issue of the third or more of students who reach post-16 education without the basic competencies in maths, we are particularly interested in the Royal Society's definition of what it calls **Foundational Mathematics** as "the essentials for life and further learning". **General Quantitative Literacy (GQL)** builds on this as the ability to use and apply mathematical concepts to solve real-world quantitative problems.

Our view is that these categories are immensely helpful and accurate and that GCSE Maths should concentrate on assessing the foundations of mathematics, establishing the essentials for life and further learning and providing the understanding of fundamental mathematical ideas. Some of the more advanced level content suggested alongside Foundational Mathematics should be covered by A Level or, for higher achievers at Key Stage 4, by the availability of further and additional maths qualifications.

The extent to which the GCSE should overtly provide **General Quantitative Literacy** (the ability to use and apply mathematical concepts to solve *real-world quantitative problems*) is a moot point. Yes, it should provide the knowledge and understanding required, but there is a major role for utilising maths in wider contexts that sits in other parts of the national curriculum. Maths is, after all, a core subject, alongside English and digital literacy. Young people do need to be taught how to evaluate claims made in advertising and media, including arguments which appear to draw on statistical 'evidence', and they need to understand financial propositions presented to them in relation to, say, mobile phone contracts, or special offers in supermarkets. There is a place for all this in the curriculum, but the full weight of it should rest with the broader curriculum and not be 'siloed' within GCSE Maths or, for that matter, personal, social, health and economic education (PSHE).

This point is echoed in the Royal Society's important definition of **Domain-Specific Competencies**. Clearly there is a need, as well as opportunities, to teach maths post 16 in the context of construction, or biological fieldwork or health and social care. And, as with English, maths should permeate parts of the Key Stage 3 and 4 curriculum outside of maths lessons. Digital literacy, which should be an essential part of the curriculum for all, has a key role to play in developing young people's ability to use, analyse and manipulate data. Nor should subjects such as business studies, sport, literature or music be maths-free zones.

The required areas of maths ('quantitative skills') in A Level science subjects are already specified in detail by the DfE and mapped to GCSE content, along with a requirement that these are assessed:

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166 The Royal Society, September 2023, *A new approach to mathematical education*, p4. https://royalsociety.org/-/media/policy/projects/maths-futures/new-approach-to-mathematics-and-data-education.pdf

> *"The assessment of quantitative skills will include at least 10% level 2 [GCSE] or above mathematical skills for biology and psychology, 20% for chemistry and 40% for physics, these skills will be applied in the context of the relevant science A level."*[167]

There is an argument that 11–16 maths content (and English) should be systematically mapped to other GCSE and vocational subjects as part of any curriculum review to ensure that the use of maths is embedded in the wider curriculum while maintaining the integrity of subjects and ensuring that the same skills are not taught or assessed on multiple occasions.

Whether the maths we teach is sufficiently relevant or engaging

Is there enough practical focus and relevance in the curriculum to ensure young people leave school literate and numerate?[168]

> *"For many – children as well as adults – the abstractness of mathematics is a synonym for a detached, inflexible and cold body of knowledge. Through the use of real-world contexts, the mathematical task becomes more subjective and personal in order to get involved with mathematics more easily (Boaler, 1993)."*

There are too many reports of young people asking that fundamental question, 'Why are we learning this?'. And increasingly teachers are asking, 'Why are we teaching this?'.

GCSE Maths does not in itself preclude the use of relevant contexts in teaching. It may be that this is primarily a pedagogical issue – with the onus on teachers to demonstrate the value of mathematics and to explain its many useful applications in future life, work and study. This is particularly important for students who are struggling to grasp mathematical concepts and are uninspired by arguments about the inherent beauty of maths and its astonishing patterns and poetry of logical ideas.

However, given the sheer volume of content contained in the syllabus there isn't much time for dwelling on contextualised maths problems. Making maths relevant is important, but developing the essential foundations of mathematics must be the primary concern. We believe it is possible to support teachers in presenting the arguments for the relevance of mathematics through support materials, and to some extent through relevant assessment. Students also need to experience the use of mathematics in other curriculum subjects, outside of their maths lessons.

There is a risk in emphasising 'real life contexts' as this can mean the creation of contexts as crude verbal problems. It's helpful to understand the Singaporean and Japanese approach which is an *instantiation*[169] of maths – using physical objects and simple demonstrations. Stigler provides examples (In 'How Asian teachers polish each lesson to perfection'[170]) of how to teach fractions using different vessels of water; there is constant movement in the teaching between the physical objects and the abstract maths and it is ensured by the teachers that the maths structure of the example is made clear to young students. This physical representation of maths is much more than 'maths in context'.

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167 Department for Education. (2014, April). *GCE AS and A level subject content for biology, chemistry, physics and psychology*. https://assets.publishing.service.gov.uk/media/5a807949e5274a2e8ab50599/Science_AS_and_level_formatted.pdf

168 De Botton, O. (2024, February). *Broad and Bold: Building a Modern Curriculum*. Labour Together. https://static1.squarespace.com/static/64f707cf512076037f612f60/t/65c8a57dc6452e603ce46a8f/1707648414308/Broad+and+Bold+-+building+a+modern+curriculum+%5BFINAL%5D.pdf

169 Instantiation, most simply understood to mean 'exemplification', or 'the ideal example or representation', is also a more complicated philosophical idea. The 'instantiation principle' is essentially the concept that a characteristic or property can't exist unless you can point to a real-world instance of it. And in computing, instantiation is the act of creating a named object in a particular programming language. In everyday use, you might say your lovely new shirt is the instantiation of your sister's sewing ability. https://www.vocabulary.com/dictionary/instantiation

170 Stigler, J. W., & Stevenson, H. W. (1991). *How Asian Teachers Polish Each Lesson to Perfection. American Educator: The Professional Journal of the American Federation of Teachers, 15*. https://www.researchgate.net/publication/265487182_How_Asian_teachers_polish_each_lesson_to_perfection

There are also challenges when using contexts in maths assessments:

- What is relevant to some is alien to others and creates issues of advantaging those who are more familiar with certain contexts than others.
- There are simply too many contexts – maths for hairdressers, for engineers etc. Perhaps the teaching and assessment of these needs to be placed in the relevant subject / domain (as argued for in the Royal Society's Mathematical Futures report).
- Contexts can be contrived – finding the angle of elevation of a lighthouse, for example.
- Contexts tend to require a level of literacy that a numerate candidate might lack.
- Candidates will sometimes seek the maths 'hidden' in the context – seeing a question as a sum dressed up. When asked to determine how many minibuses were required for a school trip some candidates answered (accurately) that 3.75 were required.
- Contexts in question papers aren't realistic in that numbers are made to be easily divisible, corners are always perfect right angles etc. And, unlike in exams, people in real life often have the opportunity to discuss and work out problems with others.
- There is an assumption that contexts are motivating in themselves and that they explain why maths is useful which isn't always the case.

Also, the balance between contextualisation and accessibility is difficult to achieve – there are plenty of students with low working memory capacity (for all sorts of reasons, from anxiety to attention deficit hyperactivity disorder (ADHD)) and having context take up that space leaves little room for maths techniques. That balance can be even more difficult to maintain in assessment.

When reflecting on this, it is useful to return to the point made at the beginning of this section:

> *"It has been suggested that a strong [maths] curriculum, which is essential for facilitating high-quality learning, should focus on only fundamental concepts and principles."*

There is a current and lively debate about the teaching of **financial literacy**, although the teaching of this is already specified as part of the national curriculum.[171] Advocates argue that our curriculum should include teaching young people the financial acumen needed to manage money and make wise financial decisions. There is a solid argument for this, but research shows that there is strong evidence that competence in application of maths in financial contexts depends primarily on a secure understanding of formal maths.

Despite being drawn from different jurisdictions and using different methodologies, a review of a sample of literature on this topic[172] shows that they all come to the same conclusion – a strong grasp of the fundamentals of mathematics is essential to the development of financial competence. Although the studies caution against regarding teaching a strong foundation in maths as a substitute for financial education, there is evidence that financial competence is much more likely to be demonstrated by people with a strong grasp of mathematics, with or without the benefit of financial education.

Furthermore, some of our assumptions about what seems relevant in contextualising maths within financial literacy is perhaps not as clear as we would like – understanding mortgages,

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171 PSHE Association. (2020). *Programme of Study for PSHE Education: Key Stages 1-5*. https://fs.hubspotusercontent00.net/hubfs/20248256/Programme%20of%20Study/PSHE%20Association%20Programme%20of%20Study%20for%20PSHE%20Education%20(Key%20stages%201–5)%2c%20Jan%202020.pdf See page 31 on Key Stage 4 financial literacy.

172 Jayaraman, J. D, Saigeetha J., & Counselman, K. (2018). The Connection between Financial Literacy and Numeracy: A Case Study from India. *Numeracy, 11*(2). https://doi.org/10.5038/1936-4660.11.2.5

Marley-Payne, J., Valdes, O., & Mottola, G. (2023). *They Just Add Up: Combined Math and Financial Knowledge Tied to Better Financial Outcomes*. FINRA Investor Education Foundation. https://www.finrafoundation.org/sites/finrafoundation/files/Combined-Math-and-Financial-Knowledge-Tied-to-Better-Financial-Outcomes.pdf

Amezcua, A. V., & Everardo, J. A. H. (2017). Financial Literacy and Mathematics: A Study among Young Mexican High School Students. *Revista Mexicana de Economía y Finanzas, 12*(2), 1–22. https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1665-53462017000200001

Darriet, E., Guille, M., & Vergnaud, J.-C. (2021). Financial Literacy and Numeracy. In *The Routledge Handbook of Financial Literacy*. https://www.researchgate.net/publication/356564663_Financial_Literacy_and_Numeracy

for example, seems like a useful life skill, but given that the average age for securing a first mortgage is 37, it may not seem pressingly relevant to the majority of 11–16 year olds. Moreover, young people and adults too make bad financial decisions for a multitude of reasons which go beyond whether or not they have a good grasp of mathematics – people don't buy a lottery ticket because they think they have a reasonable chance of winning, they buy one because they want to dream.

Taken in the round, it would seem that the use and application of maths in many different contexts is critically important, but the weight of achieving the recognition of this, and providing opportunities to apply maths across different contexts is a matter for the whole curriculum. Furthermore, and by way of a conclusion, work by the Leibniz Institute for Research and Information in Education (DIPF) shows that those most competent in the problem-solving questions in PISA are those with the highest level of abstract maths understanding.[173]

173 Kuger, S., Klieme, E., Jude, N., & Kaplan, D. (Eds.). (2016). *Assessing Contexts of Learning: An International Perspective*. https://doi.org/10.1007/978-3-319-45357-6

Klieme, E., Neubrand, M., Lüdtke, O. (2001). Mathematische Grundbildung: Testkonzeption und Ergebnisse. In J. Baumert et al. *PISA 2000*. VS Verlag für Sozialwissenschaften. https://doi.org/10.1007/978-3-322-83412-6_5

Appendix 2: Some analysis on the impact of the EBacc measure on subject choice

Table 3, below, gives the percentage of EBacc versus non EBacc subjects taken nationally.[174]

Table 3: GCSE entries for EBacc and non-EBacc subjects from summer 2020 to summer 2024

Subject types	Summer 2020	Summer 2021	Summer 2022	Summer 2023	Summer 2024
EBacc entries	4,297,100	4,337,685	4,378,110	4,554,415	4,776,980
Non-EBacc entries	984,645	963,390	971,140	989,430	1,034,805
Percent EBacc entries	81.4%	81.8%	81.8%	82.2%	82.2%
Percent non-EBacc entries	18.6%	18.2%	18.2%	17.8%	17.8%

Source: gov.uk

The years featured in this table do not predate the introduction of the EBacc, when the picture may have been very different, but it does show a slight decline in the uptake of non-EBacc entries over a five-year period. If we assume students are taking somewhere between eight and nine GCSEs, this would suggest **that most students are rarely taking more than one, sometimes two, non-EBacc GCSEs**.

Tables 4 and 5, below, show the numbers of entries for EBacc subjects followed by entries for non-EBacc subjects. The percentage growth in subjects needs to be treated with care – the population of 16 year olds grew by 5 percent over this period, so **a growth in entries of 5 percent should be seen as broadly static**.

Table 4: GCSE entries in EBacc subjects summer 2023 and 2024

Subject	Summer 2023	Summer 2024	Percentage change in entries
Combined Science	881,925	926,780	5%
Mathematics	786,815	842,595	7%
English Language	754,910	807,785	7%
English Literature	601,945	623,610	4%
Languages*	332,735	349,335	5%
History	298,155	312,415	5%
Geography	283,020	287,610	1.6%
Biology	180,125	183,370	1.8%
Chemistry	173,530	174,750	0.7%
Physics	172,725	174,745	1%
Computing	88,530	93,985	6%

*includes entries for French, German, Spanish, other Modern Foreign Languages and Ancient Languages

174 Ofqual. (2024, May 30). *Provisional entries for GCSE, AS and A level: summer 2024 exam series*. GOV.UK. https://www.gov.uk/government/statistics/provisional-entries-for-gcse-as-and-a-level-summer-2024-exam-series/provisional-entries-for-gcse-as-and-a-level-summer-2024-exam-series

Table 5: GCSE entries in non-EBacc subjects summer 2023 and 2024

Subject	Summer 2023	Summer 2024	Percentage change in entries
Religious studies	245,385	248,120	1%
Art and design subjects	187,710	197,505	5%
Business studies	114,525	127,310	11%
Design and technology	79,025	80,580	2%
Physical education	74,550	77,905	4.5%
Food preparation and nutrition	53,380	56,265	5.4%
Social science subjects	49,270	52,360	6%
Drama	49,826	49,410	-0.8%
Media / film / TV studies	32,905	33,910	3%
Music	30,115	32,615	8%
Statistics	26,785	32,210	20%
Citizenship studies	22,410	21,535	-3.9%
Economics	7,205	7,760	7.7%
Performing arts	6,890	6,675	-3.1%
Classical subjects	4,480	5,005	11.7%
Engineering	2,490	2,925	17.5%

The volume of entries for EBacc subjects is much higher than for non-EBacc. Only Religious Studies, Art and Design, and Business Studies come close to the volume of entries in any given EBacc GCSE.

Religious Studies is unusual in that it is a requirement that the subject is taught to all at Key Stage 4. Although there is no requirement to enter students for the GCSE, many students are encouraged to sit it, given that the subject has been taught. Given that many students only study one non-EBacc subject, that non-EBacc subject will, for many, be Religious Studies.

Outside of Religious Studies, it is clear that most young people are opting for either Art or Business Studies as their non-EBacc choice. Art and Design covers a range of subjects including fine art, photography, textiles and graphics.

Music, D&T and PE have made a marginal recovery in numbers this year although this looks more like plateauing than real progress. The number of entries for Performing Arts is down 3.1 percent to just 6,675 candidates across England, while Citizenship Studies is down 3.9 percent – and this is without factoring in the 5 percent increase in the 16-year-old population. The growth in Statistics is large but from a very low base.

Appendix 3: Competencies, values and behaviours in the curriculum – the teaching and assessment of 'skills'

In the context of 11–16 education the term 'skills' is used to include: literacy and numeracy, problem solving, working in teams, budgeting, spoken communication (oracy), self-management, learning to learn, critical thinking, creative thinking, and systems thinking, to name but a few.

We have placed 'skills' in inverted commas because, although commonly used in this context, it covers a multitude of different meanings. It is also widely used outside the context of the 11–16 phase, particularly in relation to post-16 and adult technical and work-based education.

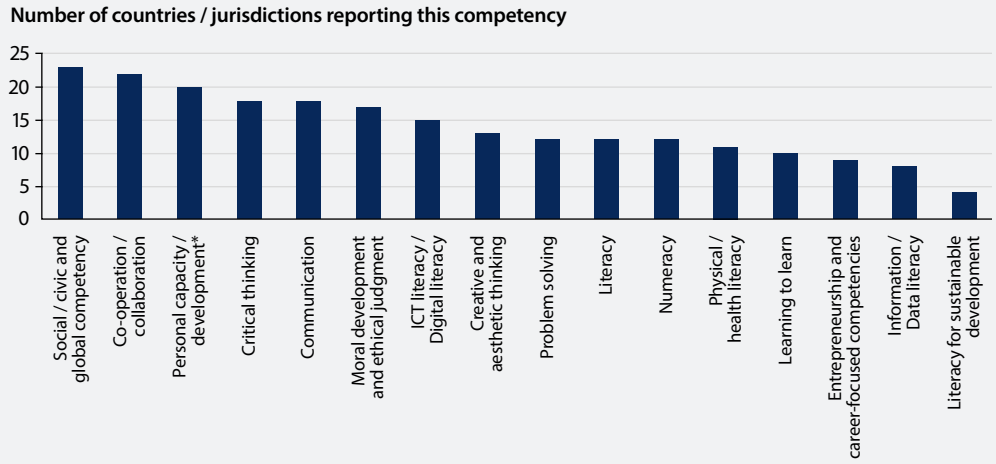
The term 'skills' can sometimes be used to mean those elements of the curriculum which foster a range of values and behaviours, such as resilience, taking personal responsibility and respecting others, as well as concepts such as emotional intelligence, ethical judgement and global citizenship.

Whereas 'skills' is routinely used as a blanket term for all of the above and more, it is sometimes more helpful to think in terms of 'competencies, values and behaviours'. These terms are more precise than 'skills'. The lack of precision in the use of 'skills' was brought out by Ofsted:

> *"…the idea of 'skills' was liberally used in many contexts. Very rarely was it clear whether the meaning was subject-specific, for example reading skills. Other uses included personal skills, such as the ability to work in a team, cognitive skills, such as critical thinking, or life skills, such as how to pay a bill or apply for a job. There were many other examples of terms where the meaning was woolly, such as progression, enrichment, questioning and repetition."*
> HMCI's commentary: recent primary and secondary curriculum research[175]

The term 'skills' also comes with some historical baggage; many teachers have experienced past initiatives which set out to assess skills explicitly using evidence drawn from across the whole curriculum and even wider sources; these experiences have not always been positive.

Figure 15: Types of cross-curricular competencies reported by countries / jurisdictions



Note: Values displayed include only countries / jurisdictions with responses that could be clearly coded as yes / no. Ordered in descending order of number of countries reporting this competency.
*Personal capacity/development: i.e. self-regulation / self-control, autonomy
Source: Data from the PQC, item 1.1.2.

Over many decades there have been various attempts to heighten the emphasis on core or key skills in the curriculum, although the starting point was usually in the 16–19 phase. These

175 Ofsted & Spielman, A. (2017, October 11). *HMCI's commentary: recent primary and secondary curriculum research*. GOV.UK. https://www.gov.uk/government/speeches/hmcis-commentary-october-2017

included the Key Skills qualifications which were initially part of Curriculum 2000, which required skills to be embedded across the curriculum, and to be separately assessed, largely through teacher assessment via a portfolio of student evidence. The Key Skills certificates were in six areas:

1. **Communication** (speaking, listening, reading and writing skills)
2. **Application of Number** (interpreting information involving numbers)
3. **Information Communication Technology** (finding, exploring, developing and presenting information)
4. **Working with others** (to achieve shared objectives, work co-operatively and have regard for others)
5. **Improving own learning and performance** (e.g., target-setting, planning, learning, reviewing, accepting constructive feedback)
6. **Problem solving** (encouraging learners to develop and demonstrate their ability to tackle problems systematically)

The assessment burden associated with the inclusion of formally certificated Key Skills in Curriculum 2000 was widely held to be excessive and policymakers rowed away from this model once the difficulties of implementation became clear.

The short-lived 14–19 diplomas, brought in by the Labour government in 2008–2010 included Key Skills, Personal Learning and Thinking Skills (PLTS)[176] and an Extended Project Qualification (EPQ).[177] The PLTS framework was designed to nurture and assess the development of: independent enquirers; creative thinkers; reflective learners; team workers; self-managers; and effective participants.

Except for the Extended Project Qualification which was first developed as part of the 14–19 diplomas, all of these attempts to assess skills attracted concerns about their implementation. Assessing generic skills is incredibly difficult – the mapping of learning outcomes and student work to separate skills frameworks was found to be complex and bureaucratic for teachers and were described by many students as pointless and demotivating. It didn't help that many students, parents and carers placed considerably less value on these skills than they did on the core subjects being studied.[178]

Furthermore, so-called 'skills-led curricula', launched in other jurisdictions, have been criticised for leading to a drop in 'academic' performance.[179] According to the Institute for Fiscal Studies: "declines have happened in essentially every country that has adopted such skills-based curricula – for example, France, Finland, Australia and New Zealand, with the last thinking about ways to introduce specific knowledge elements into its curriculum".[180]

For all the complications involved with assessing skills and despite the doubts cast about skills-based curricula, there are few who don't think skills are important. People instinctively recognise that they are key to what makes for a rounded education. The one consistent message is that, however they are described, competencies, values and behaviours are important.

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176 Qualifications and Curriculum Authority. (n.d.). *The new secondary curriculum: Personal, learning and thinking skills*. https://www.sustainabilityexchange.ac.uk/files/personal_learning_and_thinking_skills.pdf

177 This popular Level 3 qualification, often taken alongside A Levels at Key Stage 5, aims to develop students beyond their existing study programme by giving them the freedom to complete a project on an area of personal interest or benefit, while developing project management skills along the way. OCR. (n.d.). *Extended Project Qualification: The Learner Journey*. https://www.ocr.org.uk/Images/UC7_01_M713_EPQ_Summary_Brochure_FINAL.PDF
A Level 2 version of the qualification, which can be used at Key Stage 4, is available but is not widely used.

178 For an evaluation of some of the challenges of the 'Key Skills' approach, see: Davidson-Sofair, J. (2008). *An evaluation of the key skills 2000 curriculum in the further education sector and its effects on students' motivation for learning at foundation level*. [Doctoral Thesis, University of Northampton]. https://pure.northampton.ac.uk/en/studentTheses/an-evaluation-of-the-key-skills-2000-curriculum-in-the-further-ed-2

179 For an example, see: Puttick, H. (2023, November 12). What went wrong with the Scottish education system? *The Times*. https://www.thetimes.com/uk/article/what-went-wrong-with-the-scottish-education-system-7qq8hbzlm

180 Sibieta, L. (2024, March). *Major challenges for education in Wales*. The Institute for Fiscal Studies. https://ifs.org.uk/sites/default/files/2024-03/Major-challenges-for-education-in-Wales-IFS-REPORT_0.pdf

Crucially, it would be wrong to say that the development of personal skills is not a strong feature of English education. Many schools in England display excellent approaches and commitment to supporting and developing their young people. Every school in England is required to have a school curriculum which "is balanced and broadly based and which:

- promotes the spiritual, moral, cultural, mental and physical development of pupils at the school and of society, and
- prepares pupils at the school for the opportunities, responsibilities and experiences of later life."[181]

The national curriculum requires that all schools should make provision for personal, social, health and economic education (PSHE), drawing on good practice. All schools are also required to teach religious education at all key stages and secondary schools must provide sex and relationship education.

Ofsted evaluates how schools perform in supporting personal development, and the Ofsted *School Inspection Handbook* includes criteria about how the school:

- Develops pupils to become responsible, respectful and active citizens who are able to play their part and become actively involved in public life as adults
- Develops pupils' characters, which we define as a set of positive personal traits, dispositions and virtues that informs pupils' motivation and guides their conduct so that they reflect wisely, learn eagerly, behave with integrity and co-operate consistently well with others…
- Develops pupils' confidence, resilience and knowledge so that they can keep themselves mentally healthy[182]

Inspection can, and often does, provide a mechanism for looking beyond exam results at the substance and integrity of what schools are doing. An important role for any inspection regime is to balance the system and to take into account aspects of a school curriculum and its delivery that are not revealed by exam results alone. When reforming the curriculum and assessment, it is important to factor this in and make sure that there is capacity for Ofsted to perform this role – that would require, after all, what the Scottish curriculum describes as the skill of 'systems thinking'.

Some tentative conclusions about 'skills'

Skills are important and any curriculum should include the development of these within its goals and have mechanisms to ensure they are properly addressed.

The term 'skills' is used very imprecisely. It may be more helpful to think in terms of competencies, values and behaviours. Even then, terms used beneath these headings need to be explicitly described and understood by all relevant parties.

Many English schools are excellent at delivering and nurturing those competencies, values and behaviours which are not directly assessed by the current examination system. However, the current content overload within the exam system and the priority given to exam results inevitably takes resource away from wider curriculum goals. The exam and accountability system can also send unintended signals to schools, parents and students that wider competencies are considered to be relatively unimportant. There needs to be space in the curriculum for skills and they need to be shown to be a priority.

The variety of ways in which skills are described and the multiplicity of skills frameworks that abound might lead to a conclusion that the best way forward is to create a government-endorsed single framework. But it is worth reflecting on why so many different frameworks abound (virtually every large employer has its own) and why the decision was taken to devolve responsibility to each school to have its own local curriculum to support the spiritual, moral, cultural, mental and physical development of pupils. Every school has its own culture and its

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181 Department for Education. (2014, December). *The national curriculum in England: Framework document*. https://assets.publishing.service.gov.uk/media/5a7db9e9e5274a5eaea65f58/Master_final_national_curriculum_28_Nov.pdf

182 Para 325: Ofsted. (2024, April 5). *School inspection handbook*. https://www.gov.uk/government/publications/school-inspection-handbook-eif/school-inspection-handbook-for-september-2023#evaluating-personal-development

own values and these need to be developed and expressed at local, rather than national level, if they are to have meaning and ownership.

Assessment has a role to play in developing competencies. In areas regarded as high priority, it may be appropriate to include assessment that leads to the achievement of a high-stakes qualification. In most cases, however, we would recommend a different approach to assessment which is more formative in its purpose. What is critical is that staff and students alike have a good grasp of the competencies, values and behaviours they are expected to display, that these are set out in clear criteria, and that there is a shared recognition of their importance. Teachers will require time to develop their approaches and to have access to support and training.

There are a great many competencies out there. Any attempt to create a framework for assessing them needs to be ruthlessly economic in the number of competencies it includes and realistic about how the process of measuring and rewarding skills can be resourced and managed. Previous attempts to certificate a wide range of skills, as with the Key Skills qualifications featured in Curriculum 2000, proved unmanageable.

The full weight of assessing skills should not rest with the qualification system. Ofsted has an important role to play in monitoring and evaluating how competencies are addressed within the curriculum and through the pedagogies adopted by schools.

GCSE content and assessment could be more 'skills friendly'. There is scope for greater emphasis on more practical activities and experiences which require the use of a range of skills, some generic, some directly linked to the subject. Such activities can be reflected upon and evidenced in responses to exam questions, although they do not always need to be formally assessed as part of a GCSE.

The first section of this report includes reflections on Non-Exam Assessment (NEA); with the right design NEA can be an engine for developing and assessing competencies. We observe that students learn skills when undertaking their NEA which are not explicitly included in assessment criteria but are useful by-products. These include time management, research skills, emotional / psychological skills (such as confidence, resilience, self-esteem, responsibility) and teamwork and communication skills. This doesn't just relate to formal assessments, though – any GCSE *course* can have activities baked in which develop skills whether or not they are assessed.

Caution must be applied when setting about building in skills development opportunities to individual subjects; as Amanda Speilman[183] puts it: "if the same skills are emphasised in each subject, it can lead to cumulative over-weighting of some elements across the whole curriculum, and a correspondingly skewed assessment profile".

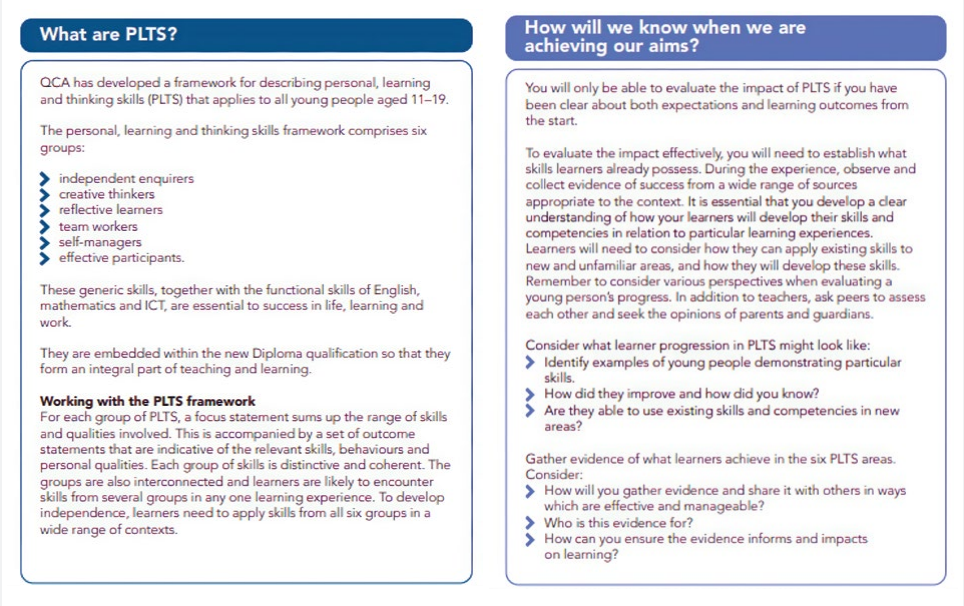
183 Not yet published.

Some examples of skills frameworks

Personal Learning and Thinking Skills

These were developed as a component of the 14–19 diplomas. The boxes below are taken from a document produced by the now defunct Qualifications and Curriculum Agency, and we have included the section on 'How will we know when we are achieving our aims' to indicate some of the challenges and complexity of the approach.

Figure 16: Personal, learning and thinking skills



What are PLTS?

QCA has developed a framework for describing personal, learning and thinking skills (PLTS) that applies to all young people aged 11–19.

The personal, learning and thinking skills framework comprises six groups:

- independent enquirers
- creative thinkers
- reflective learners
- team workers
- self-managers
- effective participants.

These generic skills, together with the functional skills of English, mathematics and ICT, are essential to success in life, learning and work.

They are embedded within the new Diploma qualification so that they form an integral part of teaching and learning.

Working with the PLTS framework

For each group of PLTS, a focus statement sums up the range of skills and qualities involved. This is accompanied by a set of outcome statements that are indicative of the relevant skills, behaviours and personal qualities. Each group of skills is distinctive and coherent. The groups are also interconnected and learners are likely to encounter skills from several groups in any one learning experience. To develop independence, learners need to apply skills from all six groups in a wide range of contexts.

How will we know when we are achieving our aims?

You will only be able to evaluate the impact of PLTS if you have been clear about both expectations and learning outcomes from the start.

To evaluate the impact effectively, you will need to establish what skills learners already possess. During the experience, observe and collect evidence of success from a wide range of sources appropriate to the context. It is essential that you develop a clear understanding of how your learners will develop their skills and competencies in relation to particular learning experiences. Learners will need to consider how they can apply existing skills to new and unfamiliar areas, and how they will develop these skills. Remember to consider various perspectives when evaluating a young person's progress. In addition to teachers, ask peers to assess each other and seek the opinions of parents and guardians.

Consider what learner progression in PLTS might look like:

- Identify examples of young people demonstrating particular skills.
- How did they improve and how did you know?
- Are they able to use existing skills and competencies in new areas?

Gather evidence of what learners achieve in the six PLTS areas. Consider:

- How will you gather evidence and share it with others in ways which are effective and manageable?
- Who is this evidence for?
- How can you ensure the evidence informs and impacts on learning?

From: Personal, learning and thinking skills – Supporting successful learners, confident individuals and responsible citizens. QCA, 2008

OECD research on types of cross-curricular competencies

The OECD's excellent work on curriculum overload describes the most commonly used competencies (it does not refer to skills), taught through a cross-curricular approach, in a range of different countries / jurisdictions.[184]

184 OECD. (2020). *Curriculum Overload: A Way Forward*. https://doi.org/10.1787/3081ceca-en

World Economic Forum

Another way of looking at essential skills is to consider the World Economic Forum's list of the world's most in-demand skills.[185]

Figure 17: World Economic Forum's Top 10 Skills of 2023

The Oracy Skills Framework

This excellent, well-researched and clearly defined framework gives an example of compact but precise summation of a combination of interrelated skills.[186]

Babcock / Surrey County Council framework for PSHE

This guide to support the delivery of personal, social, health and economic skills (PSHE) sets out some of the skills that can be delivered through the national curriculum requirement to deliver PSHE.

> *"PSHE requires young people to develop emotional literacy and the skills for positive decision making... At the heart of effective PSHE lay the foundations for positive and healthy relationships, self-awareness, resilience, self-worth, aspiration and being able to communicate effectively and seek appropriate help and assistance where necessary."*[187]
> PSHE (Personal, Social, Health, Economic) Education Framework For Secondary Schools 2016, Babcock / Surrey County Council
> https://www.healthysurrey.org.uk/__data/assets/pdf_file/0009/219195/PSHE-Framework-for-Secondary-Schools-2016.pdf

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185 World Economic Forum. (2023). *Future of Jobs 2023: The most in-demand skills.* https://www.weforum.org/agenda/2023/05/future-of-jobs-2023-skills/

186 https://www.educ.cam.ac.uk/research/programmes/oracytoolkit/oracyskillsframework/ Oracy%20Skills%20Framework%202020.pdf

187 Babcock / Surrey County Council. (2016). *PSHE (Personal, Social, Health, Economic) Education Framework For Secondary Schools 2016.* https://www.healthysurrey.org.uk/__data/assets/pdf_file/0009/219195/PSHE-Framework-for-Secondary-Schools-2016.pdf

Appendix 4 The important contribution of vocational qualifications at Key Stage 4

OCR offers Key Stage 4 vocational qualifications called Cambridge Nationals. They are available at Level 1 and Level 2, the size of a single GCSE. Forty percent of the content is assessed by exam, 60 percent is teacher assessed with a significant emphasis on practical activities. Cambridge Nationals are modular. We called together a wide range of stakeholders to explore the benefits of delivering our Cambridge Nationals qualifications, although what they told us will apply to vocational qualifications offered at Key Stage 4 by other boards. The arguments in favour of vocational learning pre-16 that they provided were compelling and numerous.

This is what they told us:

- **Written exams, alone, don't develop all the capabilities needed** from a broad curriculum.

- Nationals provide some of the **wider curriculum aims** set out in the introduction to the Key Stage 4 National Curriculum: "[to] prepare pupils at school for opportunities, responsibilities and the experiences of later life".

- Taking a Cambridge National supports **good careers advice**; it helps young people to learn about the world of work and to review their aspirations – including what they like and what they don't like. This is critical if more young people are to take technical and vocational options at 16.

- Discussions with employers reveal how much they value **resilience and agility** in young people and that resilience and agility can be fostered where learning requires **problem solving** and consistent **performance over time**.

- Subject-based exam systems place too much emphasis on 'getting the right answer' and too little on the learning journey. Learning should include **taking risks** in a way that **encourages collaboration and perseverance** and **freedom to make mistakes and learn from them**.

- **Ongoing feedback** can be an important element of vocational learning.

- A 'one hit' assessment at the end of a course doesn't mirror **modern working practices**.

- **Project and team-based working** are important elements; the example was given of a 'systems control fault finding' project where pupils explore a fault which requires team working and communication – people don't or shouldn't work in isolation in the workplace. A further example was given of where employer-set projects from Jaguar and Siemens develop team working and resilience – the client can send the pupils back to the drawing board!

- Vocational qualifications have the potential to develop **strong networking skills** in a world where remote working may lead to more precarious forms of employment.

- It is important to think about how **presentation skills** are best assessed. Pupils need to think about how they present themselves, how to sell a project and to consider what 'good' looks like in **an increasingly virtual world** where people meet face to face less often.

- Sector-specific disciplines can be transferable. **Many sectors are, in fact, 'cross sector'** so, for example, the demands for IT in the NHS are high. Many young people who study sports qualifications will go into sales or social work. They also develop many skills that support further academic study in any subject.

- A lot of project work should **be iterative, with improvements over time and with space and time to discover the right answer but also to make mistakes**. **Reflection** should be as much about the process undertaken as about the final outcome.

– Nationals are able to support **student wellbeing** by having fewer exams, and different approaches to learning and assessment.

Cambridge research has looked at the wider domains covered by Cambridge Technicals, summarised below.

Multiple Domains of knowledge and NEA in OCR's Cambridge National Qualifications – some research findings

Irenka Suto et al. (2020). A Way of Using Taxonomies to Demonstrate That Applied Qualifications and Curricula Cover Multiple Domains of Knowledge. *Research Matters: A Cambridge Assessment Publication, 30*, 26–34

– There are many different types of knowledge and different levels of processing knowledge. In this paper, Suto et al. highlight four types of knowledge (information, mental procedures, psychomotor procedures and interpersonal) and seven levels of processing (retrieval, comprehension, analysis, knowledge utilisation, metacognition, self system).

– Over several years, Cambridge's Assessment Research Division has used these frameworks as a way to systematically compare different types of assessments. The research has provided independent evidence of qualifications where NEA are used to assess different kinds of knowledge than exams and where NEAs are used to target a wider range of levels of mental processing than exams, especially higher levels of mental processing.

– For example, Child and Vitello, 2018; and Vitello and Child, 2018 found that NEAs in Cambridge Nationals assess **comprehension via symbolising, knowledge utilisation via experimenting and investigating, and target self-system processes** which is the highest level of mental processing in Suto et al.'s recommended taxonomy.

– Many teachers have told us that they believe that vocational qualifications provide a dimension to learning which is of benefit to all young people, alongside their GCSE studies. They should not be stereotyped as something for the less academically able.

Appendix 5: Climate change education – a call for action

"Students say the climate change education they receive is too focused on passing exams, and doesn't equip them with the skills needed to tackle future impacts of the climate crisis." *The British Science Association (BSA)*[188]

The British Science Association argued that climate education at Key Stage 4 is "constrained by exam requirements", with pupils studying GCSEs in both science and geography feeling that "they are taught 'just enough to pass the exam'."[189]
House of Lords Committee for 11–16 Education

"Improved understanding of the disproportionate impacts of climate change on vulnerable communities helps drive equitable climate action, and climate change education enables learners to discern accurate information from misinformation and claims of environmental benefits that do not exist (greenwashing)."
Ready for the world: Empowering learners through climate change education, Cambridge University Press & Assessment[190]

Why climate change education matters

It goes without saying that climate change is the biggest existential threat to the planet we face and, as such, we would expect to see a curriculum that supports young people in understanding the science behind it, the political, economic and social dilemmas involved, and the role they can play as citizens and as the employees and academics of the future.

Climate education matters in tackling the climate crisis because it:

- Helps people understand the root causes and consequences of climate change
- Shifts behaviour and attitudes towards more sustainable lifestyles; it not only enables shifts in those receiving that education but also the families and communities around those in education
- Builds the knowledge, competencies and skills necessary to adapt and innovate to save our planet, transforming economies, and improving health and security
- Benefits vulnerable groups that are disproportionately affected by climate change

Furthermore, we need to establish in young people foundational science knowledge and understanding and build the critical and evaluative skills for students to engage with emerging new knowledge and thinking, and enable them to challenge unsustainable ways of thinking. An illustration of some of the benefits of climate change education is provided below.

Climate change is a topic that engages young people

Largely, young people are interested and engaged in climate change and sustainability issues. *Teach the Future*,[191] a campaign group powered by young people, has given voice to their frustrations at the lack of climate change topics in the curriculum, let alone any systematic attempt to embed it as a core and urgent topic across the curriculum as a whole. There are opportunities to use climate change as a means of engaging many young people, including those at risk of becoming disengaged and cynical about their education. The topic of climate

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188 British Science Association. (2023). *UK secondary school pupils call for more relevant and rigorous climate change education*. https://www.britishscienceassociation.org/news/uk-secondary-school-pupils-call-for-more-relevant-and-rigorous-climate-change-education

189 House of Lords Education for 11-16 Year Olds Committee. (2023, December 12). *Requires improvement: urgent change for 11-16 education*. https://committees.parliament.uk/publications/42484/documents/211201/default/

190 Cambridge University Press & Assessment. (2024). *Ready for the World: Empowering learners through climate change education*. https://www.cambridgeinternational.org/Images/707181-climate-change-education-introduction-paper.pdf

191 Teach the Future website: https://www.teachthefuture.uk/

change, of itself, provides a compelling reason as to why education is important and purposeful.

Climate change education helps support mental health and wellbeing and the benefits of engaging with the natural world

Climate change anxiety in young people is an identified phenomenon. An article in *The Lancet* describes the stark findings of an international survey:

> *"Respondents across all countries were worried about climate change (59% were very or extremely worried and 84% were at least moderately worried). More than 50% reported each of the following emotions: sad, anxious, angry, powerless, helpless, and guilty. More than 45% of respondents said their feelings about climate change negatively affected their daily life and functioning, and many reported a high number of negative thoughts about climate change (eg, 75% said that they think the future is frightening and 83% said that they think people have failed to take care of the planet)."*[192]

Education must play a key role in giving young people a sense of hope and agency in relation to tackling climate change.

There are broader issues, related to climate change and sustainability, but distinct in themselves, concerning young people's access to and engagement with nature. Young people are increasingly sedentary and much of the classroom-based approach to education contributes to this. Getting outside of the classroom and observing nature is good for physical and mental well-being, and provides an opportunity to develop practical competencies, values and behaviours. This is expressed eloquently by Hayley Jarvis, head of physical activity for the mental health charity Mind, quoted in an article by the Woodland Trust:

> *"Ecotherapy, a type of formal treatment which involves doing activities outside in nature, can be as effective as antidepressants in treating mild to moderate depression and anxiety…*
>
> *Unlike working out in the gym or other indoor activities, the colours, sounds and smells we find outdoors stimulate our senses in a different way and can boost our mood. Getting away from modern life and into a relaxing outside space can allow us to switch off from everyday pressures, help relieve stress, and give us time to clear our heads."*[193]

Climate change education supports the development of a carbon literate generation

Increasingly, businesses are facing challenges in relation to sustainability. From corporates to micro businesses, the understanding of sustainability issues, associated legal, ethical and regulatory responsibilities, the need to respond to and shape changing consumer attitudes, and the impact of all this on the bottom line are critical. **The workforce of today and the future needs to be 'carbon literate'**[194] **at every level, as do all our citizens.** This is not the sole preserve of scientists, technicians and politicians.

Climate change education – the current situation

The current levels of education that most students receive about climate change and sustainability are haphazard, depending largely on the policies and approaches adopted by individual schools and the efforts of individual teachers. There are plenty of opportunities within the current curriculum for the delivery of climate-related topics but they are far from baked in. The thorough and methodical analysis by Teach the Future of GCSE Science and Geography exam papers illustrates this (our emphasis):

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192 Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, E., Mayall, E., Wray, B., Mellor, C., & van Susteren, L. (2021). Climate anxiety in children and young people and their beliefs about government responses to climate change: a global survey. *Lancet Planetary Health*, 5(12), e863-e873. https://doi.org/10.1016/S2542-5196(21)00278-3

193 Phillips, O. (2023, March 21). *Young people's climate anxiety is soaring due to lack of access to green space*. Woodland Trust. https://www.woodlandtrust.org.uk/press-centre/2023/03/young-people-climate-anxiety-green-space-access/

194 Carbon literacy is the knowledge and capacity required to create a positive shift in how mankind lives, works and behaves in response to climate change. Carbon Literacy Project. (n.d.). *What On Earth Is Carbon Literacy?* Retrieved August 19, 2024, from https://carbonliteracy.com/what-on-earth-is-carbon-literacy

"GCSE science papers covered a range of topics, with greenhouse gases, pollution and global warming appearing regularly in chemistry papers. Biology papers often mention biodiversity and conservation. Relevant physics papers usually concern renewable energy sources. However, it must be noted that over one third of papers analysed contained no mention of climate change related topics, and many of those which did, contained only one or two relevant questions. ***Depending on the exam board and tier, it would be possible for a student to have sat an entire set of science qualifications without having to have answered more than one question on climate change, sustainability or the environment.***

For current students using past papers as a learning and revision tool, and for teachers using these as guidelines for teaching, the lack of questions convey the message that these topics do not require significant learning time or emphasis dedicated to them. Geography papers were significantly better in their inclusion of these topics, although this may be expected from a subject which specialises in the study of the physical features of the earth. A range of topics were covered across the papers and boards, including sustainable development, renewable energy, and conservation. We noticed however that questions are often problem-centred, focussing on the causes and effects of climate change, as opposed to solutions, something which we would like to see more emphasis given to in the future."[195]

Roadblocks to climate education

Reboot the Future, in a report sponsored by Cambridge University Press & Assessment, identified some of the 'roadblocks' to teaching sustainability in the current system.[196] The graphic below, taken from this report, calls out some of our overarching themes – a crowded curriculum, the over-emphasis on examinations, and the need for more teacher support and development.

Figure 18: The roadblocks to teaching sustainably

Progress is being made with climate education

Although there is much more to be done it would be wrong to suggest that progress isn't being made with climate education. Such progress is largely as a result of the dedication and

195 Teach the Future. (2023, May 15). *Failing the climate test: exam boards and the climate emergency*. https://www.teachthefuture.uk/blog/failing-the-climate-test-exam-boards-and-the-climate-emergency

196 Reboot the Future & Cambridge University Press & Assessment. (2023). *The Rebooting Education Report 2023*. https://www.rebootthefuture.org/media/Rebooting-Education-Report-2023-9MB.pdf

hard work of individuals and organisations (often in collaboration with each other) to provide resources and a whole infrastructure to support climate change education and opportunities to learn in the natural world.

For example:

- Extensive work has been carried out to map opportunities for teaching climate change to the existing national curriculum and associated examinations. A synthesis of all these mappings is presented in the impressive and expert work of the National Climate Education Action Plan Group (NCEAP) in their report, *Climate Change in the Curriculum*.[197] The mapping is impressive and detailed and is already being used by many teachers to inform teaching plans and by curriculum leads. They are also useful tools for the inclusion of climate change topics in refreshed textbooks, support materials, training and the content of exam questions. Ultimately, the work carried out on these mappings can greatly support approaches to including climate change in any future review of the whole curriculum.

- Exam boards and publishers are increasing climate change content in textbooks, support materials and exam questions. This is happening in many subjects – OCR is refreshing its Geography B specification (Geography for Enquiring Minds) to provide a clearer focus on climate change, with guidance and support.[198]

- Cambridge University Press & Assessment is leading on a major climate education initiative to build hubs and partnerships and provide support. With the strapline, 'We're empowering a generation of learners who can tackle the climate crisis', it seeks to inspire and inform climate education on an international basis.[199]

- OCR is developing a GCSE in **Natural History**:

  "To fully appreciate the complexities of the natural world it is important to study it closely and interact with it through field research and measurement. Natural history provides opportunities to develop skills out in the field as well as in a classroom and/or laboratory. Studying natural history makes an important contribution to understanding the relationship between the natural world and culture, policy decisions, scientific research and technology." From OCR's Purpose statement for the GCSE in Natural History."[200]

- As part of our commitment to support the inclusion of green issues in the curriculum, OCR is planning to introduce a new qualification at Key Stage 4. The Cambridge National in Sustainability: Business and Communities is aimed at young people at school who wish to expand their knowledge and understanding of sustainability. 'Green jobs' will not be niche, so the intention is that the qualification reflects the fact that sustainability and climate change will touch every career.

- There are numerous high-quality new and established initiatives to support education in nature and the teaching of climate change. These are supported by a host of organisations who often work together to support their shared aims, including Natural England, the Natural History Museum, the Eden Project, the Royal Horticultural Society, the Royal Meteorological Society charities such as Sustainability and Environmental Education (SEEd) and the Wildlife Trusts. This list is far from exclusive and we apologise for the numerous omissions. OCR works with many of these in support of our work on natural

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197 Knight, S., & McQuaid, S. (n.d.). *Climate Education in the Curriculum: From Early Years to Further Education in England*. University of Reading. https://static.reading.ac.uk/content/PDFs/files/Planet/climate-education-in-curriculum.pdf

198 For an example, see: Harris, J. (2022, February 21). *Incorporating climate change into A Level Biology*. OCR Blog. https://www.ocr.org.uk/blog/incorporating-climate-change-into-alevel-biology/

199 Cambridge University Press & Assessment. (n.d.). *Climate Education*. Retrieved August 19, 2024, from https://www.cambridge.org/people-and-planet/climate-change-education

200 OCR. (n.d.). *GCSE Natural History*. Retrieved August 19, 2024, from https://teach.ocr.org.uk/naturalhistory

history education to commission relevant blogs, surveys, podcasts, articles and materials.[201] The dedication, expertise and passion of the individuals involved has been inspiring.

Some actions needed to support quality climate education

Key to implementing a successful climate education strategy will be:

- Making a national commitment to ensuring that a main curriculum aim should be to develop young people who:
  - Are engaged with and passionate about the natural world
  - Want to do their best to protect it
  - Can influence their wider communities and feel empowered to make a contribution
  - Are interested in future career pathways related to tackling climate change
- Encouraging the provision of textbooks and support materials that include greater coverage of climate change. This must be quality assured so that it is accurate, contemporary and high quality.
- Co-ordinating and harnessing the outstanding and expert work of the many organisations committed to this field – they are an incredible resource
- Listening to young people and utilising their passion for this subject
- Making available qualifications at Key Stage 4 that specifically cover issues relating to natural history and to sustainability
- Making climate education a core purpose of a review of the Key Stage 3 and 4 curriculum, identifying and incorporating opportunities to learn about climate change and sustainability across a wider range of subjects
- Requiring, in an appropriate and proportionate way, that climate education features in GCSE content and is assessed and recognised accordingly
- Ensuring that there is enough space and time in the curriculum for climate education
- Providing teachers with training and support to develop their confidence and expertise in teaching climate-related topics
- Providing a clear focus on green careers and progression routes to the desperately needed future green workforce

Above all, it is essential that the government should provide leadership and a sense of urgency in supporting the communities of interested parties in implementing climate change education.

201 For access to the rich variety of articles produced by our partners, see : OCR. (n.d.). *Articles from Natural History supporters*. Retrieved August 19, 2024, from https://teach.ocr.org.uk/ocr-natural-history-supporter-articles?hsCtaTracking=423e789b-8a5a-497a-91fd-c03c7495de32%7Cffa5380c-7429-46fa-bbe5-21d5747c7e12

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