The Data Source for *Making Maths and English Work for All – Conversations and Desk Research*

Research report

March 2015
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# Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ACL</td>
<td>Adult and Community Learning</td>
</tr>
<tr>
<td>AELP</td>
<td>Association of Employment and Learning Providers</td>
</tr>
<tr>
<td>AO</td>
<td>Awarding Organisation</td>
</tr>
<tr>
<td>AOC</td>
<td>Association of Colleges</td>
</tr>
<tr>
<td>BIS</td>
<td>Department for Business, Innovation and Skills</td>
</tr>
<tr>
<td>CPD</td>
<td>Continuing Professional Development</td>
</tr>
<tr>
<td>DfE</td>
<td>Department for Education</td>
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<tr>
<td>ESOL</td>
<td>English for Speakers Of Other Languages</td>
</tr>
<tr>
<td>FE</td>
<td>Further Education</td>
</tr>
<tr>
<td>FL</td>
<td>Foundation Learning</td>
</tr>
<tr>
<td>FS</td>
<td>Functional Skills</td>
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<tr>
<td>FSMQ</td>
<td>Free Standing Mathematics Qualifications</td>
</tr>
<tr>
<td>FSQ</td>
<td>Functional Skills Qualifications</td>
</tr>
<tr>
<td>GCSE/IGCSE</td>
<td>General Certificate of Secondary Education/ International General Certificate of Secondary Education</td>
</tr>
<tr>
<td>HE</td>
<td>Higher Education</td>
</tr>
<tr>
<td>L&amp;N</td>
<td>Literacy and Numeracy</td>
</tr>
<tr>
<td>MMEW</td>
<td>Making maths and English Work for all</td>
</tr>
<tr>
<td>NatSpec</td>
<td>Association of National Specialist Colleges</td>
</tr>
<tr>
<td>NEET</td>
<td>Not in Education, Employment or Training</td>
</tr>
<tr>
<td>NIACE</td>
<td>National Institute of Adult Continuing Education</td>
</tr>
<tr>
<td>NRDC</td>
<td>National Research and Development Centre for adult literacy and numeracy</td>
</tr>
<tr>
<td>QCF</td>
<td>Qualifications and Credit Framework</td>
</tr>
<tr>
<td>SEND</td>
<td>Special Educational Needs and Disabilities</td>
</tr>
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<td>SME</td>
<td>Small and Medium-sized Enterprises</td>
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1. Introduction and Methodology

In November 2014, Nick Boles, Minister of State for Skills and Equalities, through the Department for Business, Innovation and Skills (BIS) and the Department for Education (DfE) asked the Education and Training Foundation to lead a review on what employers and learners need from the maths and English qualifications taken by students who are not studying GCSEs.

GCSE is a recognised brand amongst employers and the public, and government policy is to enable as many young people as possible to have the chance to take and achieve GCSE maths and English at grade C or above at or around the age of 16.

The Foundation working closely with a Steering Group and hearing from expert witnesses, also commissioned, in January 2015, a delivery partner -Pye Tait Consulting- to conduct an open consultation involving employers, stakeholders, practitioners and, a small sample of learners (a separate study was on-going on behalf of the Foundation which directly focussed on learners).

Making maths and English Work for All (MMEW) became the promotional name for the review, during which Pye Tait was involved by undertaking desk research and leading on the open consultation. Pye Tait Consulting planned a range of opportunities and ways for all to get involved in, and contribute towards, the conversation on making maths and English work for all.

The methodology is explained further in sections 1.1 to 1.4.

It is important to stress that this was a ‘phase one’ exercise, opening up discussions and identifying issues, but that it could not possibly be, in this very short time frame, a definitive, fully researched answer to the key research questions, which were:

- What maths\(^1\) and English skills do employers value and need?
- What awareness do employers have of other non-GCSE qualifications? and
- How far do the other non-GCSE qualifications deliver the skills employers need?

The Making maths and English Work for All review examined the routes (primarily using qualifications as proxies for skills) available to those who could benefit from improving either or both maths and English skills to GCSE grades A*-C. This specific cohort includes current employees and new entrants, learners on Apprenticeships or Traineeships, people seeking work or those in offender learning. For many of these individuals, re-taking GCSEs is not the most appropriate route to acquiring or demonstrating these skills.

Key to this review was open engagement with employers, stakeholders and practitioners to seek views on the effectiveness of, and if and where improvements might be required, on these alternative education routes. Engagement focused on how to ensure current and future employees

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\(^1\) Throughout the review and the report the term maths has been used instead of mathematics, unless it was appropriate to use the latter for a particular reason.
Making Maths and English Work for All

have the opportunity to achieve a level equivalent to GCSE A*-C in maths and English so that they can meet life and work needs and expectations.

The study is part of a lengthy history of research and reports on maths and English skills in England and across the wider UK. It stems from employer feedback – both anecdotal and statistical – concerning the levels of competence in these subjects in the workforce but specifically in the new entrants from schools.

It takes place against the background of government consideration of making GCSE at those grades (or future equivalents) the minimum standard of achievement with associated requirements for young people who are graded below that span of grades (i.e. at grade D and below) to re-sit their GCSE to achieve at least a grade C. Part of this consideration is being given to making GCSEs a requirement of Apprenticeships.

The principal work for the Making maths and English Work for All review was completed in a very short time span between January and late February 2015, with analysis and reporting, consisting of an interim report and several submissions of partially complete report sections, and the final source data report complete by March 23rd.

In response to the study’s tight timescale the research approach was based on four complementary work-streams running concurrently and, wherever possible, in a cross-supportive manner. The importance of the interim reporting target in the first few days of March meant that the vast majority of the surveying and interviews had to be completed within three to four weeks which necessitated a parallel research design and a period of initial analysis at the interim point.

Following that report the surveys and qualitative streams were completed and a final period of analysis entered into. The final report is based on the views and feedback of just under 1,400 employers, stakeholders and practitioners.

1.1 Work-Stream 1: Raising awareness

Stringent engagement targets were set for Pye Tait Consulting by the Education and Training Foundation (the Foundation) (see Table 1) so it was clear from the outset that promotion of the review and of the mechanisms available for participation was an extremely high priority.

Following discussions with the Foundation these promotion activities were initiated in January 2015 and continued throughout the consultation phase almost to mid-March 2015.

The project was governed by a Steering Group with representatives from the Federation of Small Businesses (FSB), The UK Commission for Employment and Skills (UKCES), the Association of Employment and Learning Providers (AELP), the Association of Colleges (AOC) and the National Network of Local Adult Learning Providers (HOLEX). The project had an impartial chair, Professor Ed Sallis, OBE.

A complex, multi-channel communication plan was devised between Pye Tait Consulting and the Foundation.
Making Maths and English Work for All

It consisted, as well as word of mouth and cascade promotion, of large email mailings, a dedicated web-zone and promotion via other websites, a number of press articles, promotional hand-outs, and social media. All were used to raise awareness of the review and promote the consultation and engagement activities among employers, education practitioners and stakeholders.

This plan is further explained in Section 1.3.

1.2 Work-Stream 2: Desk research

The issue of maths and English skills at the level below GCSE grade C or its equivalent has been a concern for many years. Consequently a great many research projects and government studies are extant, in addition to papers and studies running concurrently with this study.

A literature review was, therefore, conducted in parallel to the other work streams (see section 2).

The review of existing literature and data was mainly conducted in the early stages of the project but continued right through to its final analysis stage.

In total, well over sixty reports and data sources were reviewed from a wide range of different sources stretching back to the Newbold Report of 1921 and taking into account expert input from Steering Group members (see Bibliography in Appendix 5). These sources all focussed on one or more of the key topics of the maths and English debate, mainly:

- the UK’s world ranking in maths and English and how this has changed over time;
- knowledge and skills gaps and challenges in maths and English among young people;
- the maths and English skills needs of employers;
- existing alternative educational routes and non-GCSE qualifications.

The literature review overlapped with the consultation stream so as to include reports and data recommended and/or provided by consultation participants.

1.3 Work-Stream 3: Consultation

This took place over a five week period and operated concurrently with other streams. The target was to engage with a robust number of stakeholders in the system at this level including employers of all sizes, further education practitioners, stakeholders, and learners. Due to the very tight timescale it was agreed that it would not be possible to engage widely with learners.

Four key groups were identified for the consultation:

- employers – a coverage of small and large and across a range of primary, secondary and tertiary sectors in England;

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2 In order to focus more clearly on employers likely to employ entry-level employees at the level with which this review is concerned, the sample was partially focused on manufacturing and construction (35% of respondents) but also included a very wide range of sectors and sizes of company (see Appendix 1)
Making Maths and English Work for All

- **education practitioners** – teachers, trainers, tutors and teaching assistants in the Further Education sectors, private training providers, offender learning organisations and adult and community learning establishments;

- **stakeholders** – representatives from: awarding organisations; subject specialist organisations; trade associations; unions and sector, employer and learner representative organisations;

- **learners** – post-16 participants.

Table 1 below presents the target and achieved numbers of individuals consulting in each group.

A range of activities were hosted across different channels to ensure maximum participation across four and a half weeks from 27th January to 27th February 2015:

- Two online surveys: one targeting employers, the other for practitioners and other stakeholders;
- Telephone survey with employers;
- In-depth telephone interviews with employers, practitioners and stakeholders;
- 11 face-to-face group/workshop discussions with employers, practitioners, stakeholders (including awarding organisations) and learners;
- Three webinars with practitioners and stakeholders (also including awarding organisations).

Table 1: Number of participants involved in the conversations

<table>
<thead>
<tr>
<th>Type</th>
<th>Target number</th>
<th>Achieved number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employers</td>
<td>425</td>
<td>646</td>
</tr>
<tr>
<td>Practitioners</td>
<td>375</td>
<td>489</td>
</tr>
<tr>
<td>Stakeholders</td>
<td></td>
<td>229</td>
</tr>
<tr>
<td>Learners</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td>TOTAL</td>
<td>830</td>
<td>1,395</td>
</tr>
</tbody>
</table>

The variety of different consultation activities was chosen to allow for a more varied and comprehensive exploration of people’s views and experiences.

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3 People were encouraged to participate in more than one of the consultation activities. A number of education practitioners and stakeholders completed the online survey and then elaborated on their responses in a telephone interview or workshop or webinar event. Therefore, there may be a small element of duplication among the practitioner and stakeholder achieved totals.
The follow-on, in-depth telephone interviews, plus workshop and webinar discussions built on issues raised in the predominately qualitative online and telephone surveys, and explored these in more detail.

Analysis began towards the end of Work-Stream Three and so the later consultation events took on a more reflective approach in which participants were encouraged to discuss emerging findings and recommendations.

The online survey scripts and telephone interview topic guides were all developed by Pye Tait Consulting in collaboration with the project Steering Group. These scripts were approved by the Foundation and Steering Group before implementation.

Time did not permit greater elaboration with employers beyond interviews and completions on the online survey. There were many examples of employers willing to talk to us about their skill needs and their use of routes other than GCSEs: however, the creation of case studies or named examples, approved by the employer, takes time to create. Although we know of many examples, the Army was able to respond within the very short time-frame with an excellent example of non-GCSE qualifications being used in a stand-alone form as well as within Apprenticeships. This is a model of a large employer using a variety of routes to up-skill and improve the literacy and numeracy needs of new entrants and the existing workforce, via not just Apprenticeships, but also Functional Skills qualifications (further detail is also provided in Appendix 2).

1.4 Work-Stream 4: Analysis and reporting

The consultation revealed that the maths and English debate remains an important and contentious issue for many. It was, therefore, vital to accurately reflect the messages coming out of discussions with employers, practitioners, stakeholders and learners, and to explore differences in opinion.

Although ideally a process to be conducted at the completion of all research activities, the analysis of the very large amount of data gathered through this study had to be analysed in a series of stages and repeated at least twice. This was due to the unavoidable necessity to present interim findings to government at a point several weeks prior to the official conclusion of the study in mid-March.

However, the extensive data collected as part of this review forms a detailed evidence base on non-GCSE educational routes and qualifications available to post-16 adult learners as well as their value in the eyes of employers.

The findings from this review have informed the recommendations put forward by the Foundation on ways it considers provision and recognition of non-GCSE maths and English educational routes should be improved.
2. Background

2.1 Introduction - Stubborn Issues

Concern with maths and English is not a new phenomenon in England or the wider UK but, in the context of the current study, it is important to distinguish between those concerns which have arisen over the years with respect to technical issues regarding syllabuses, teaching methods and examinations at post-16 levels, and those which focused on the maths and English abilities of the 14-16 age group and among the adult population of those who had low attainment and capability in one or both of the subjects.

Across the critical subjects of maths and English scores of studies have been undertaken and reports written, many of which addressed the needs of those who were unable to acquire sufficient skill at school or who could not meet the “pass” standards of the day. What follows is a sample of those many studies illustrating pertinent findings and comments from each.

At the turn of the twentieth century the fundamental concern was with the immense problem of illiteracy and innumeracy in the working population. In 1921 the Newbolt Report made a number of recommendations of which a few resonate even a century later and were mentioned by employers and practitioners alike during the research for this current report. Among its comments were that:

- every teacher is a teacher of English;
- children should be practised, not only in the art of speaking and reading, but also in the art of listening;
- pupils specialising in maths or science should be taught to use English accurately.

The issues with the General Certificate of Education (GCE) examinations and the lack of arrangements for those who either could not sit them or did not have the ability to pass were reviewed for the Beloe Report of 1960 which looked at a wide range of “alternatives” to GCE exams and recommended the creation of a new system of exams for less academic 15 year olds, to run alongside the existing GCE O Levels. As a result, the Certificate of Secondary Education (CSE) was introduced in 1965. It was the increasing public perception of the CSEs as being somehow “second-rate” which led to their amalgamation with GCE “O” Levels through the design and introduction of GCSEs (announced in 1984).

However, it was the Newsom Report of 1963 which perhaps did most to set in train the focus on “the other half” – that is, those who were unable to attain GCE passes but who had no real alternative to achieving in important subject areas such as English and maths. Some selected quotes from that report are apposite:

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4 Newbolt Report (1921); The Teaching of English in England
5 Formerly comprising Ordinary level – O Level, now the General Certificate of Secondary Education – GCSE, and the Advanced Level - A Levels - used as an entry qualification for universities in the United Kingdom, and further afield
6 Beloe Report (1960); Secondary School Examinations other than the GCE.
7 Newsom Report (1963); Half Our Future.
There are ... some objectives which can and ought deliberately to be pursued through every part of the curriculum. Very high in this list we should place improvement in powers of speech: not simply improvement in the quality and clearness of enunciation, although that is needed, but a general extension of vocabulary, and, with it, a surer command over the structures of spoken English and the expression of ideas. That means seizing the opportunity of every lesson, in engineering or housecraft or science as well as in English, to provide material for discussion - genuine discussion, not mere testing by teacher’s question and pupil’s answer.

Parents and employers are naturally anxious to be assured in all this that sufficient attention is being paid to basic skills. It is sheer common sense to urge that every possible opportunity, throughout the whole of school work, be taken to provide the pupils with practice in reading, writing and elementary mathematics, and in searching out information for themselves.

Another feature which we should welcome would be an emphasis on oral work. Any test of the pupils’ attainments ought to include their command of spoken English.

Reading skills were a major focus for the Bullock Report of 19758 which lamented the state of language attainment in the English population and made a number of recommendations, including, that:

- every school should devise a systematic policy for the development of reading competence in pupils of all ages and ability levels;
- LEAs and schools should introduce early screening procedures to prevent cumulative language and reading failure and to guarantee individual diagnosis and treatment provision for the tuition of adult illiterates and semi-literates should be greatly increased, and there should be a national reference point for the co-ordination of information and support;

The Cockcroft Report published in 1982 placed the spotlight on maths and specifically looked at the “real” needs of employers9. Its findings underlined the recognition of widespread functional innumeracy and also cast stark light on one of its probable causes:

The extent to which the need to undertake even an apparently simple and straightforward piece of mathematics could induce feelings of anxiety, helplessness, fear and even guilt in some of those interviewed was, perhaps, the most striking feature of the study.

Cockroft described the basic skills which his Committee regarded as essential for adults – “the ability to read numbers and to count, to tell the time, to pay for purchases and to give change, to weigh

8 Bullock Report (1975); A language for life
and measure, to understand straightforward timetables and simple graphs and charts, and to carry out any necessary calculations associated with these and stressed one of the skills which employers in the current study also emphasised:

... it is important to have the feeling for number which permits sensible estimation and approximation - of the kind, for instance, which makes it possible to realise that the cost of 3 items at 95p each will be a little less than £3 - and which enables straightforward mental calculation to be accomplished.

Although his study failed to replicate the findings, Cockroft mentioned the CBI’s evidence to the Parliamentary Expenditure Committee in 1977:

Employers are becoming increasingly concerned that many school leavers, particularly those leaving at the statutory age have not acquired a minimum acceptable standard in the fundamental skills involved in reading, writing, arithmetic and communication. This shows up in the results of nearly every educational enquiry made amongst the CBI membership, and is backed up by continuing evidence from training officers in industry and further education lecturers that young people at 16+ cannot pass simple tests in mathematics and require remedial tuition before training and further education courses can be started.

The stubborn nature of the problem of low attainment and functional illiteracy and innumeracy is underlined by the 1995 study by the London Mathematical Society and illustrated in the International Adult Literacy Survey (carried out between 1994-96), in which the outcomes for the UK were so poor they resulted in media headlines such as ‘1 in 5 adults cannot read’. This situation prompted a major national enquiry, led by Lord Moser, resulting in Government funding of the Skills for Life initiative which channelled millions of pounds into the development of basic skills programmes for adults (see section 3.3.4).

Some seventeen years later, evidence of this continuing issue is being emphasised as the target of the latest initiative by Aviva (among many others) in 2015 to tackle these issues. Aviva states that its own research – almost 100 years after the Newbold Report – reveals that no less than two-thirds of parents cannot complete the maths homework given to primary school children.

2.2 Current performance in maths and English

The results of the recent Aviva study is reinforced by research by NIACE in 2012 which found that “over eight million adults still lack functional numeracy skills and over five million lack functional literacy skills”, with the added, somewhat worrying, concern that maths and English competence had not improved at lower skill levels since 2003.
The issue of maths and English skills in England has been brought into greater clarity recently by OECD’s *Skills Outlook 2013*. This research found that England’s performance was not good. The nation’s literacy score is merely close to the OECD average, and the numeracy score is noticeably below average\(^\text{15}\). These statistics have subsequently been referenced and cited by a wide range of stakeholders including the Education and Training Foundation, the Times Educational Supplement and BIS. The low ranking for England in numeracy is a particular cause of concern. Many sources, as cited earlier in this section, and more recent research including Vorderman et al\(^\text{16}\), note the importance of maths skills to the UK when attempting to compete internationally in commerce and industry.

*Mathematics is a 'critically important' subject. It is a language without which the entire global infrastructure is struck dumb.*

Another agency with a dedicated focus and remit for numeracy also stressed in its latest annual paper the scale of the problem in numeracy facing the UK, its depths as calculated by OECD and the impacts on the economy and on individuals\(^\text{17}\).

In its overview, National Numeracy re-stated these findings from the recent OECD study in a powerfully concentrated format:

- 78% of UK adults are operating below level 2 in maths (cf 43% in literacy)
- A quarter of adults (around 17 million people) are operating with numeracy BELOW entry level 3 (i.e. the expectations of a 9 year old).
- Since 2011, while adult performance in literacy appears to have increased, ability in numeracy has actually fallen.
- The average annual cost to employers of low basic skills is £3.2 billion per year
- The cost to the UK economy of low numeracy is estimated at around £20.2 billion which is roughly 1.3 per cent of GDP
- Just over 1/4 of skills shortage vacancies result from a lack of numeracy skills

\(^{15}\) OECD (2013) *Skills Outlook 2013 First Results from the Survey of Adult Skills.*  
\(^{16}\) Vorderman, C et al (2011) *A world-class mathematics education for all our young people.*  
\(^{17}\) National Numeracy; *The National Numeracy Overview*; January 2015
Figure 1: Adults with Skills Equivalent to ‘C’ or Above at GCSE in England (2012)

The Education and Training Foundation acting on these many concerns about numeracy in 2014, commissioned research to look overseas as well as in the UK at what works well in maths teaching. It found evidence suggesting that one in five 16-19 year olds are functionally innumerate. Moreover, the same research highlighted a perceived lack of applied or practical maths (as needed in the workplace) and its importance in the syllabus in addition to the underlying concepts of mathematics.

This concern was partly behind the development, in Wales, of a new GCSE (available for teaching from 2015) that focuses on Numeracy. It meets a recommendation in the Welsh Review of Qualifications for 14 to 19-year-olds in Wales and aims to develop confidence and a positive attitude towards maths. A strength is its content on:

*Number, measure and statistics plus some aspects of Algebra, Geometry and Probability* and whereby assessment is in application of the content in context.

Some stakeholders for the MMEW mentioned the Welsh GCSE as going some way towards their preferred focus on the teaching of mathematical literacy.

A National Numeracy objective which resonates with the feedback from our participants is: “A separate and universally respected qualification in numeracy is needed alongside GCSE maths”.

Many stakeholders and several employers in our research stressed the need for such a qualification to act in a number of ways:

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19 Welsh Government (2012), Review of Qualifications for 14 to 19 year olds in Wales, November 2012
As a means of boosting practical and business-related skills in maths and English,
As a stepping stone to higher (i.e. Level 2 GCSE) qualifications, and
As a means of enhancing confidence and removing the fear factor in maths (and English) in more achievable steps.

National Numeracy also launched an online campaign and tool designed to test and enhance maths skills at all levels and, in parallel, is working to understand the behavioural aspects of maths skills – some of which were mentioned by many employers and stakeholders in our conversations for this review (National Numeracy’s visual representation of the behavioural environment is included in Appendix 4).

Our participants summed this aspect up as a trend of “aren’t I cool, I can’t do maths/English” attitude. This attitude to maths in particular has been highlighted in many places20 - with many of the media publicising the issue in words similar to those used by the Irish Times

‘I’m useless at maths’- should never be a boast’.

The Foundation’s Effective Practices in Post-16 Vocational Maths research completed in late 2014 referred to it as: ‘a negative culture of maths learning in the UK and an acceptance of failure in maths’21.

2.3 Government policy

The 2011 Review of Vocational Education – The Wolf Report drew close attention to the importance of Mathematics and English GCSEs for students’ future prospects and to the percentage of the cohort who are unsuccessful in attaining these qualifications between the ages of 16 and 18 at grades A* to C.

In response to the many other reports, and directly in answer to the Wolf Report the Government proceeded with its proposals by announcing in 2014 that it will strengthen the condition of funding regarding maths and English.

Full-time pupils who achieve a D in GCSE English or maths will continue with GCSEs rather than other types of qualification22,23. Those who do not achieve a D or above, or who are studying part-time, will be expected to continue to pursue A*-C at GCSE, potentially after completing an approved ‘stepping stone’ qualification. To further emphasise the importance of these skills, English and maths are recognised in Ofqual grades for providers24.

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21 Education and Training Foundation, Effective Practices in Post-16 Vocational Maths, 2014
22 BIS (2014b) New English and maths GCSEs: Post-16 education and skills.
24 BIS (2014b) New English and maths GCSEs: Post-16 education and skills.
The context of 2011 as presented by Wolf articulated a picture of institutions failing to offer GCSE maths and English for re-sits:

‘recent years have seen the near-elimination of maths and English GCSEs from post 15 study: most young people who fail both, or even one, at the end of KS4 are given no opportunity to re-take’.

She went on to say that varying teaching approaches can be a successful strategy and that a second attempt at a qualification is not a pointless exercise. The Wolf report suggested that many teachers and trainers in those institutions were not equipped to teach maths and English.

Apprentices have to be offered a Level 2 Functional Skills or GCSE in maths or English if they failed to achieve a level 2 standard in these subjects. Level 1 English and maths are the minimum requirements to complete an Intermediate Apprenticeships. The expectation is that apprentices are given the opportunity towards achieving a GCSE at grade A* to C in Maths and/or English if they have already achieved the equivalent functional skill at level 2.

These developments in policy link to Recommendation #9 in the 2011 Wolf review of vocational education, which proposed that students under the age of 19 should be given training which either directly leads to A*-C at English and maths GCSEs or provides significant progress towards entering and succeeding at GCSEs.

Some sources have already noted the additional stress placed upon providers by these increased requirements for English and maths attainment. This additional stress was noted by the Education and Training Foundation in 2014. Macey in 2013 specifically noted a tension between employers’ desire for English and maths skills and their anxieties about their staff being able to achieve relevant qualifications. In one particular example, Macey remarked that some employers are concerned that the requirement for apprentices to achieve English and maths qualifications at GCSE Level could prevent some talented apprentices from finishing their course. Identical concerns have been expressed by the Care sector which is already labouring under the requirement for its apprentices to sit and pass GCSE English and maths.

Conversely, GCSEs forming an entry requirement to Apprenticeships is already the norm for some sectors (e.g. Financial Services and Engineering) and for some occupations.

BIS is investigating the possibility of mandatory maths and English training for those on Jobseeker’s Allowance who do not have Level 2 qualifications. A pilot was initiated in late 2014 to test the viability of delivering Functional Skills or GCSEs using a partially or fully online approach. The Labour Party is also interested in this possibility, stating in 2014 that they wish to make English and maths training mandatory for jobseekers lacking “basic skills”.

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2.4 The literature on employers’ needs

Cockroft, in 1982, looked into the issue of employer needs in maths in great detail and virtually rejected the CBI’s then claims that employers had noted a genuine problem with a lack of skill in maths among new entrants. That was thirty years ago and, whatever the rights and wrongs of those claims and counter-claims, the business world has changed markedly since then. There are now very few job-roles whose requirements are minimal where maths skills are concerned, and the modern emphasis on excellent customer service and the use of written and spoken communication through telephones, emails, and texts (as well as face to face customer care) has led to enhanced requirements in written and spoken English.

Several sources have noted this trend - that, in recent years, the number of low-skilled jobs which only require minimal maths and English skills has decreased, whereas jobs which require a higher level of English (and communications) and maths ability have become more common; a theme on which the majority of the extensive report by UKCES on jobs and skills for 2030 is predicated. For example, when discussing mathematics, Vorderman et al. mention that employment in transport and machinery has decreased while employment in middle management, professional services and sales has increased. BIS research into the benefits of English and maths qualifications found that they have a positive impact on hourly earnings, with GCSE maths in particular having a noticeable benefit of an earnings increase of 4.5% in the first year, continuing with time to a peak of 19%.

A presentation by the Department for Education and a report by Mathematics in Education and Industry (MEI) pointed out that achievement at Level 2 provides the basis for studying maths at higher levels. Higher level maths skills are an enabler for careers in STEM subjects, considered crucial to the UK economy, which is effectively fighting for business in a wider global economy.

The problem has – alongside the rapid change in technology – increased during the first decade or so of the twenty-first century.

Smith reported in 2004 that employers in a range of sectors (engineering, construction, pharmaceutical, financial and retail) need access to a larger pool of skilled statisticians. The same report mentions the need for mathematical skills at all levels in order to maintain the UK’s international competitiveness. Smith suggests that the competitiveness of UK maths skills has been a consistent concern for over a decade but it could be argued that the concern with maths in particular has been around for a good deal longer. Among others, Vorderman et al. referred to this issue again in 2011.

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31 Vorderman, C. et al. (2011) *A world-class mathematics education for all our young people.*
32 BIS (2013c) *A Disaggregated Analysis of the Long Run Impact of Vocational Qualifications.* 2013
Various sources provide evidence that employers need better English and maths skills from new entrants and/or existing employees.

Recently, a survey by the CBI discovered that 38% of employers were dissatisfied with the basic numeracy of entrants from school/college and 36% were dissatisfied with basic literacy 36.

Results from the previous three years were very similar, showing no sustained changes in levels of satisfaction. Slightly older research by CBI found that over a fifth of surveyed employers provide remedial training in numeracy and in literacy for leavers from education 37. Research from six years back for CBI 38 identifies a very detailed list of employers’ maths, English and ICT needs, which albeit is showing some issues of age, is still very relevant to today and reinforced the findings of our survey (see sections 4.2 and 4.3).

Although it acknowledged that the specific requirements vary between sectors and job roles, CBI’s more recent research (2014) found that the greatest concerns among employers were about employees’ ability in the following areas (this is supported by other similar research 39, 40, 41):

**English**
- General communication skills;
- Speaking clearly and comprehensibly;
- Listening and reacting appropriately;
- Vocabulary (a wider ability to use appropriate words accurately);
- Punctuation and grammar;
- Spelling;
- The ability to write longer pieces of text than just a few paragraphs;
- The ability to compose business-appropriate correspondence; and
- The ability to research, communicate and redact information.

**Maths**
- Awareness of different measures and converting between them;
- Basic understanding of probabilities
- Calculating and interpreting percentages;
- Extracting necessary information, even from basic texts;
- Calculate change, including calculating discounts; and
- Estimate resources needed.
- Interpretation of quantitative data;
- Mental arithmetic;
- Noticing possible rogue results/calculation errors; and
- Using fractions, decimals and ratios.

41 The Education and Training Foundation (2014) Effective practices in post-16 maths.
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The research by CBI in 2006 stressed that literacy is important for the transmission of information within companies (including between senior and managerial-level staff and supervisors and operatives), especially in a context of increasing use of work plans and performance reports.

The same report also observed that even employees with adequate reading skills may struggle with writing skills, which can limit the variety of tasks that they are able to complete. Moreover, it is suggested that weak writing skills can become a barrier to starting work or changing jobs (including through internal promotion).42

The same source noted that about a third of employers remarked that they would most like to see mental arithmetic improved amongst school leavers (an important priority amongst a list of maths skill gaps requiring attention).

The CBI presented one case study which includes the observation that operative-level staff at a manufacturing company have had increased requirements for literacy and numeracy skills in recent years. The tasks that operatives perform have changed to include learning lengthier production processes and understanding their targets when expressed as a percentage.43

Furthermore, employer requirements extend beyond pure academic achievement. Some commentators have emphasised that employees must know how to apply maths and English within their workplace context – a requirement which is additional to, and potentially very different to, the academic understanding they may have developed.44,45,46

The ability to apply maths and English skills to the workplace might involve using methods in contexts that are unfamiliar from school, or judging the most appropriate way to use existing skills in the workplace (for example, when phrasing communications).47,48 Related to this, BIS suggested in 2014 that post-16 English and maths teaching should be linked to sectors or even specific vocations.49

Referring specifically to mathematics, Hodgen comments that although the majority of the UK workforce does not use high-level maths skills in everyday work, ‘simple’ skills are often used in specialised and/or complex situations leading to the development of specialised methods. Although these methods often do not use advanced mathematical concepts, they can be difficult for inexperienced employees to adopt. This motivates Hodgen to suggest that maths education should include more problem-solving and contextualisation, to help learners to adapt their skills quickly when they enter a new workplace.50

43 Ibid
45 BIS (2014b) New English and maths GCSEs: Post-16 education and skills.
49 BIS (2014b) New English and maths GCSEs: Post-16 education and skills.
While fundamental maths and English skills are required for many tasks within the workplace, and while they are essential for specific job roles, this literature review suggests some additional benefits of maths and English to employers. The CBI, for example, theorises that English and maths skills could act as “enablers” for the effective application of other skills within the workplace51 and research by Hoyles suggests that mathematical competence allows employees to notice errors even when they are not actively checking for mistakes52. Similarly ability in English provides the bedrock of higher specialisms in such areas as marketing and even operations (for instance in the explanation of technical processes).

The Education and Training Foundation notes two additional non task-specific benefits to maths competence: fewer mistakes and the costs associated with them, and a reduced need for supervision53. This can be set alongside the findings from interviews conducted for the present report which found that employers devote resources to such activities as mentoring employees in maths and English, creating templates for written documents, creating standard scripts for telephone conversations, and having to support employees when communications or calculations go wrong.

Hoyles, in 2002, and Hodgen in 2013, each noted that the use of ICT in modern workplaces has impacted upon the maths skills required by employees (when compared to previous generations). The impact of ICT has included increasing the need for employees to validate, understand and interpret mathematical information, contrary to the temptation some employees might feel to simply trust the output from computer systems. Employers interviewed for the present study emphasised that modern ICT, far from removing the need for maths and English skills, has actually expanded it considerably as the sheer volume of calculations and communications has increased.

2.5 Issues with English and maths skills

When asked for their top three priorities for future school-age education, 65% of employers mentioned literacy and numeracy in response to a 2011 survey by the CBI54. Over a one year period, among Ofsted subject-area reports for maths and English, over half recorded that the teaching was inadequate or required improvement55.

There also appear to be related difficulties within the FE sector, where only 33% of 16-18 year olds who sat a GCSE in English in 2011/2012 achieved grades A*-C56.

55 House of Commons Select Committee report on adult literacy and numeracy, 2014, based on 54 inspections conducted between September 2012 and August 2013.
56 Adriaanse, Karen (2014) The role of the FE and skills sector in supporting learners to improve their skills in English and maths – an Ofsted perspective. Ofsted.
Two important but different types of issue with English and maths skills are identified in the literature. They relate on the one hand to concern over English and maths skills per se and related to level, and, on the other, to the way in which those skills are applied in specific work-related contexts. Employers appear to be concerned with both but in different ways. Their concern with the former appears – at the levels pertinent to the current study – to be primarily the extent to which those skills form the basis for the second.

Although Hodgen notes that secondary school pupils had recently been found to have poor understanding of decimals and ratios (which might become important in later life), his work emphasises that the issues extend to an additional problem of being able to apply skills in a job. Moreover, research from the CBI found that some employers believe education leavers are simply not good enough at applying mathematics skills to work and that this may be due to the way in which fundamental techniques and skills are taught at school, the depth to which pupils are exposed to the skills, and the extent to which they are required to memorise and internalise them.

Recent research by BIS identifies two possible reasons for learners struggling when attempting to achieve grade C or higher in English and maths. Firstly, it is noted that different learners may respond better to different ways of learning. BIS provides the example of adults who wish to study GCSEs, remarking that they might find the qualifications to be too much adapted to school-age learners (who approach GCSEs as part of a process of continuous education, and have a recent knowledge base to draw upon).

The House of Commons report on adult numeracy and literacy corroborates this to some extent by commenting that skills might well deteriorate over time (often referred to as skills fade), which process can then become a barrier to returning to study. The report also points to the fact that GCSEs suit the delivery methods used in schools but that these methods are probably not appropriate for all types of adult learner.

Unionlearn has also commented on this topic in a consultation response to NIACE, arguing that those in employment receive the best results from training which relates its content to experience in the workplace.

Secondly, the BIS report emphasises the importance of teaching which engages and motivates learners. The report also acknowledges the relevance of innovative and creative teaching methods in accomplishing this. Recent research by Dalby underlines the importance of engagement/attitude for the study of English and maths. While discussing Functional Skills maths, Dalby notes that

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59 BIS (2014b) New English and maths GCSEs: Post-16 education and skills.
62 BIS (2014b) New English and maths GCSEs: Post-16 education and skills.
learners who had been ‘disaffected’ with maths at school benefitted from positive attitude changes which often helped their understanding and confidence.

Related comments are made in the House of Commons report, which proposes that negative experiences of English or maths at school age can deter people from studying these subjects in later life. An older paper (2011) from MEI concludes, too, that: ‘retaking the same kind of GCSE they have already failed has not proved beneficial to the large majority of students who fail to achieve a grade C in Key Stage 4; it serves instead mainly to reinforce negative views of mathematics amongst a large section of the population.’

David Mallows, providing evidence as an expert witness to the Making Maths and English Work, suggests that encouragement and motivation can be wider social issues outside the schools, colleges and places of employment and suggests governments should encourage the enjoyment of literacy and numeracy.

In his brief paper submitted to the Foundation’s ‘Making Maths and English Work for All’ study in February 2015, Mallows considered some of the issues in the light of data from the OECD’s Programme for the International Assessment of Adult Competencies (PIAAC) Survey of Adult Skills and also of concepts taken from the report of the European Commission High Level Group of Experts on literacy. He made a number of cogent points about the supply and demand for English and maths skills and the validity of “credentials” (qualifications) which unfortunately lie outside the immediate remit of this current study.

However, he stressed that some countries which did well in the PIAAC rankings are also developing new strategies to address the literacy and numeracy needs of their population, and he described his contention that there may not be a simple or direct relationship between social issues and skills in literacy and numeracy (he quotes Anke Grotlüschen of the University of Hamburg):

“...it might be possible that many adults are quite at ease even with what might be ‘measured’ as low literacy skills and are therefore, unlikely to participate voluntarily in any class.”

This resonates closely with what a good number of practitioners – in evidence to this study – spoke about: that is, their perception that society and business are adapting to lower English and maths skill levels within the cohort by reducing demands on individuals (automation, IT, pre-developed English templates, etc.) and taking into account the unwillingness to improve their skills in these areas of some school-leavers, adults and employers. Some practitioners in interviews mentioned

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65 MEI, Mathematics for all, Post-16 An MEI Position Paper, 2011
67 NRDC and UCL Institute of Education. February 16th 2015
68 http://skills.oecd.org/skillsoutlook.html
their concern at the way in which some learners regard their lack of maths and English skills as a badge of pride.

Mallows pointed to other evidence that aligns with practitioner responses to the current study which said that they felt that more should be done to create and then expand a maths and English culture among British adults – one which encourages reading and writing and which explains and promotes the use of number in everyday life. PIAAC looked at everyday literacy practices, finding that: “Adults who read frequently ... outside work have higher scores on the literacy scale, on average, than their counterparts who rarely engage in such activities”\(^{70}\) (OECD 2013: p190). This holds even when controlling for educational level and socio-economic status.

Learners from different backgrounds have different challenges in achieving in English or maths. Recent research by the CBI found that only 48% of disadvantaged 16-year olds achieve 5 GCSEs at A*-C (including English and maths) compared to 77% amongst the least deprived backgrounds\(^{71}\). This is further corroborated by very recent research that the Sutton Trust commissioned from Oxford University on what promotes better achievement for bright and disadvantaged students\(^{72}\).

Research by BIS in 2013 suggested that a variety of background factors can affect the motivation of adult learners when studying English and maths (including age, gender, level of course and type of provision, amongst other more personal factors)\(^{73}\). In addition to the quality of teaching, the personal attributes of the learner influence their motivation and have an impact upon their progress and success.

The Association of College’s review of ESOL qualifications noted that they are delivered to a wide variety of different learner types, particularly with respect to educational backgrounds. Some learners have strong educational backgrounds and are proficient at studying new subjects, whereas other may have struggled with educational systems (and literacy) in another country. Learner requirements have an impact upon the amount of tutelage and support needed by learners\(^{74}\).

3. The current (qualifications) environment

This chapter provides a summary view of the current GCSE and non-GCSE landscape in England in terms of maths and English qualifications as well as non-qualification based approaches.

Ofqual pointed out in their submission to the BIS Select Committee on Adult Literacy and Numeracy (2014-15) that:

\(^{70}\)OECD (2013) OECD Skills Outlook 2013: First Results from the Survey of Adult Skills OECD: Paris
\(^{71}\)CBI (2014b) A better off Britain, 2014
\(^{72}\)Subject to Background, Katalin Toth, Kathy Sylva, Pam Sammons, March 2015
Qualifications are, of course, only a part of the picture. Qualifications represent a standard and cannot in of themselves improve the quality of teaching, raise student achievement or motivate learners with poor literacy and numeracy skills to seek to develop their skills.\textsuperscript{75}

This is an important point to make as while qualifications are a vital part of the system they should not drive teaching and learning. This is also the rationale behind the support and reinforcement by the various initiatives currently underway to provide teachers and trainers in the education and training sector with greater capability and confidence in their teaching of these two subjects.

3.1 Provider capability

The Foundation noted concerns about the capacity of providers to teach English and maths. Research focused upon the FE sector found that at GCSE-level, only 12\% of those teaching maths and 6\% of those teaching English have qualifications in their subject at a level above GCSE. Moreover, the research discovered that teachers aged 34 and below are on average the least qualified group, which may put additional strain on provision in the future\textsuperscript{76}.

A presentation by the Department for Education in 2013 stated that around 12\% more maths teachers and 7\% more English teachers might have become necessary in response to reforms of the conditions of funding\textsuperscript{77}.

In its report on adult English and maths skills, the House of Commons remarked that the quality of provision for adults is a ‘mixed bag’. Additionally, the report notes that teaching English and maths to adult learners is not a profession that receives wide awareness and recognition, meaning that it does not attract as many highly-qualified practitioners as other types of provision do\textsuperscript{78}.

Guroo’s survey of Functional Skills providers found that 61\% of respondents consider themselves very experienced, and 93\% as experienced or very experienced. This is a notable increase on the previous year, where the results were 34\% and 85\% respectively. Furthermore, the results from 2015 found that 74\% of respondents describe themselves as completely prepared to deliver Functional Skills and another 21\% describe themselves as quite well prepared. This is in contrast to GCSEs, for which only 16\% believed themselves to be completely prepared and 20\% to be quite well prepared\textsuperscript{79}. Further research on confidence and capability is being carried out by NIACE who will report in April 2015.

In 2013, the 157 Group reported that several of their members had chosen to provide additional English and maths training to staff in advance of the 16–19 English and maths funding conditions. This suggests that some providers were not entirely confident about capacity to teach English and

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maths at that time, although capacity increased for some providers before the funding condition came into effect. A blog on UK FE Chat noted that, prior to the funding condition, the number of students with a D grade at GCSE (in English or maths) who then went on to achieve C or higher after the age of 16 varied considerably across institutions. Within Sixth Form colleges for example, the range of students increasing their grades to A*-C was from 0% to 93% (re-studying GCSEs was not mandatory at the time) - suggesting that some providers were well equipped for the change to the funding condition, whereas others were severely under-equipped.

The Foundation, for example, is leading on the Maths Enhancement Programme (MEP) which is supporting teachers, trainers and tutors from all forms of provider in the delivery of maths. The MEP, delivered in partnership with the National Centre for Excellence in the Teaching of Mathematics (NCETM) and the Centres for Excellence in Teacher Training (CETTs), aims to prepare further education practitioners to deliver GCSE maths by boosting their confidence in maths, enhancing their mathematical knowledge and equipping them with the relevant maths subject pedagogy.

The six-day training programme is open to all further education providers, particularly those currently involved in delivering numeracy or functional skills, and covers four main modules:

- statistics and data handling
- algebra
- geometry
- trigonometry

The Maths Enhancement Programme has been highly successful, with over 2,000 teaching practitioners having received training since the Programme’s implementation in 2014, and has inspired the development of complementary continuing professional development (CPD) programmes, maths teaching workshops, and a Self-Evaluation Tools, to be launched during 2015. After the success of the Maths Enhancement Programme, the Foundation developed a sister enhancement programme which focusses upon improving the confidence and English skills of Functional Skills English teachers and trainers. Participants can choose to follow a number of specialist “training pathways” which address the specific needs of different practitioners and incorporate a range of different learning activities, including train the trainer activities and e-learning.

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82 http://www.et-foundation.co.uk/our-priorities/maths-english/ [Accessed 20/03/2015]
83 http://www.et-foundation.co.uk/supporting/support-practitioners/gcse-maths-enhancement/ [Accessed 20/03/2015]
84 http://www.et-foundation.co.uk/supporting/support-practitioners/maths-teaching-workshops/ [Accessed 20/03/2015]
85 http://www.et-foundation.co.uk/supporting/support-practitioners/english-enhancement-programme/ [Accessed 20/03/2015]
Other well-received activities include: the “Golden Hello”\(^{86}\) to encourage newly qualified maths teachers (certified to teach maths at GCSE level and above) to practise maths in the FE sector by offering them a one-off payment of £7,500 after they have completed two years of FE teaching. The initiative aims to retain good quality maths teacher graduates in the FE sector; and, the mathematics Graduate Recruitment Incentive Award\(^{87}\) where a financial incentive of £20,000 - £30,000 is available to FE and skills organisations to support their recruitment and retention of specialist graduate mathematics teachers.

3.2 The condition of funding and context

It was on 2 July 2014 that the government announced plans to introduce new GCSEs into the post-16 sector to meet the government’s ambition to enable as many young people and adults as possible who lack good qualifications in English and maths to have the chance to take GCSEs in these subjects.

Statistics available at that time in early 2014 showed high proportions of young people (40%) doing GCSEs maths and English at 16 not achieving C and above, and that of those only 10% go onto achieve C or above by the age of 19. These were the backdrop to the announcement by the former Skills Minister, Mathew Hancock, that this cohort must continue to work towards achieving these qualifications or an approved interim qualification as a ‘stepping stone’ towards GCSE as a condition of student places being funded.\(^{88}\)

This approach will change from August 2015 for the academic year 2015-16 when “stepping-stones” will no longer form a part of that policy.

A condition of funding is set out by the Education Funding Agency (EFA) for study programmes, and for Skills Funding Agency (SFA) for post 19 provision. The EFA requirement is for students, as part of their 16-19 study programme, to continue with their English and maths at GCSE without an A*-C in these subjects by age 16.

Essentially, the EFA condition of funding (June 2013) is met if students are enrolled to take one of the following qualifications in the subjects where they do not already hold at GCSE A*-C level:

- GCSE or IGCSE (including Level 1/Level 2 certificates) that count towards the English Baccalaureate (Ebacc) measure in KS4 performance tables,
- Functional skills and free-standing mathematics qualifications registered with Ofqual, as a stepping stone to GCSE study, or
- English for speakers of other languages (ESOL) qualifications registered with Ofqual, as a stepping stone to GCSE study (in relation to English only).

\(^{86}\) [Accessed 20/03/2015]

\(^{87}\) [Accessed 20/03/2015]

\(^{88}\) [Accessed 20/03/2015]
The qualifications that count towards the condition of funding is supplemented by those funded by the Skills Funding Agency (SFA) for post 19 provision. These include the following maths and English qualification types, from Entry to Level 2, the number of which is presented in brackets against each below.

- GCSE (29);
- IGCSE (7);
- Functional Skills (133);
- Free-standing Maths (8);
- QCF (209)

Excluding the GCSEs, the total number of individual qualifications (i.e. not de-duped) categorised by the ‘English and maths offer’ on the SFA spreadsheet (Ofqual regulated qualifications) reaches 357.

The SFA also provides funding for ‘non-regulated’ ESOL, which is training not directly connected to a qualification but instead has learning aims intended to prepare learners for GCSEs. Both regulated and non-regulated ESOL are co-funded unless the learner meets certain criteria for full funding.

English for Speakers of Other Languages, and QCF English for Speakers of Other Languages (recently introduced in 2015 thus providing some duplication with the older ESOL qualifications still on the register) add a further 223, altogether totalling 580 excluding the GCSEs.

### 3.2.1 Vocational Qualifications Reform

Prior to the introduction of the GCSE policy, and in response to the growing number of maths and English qualifications, a review of maths and English QCF qualifications commissioned by the Skills Funding Agency concluded in March 2014. Its report was used to inform the government’s Qualifications Reform Plan.

The review found positive feedback about the use of the QCF qualifications in that they enable bite-sized and targeted learning leading to achievement for entry level learners who may have never previously achieved. The report also pointed out a number of issues related to the qualifications themselves:

- the lack of comparability of credit value/content/outcomes and size across all the QCF maths and English units and qualifications;
- the use of different assessment methods to assess similar content at a similar level across the different awarding organisations, and whether they place equal demand on the learner and have the same degree of quality control from one awarding organisation to another;
- along with concern that not all of the qualifications will support meaningful progression for the learner.

As a result of that review, QCF maths and English qualifications would now only be approved for funding if they are of the following size:

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- at entry and level 1 - 3 credits or more (Awards and Certificates)
- at level 2 - 13 credits or more (Certificates).

Going forward, Ofqual announced the QCF will be renamed the Framework of Regulated Qualifications – FRQ. \(^91\)

3.2.2 Funding Rates for maths and English qualifications

Amounts of funding are determined according to SFA’s funding matrix, which currently takes into account the number of QCF credits of the qualification and also the sector/subject area. \(^92\) Last year, the SFA’s funding matrix for 2014/2015 stated that:

- Functional Skills qualifications in English or maths had a weighted funding rate of £724;
- Qualifications in English for Speakers of Other Languages of the ‘ESOL’ type had a weighted funding rate of £724, except for the Speaking and Listening qualification (that only covers part of the curriculum) which had a rate of £300;
- Qualifications in English for Speakers of Other Languages of the ‘QCF’ type had a weighted funding rate of £1,265, except for the Speaking and Listening qualification (that only covers part of the curriculum) which had a rate of £600; and
- Free-Standing Mathematics Qualifications had a rate of £300.

This year (2015), GCSEs for those that failed to achieve grades A-C* before the age of 19 will be funded at £811 rather than £724. Full funding is available to anyone over the age of 19 who wishes to study a GCSE in English or maths (who does not already have grade C or higher), although resits are not funded by SFA. \(^93\)

The Education Funding Agency (EFA) provides funding for English and maths education for 16-19 year olds within the overall “national funding rate per student”. For full time students in 2014/2015, the standard rates were:\(^94\):

- £4,000 when 540+ annual timetabled hours are given to 16-17 year olds or those with high needs;
- £3,300 when 450-539 annual timetabled hours are given to 16-17 year olds or those with high needs;
- £3,300 when 450+ annual timetabled hours are given to 18+ year olds who do not have high needs.

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\(^92\) Skills Funding Agency (2015a) Funding rates and formula 2015 to 2016.

\(^93\) Ibid.

\(^94\) Education Funding Agency (EFA) (2014) Funding guidance for young people Academic year 2014 to 2015: Funding rates and formula.
3.3 Current non-GCSE maths and English qualifications

GCSEs are a broad curriculum qualification with particular characteristics including synoptic assessment. They suit all candidates needing a field of knowledge to enable them to progress to further academic study which could also be potentially in a vocational context – e.g. a higher level engineering apprenticeship.

The current English and maths GCSEs have been reformed; the new specifications, developed and further consulted upon by Ofqual, are to be taught for the first time from September 2015. The new GCSEs in English language and maths aim to provide greater assurance of literacy and numeracy, and help those who achieve them apply the knowledge and skills they acquire in their everyday lives, including the workplace.

The maths GCSE will include more problem solving, including in every day contexts. The new English language GCSE places greater weight on accurate spelling, punctuation and grammar. The intention is that they will ‘be rigorous qualifications, capable of being achieved by the vast majority of students, and that they will provide a strong foundation for progression to further academic and vocational study’.

BIS also pointed to the ambition that:

“once the new GCSEs are available they will replace other qualifications as the single gold-standard for literacy and numeracy at level 2”.

Although, neither the current nor new GCSEs are in scope to this review, and with reference to the new GCSEs with their larger content in maths and English (for one subject by almost as much as a third) a number of comments were received from stakeholders and practitioners expressing their anxiety about the effect on pass rates for the cohort who currently struggle to achieve better than a Grade D.

Practitioners commented and the research on employer needs indicate the importance of speaking and listening. The fact that speaking and listening assessments will not count towards final marks in GCSE English and English language was a worry for many, but possibly also represents a market opportunity for the non-GCSE qualifications explained below.

A diagram presenting the current routes with some minor changes/suggested improvements is provided in Figure 22 after the conclusions in chapter 6.

3.3.1 Functional Skills Qualifications (FSQs)

Although originally designed and presented as an alternative to GCSEs with an ‘intended added value… (to) equip people to apply English, ICT and mathematics in practical situations, choosing

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appropriate skills and techniques to solve problems\textsuperscript{97}, Functional Skills qualifications have latterly been described as “stepping stones” to GCSE. They were primarily designed to accredit work relevant knowledge and skills, not operate as stepping stones to GCSEs.

The development history of Functional Skills qualifications is pertinent to their current situation and partly explains the current relatively low level of recognition among employers of Functional Skills.

Functional Skills were first introduced as a concept in two key White Papers in 2005 by the then Department for Children, Schools and Families\textsuperscript{98}. Critically, this was in direct response to calls by employers for far more emphasis on the application of 'core' skills in English, mathematics and ICT. The Qualifications and Curriculum Agency (QCA) were tasked with their development with the purpose of embedding them, not only throughout the secondary curriculum, but as functional elements within GCSEs in English, mathematics and ICT from September 2010.

An unusually long pilot took place from 2007 to 2010 with a summative evaluation of the pilot highlighting the issues and successes around impact, delivery, accessibility and maintenance of standards – for the purposes of validity, reliability and comparability. The report also expanded on additional intentions for the Functional Skills qualifications, which were to be used:

- within the Apprenticeship frameworks – replacing Key Skills\textsuperscript{99};
- within the well-regarded 14-19 Diplomas, which were dropped in 2010;
- within the Foundation Level of GCSEs.

Inclusion of the functional skills elements in GCSEs would mean that achievement at level 2 would be necessary for achievement of A$^+$–C in GCSEs in English, mathematics and ICT.

Research was conducted for the Qualifications and Curriculum Development Agency (QCA’s successor organisation) shortly after the launch of Functional Skills and post the Functional Skills pilot. It led to the tentative early conclusion that employers overall consider them more relevant to the workplace than their predecessor qualifications: Basic Skills, Key Skills, and Skills for Life\textsuperscript{100} as they have the potential to better prepare learners for further learning, entry into employment and progression in the workplace. With respect to the period immediately following the Pilot, the research noted, as particularly striking, how the Functional Skills qualifications were welcomed almost universally by the stakeholders (employers and HE institutions).

In 2010, QCDA was closed down and the responsibility for all such qualifications was handed over to the regulator Ofqual which have now conducted two reviews of the Functional Skills qualifications.

Key points can be noted from that development history:

\textsuperscript{97} QCDA, Evaluation of the Functional Skills Pilot, 2011
\textsuperscript{98} 14–19 Education and Skills white paper (DCSF, February 2005), and the Skills white paper, ‘Getting on in business, getting on at work’ (DCSF, March 2005).
\textsuperscript{99} Postponed for an extra year by Minister John Hayes in response to an outcry about the removal of Key skills
\textsuperscript{100} QCDA (2011) Evaluation of the Functional Skills pilot. 2011,
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1) Functional Skills qualifications have been around a relatively short time (despite the pilot they were only beginning to be universally used in 2010/2011),

2) the pilot report noted some early consistency issues which may explain the findings by Ofqual in their Functional Review of Mathematics in 2012 and again in the Review of Functional Skills (Level 2) in 2015. These issues were that ‘pass rates varied considerably across AOs in all three FS at levels 1 and 2 for the duration of the pilot... Differences in pass rates across the AOs were unlikely to be explained by candidate ability or differences in teaching and learning’101.

3) AOs reported developing AO-specific, rather than consensus, views of what constituted functionality at different levels and in different subjects.

Since then Functional Skills (only available in England) have quickly grown to become the most popular non-GCSE qualifications in English and maths102.

All three Functional Skills qualifications are second only to GCSE in popularity at these levels (as further illustrated by the findings of this review - see next section). Uptake has expanded rapidly and as stated above Functional Skills are the biggest type of qualification that Ofqual regulates other than GCSEs- amounting to over one million certifications (across all five levels and inclusive of ICT) in 2013/2014103. In that same year for example there were just under a third (290,754) certifications at Level 2 maths (140,696) and Level 2 English (150,058).

The qualifications at Level 1 and Level 2 now form part of Apprenticeship frameworks and can also be taken in schools and in colleges of further education. They are available at five levels; three entry levels as well as Level 1 and Level 2.

Recent NIACE research found that providers are positive about Functional Skills, with particular reference to the use of problem-solving, reading and writing skills and spoken communication skills104. Dalby’s recent research confirms the perceived value of problem-solving, and also notes the attention given to the application of maths within Functional Skills qualifications105.

The workplace-orientated nature of Functional Skills appears to match well to needs identified by Macey - who argued that recent literature frequently reports a concern that Level 2 qualifications do not contain substantial enough ‘functionality’ as would be required to fully prepare young people for work106.

3.3.2 QCF Maths and English qualifications

These are individual, ‘bite-sized’ QCF qualifications introduced in 2012/13 to suit individual learning needs. They relate to the numeracy and literacy standards and many are used to help learners

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102 Different qualifications in literacy and numeracy are available in Wales (Essential Skills), Northern Ireland (Essential Skills) and Scotland (Core Skills).
105 Dalby, D. (2013) An alternative destination for post-16 mathematics: views from the perspective of vocational students
undertaking either GCSE or Functional Skills. In fact, some can be embedded within the GCSE programme.

They also provide prospects for those learners who may struggle with the new, reformed and untiered English GCSE (from September 2015).

Other audiences may include learners with special educational needs or disabilities or individual learners who have weaknesses in a particular area, e.g. measurement or understanding space or space.

These qualifications were a particular focus for and subject to the Vocational Qualifications Reform explained above.

3.3.3 English for Speakers of Other Languages (ESOL)

English for Speakers of Other Languages (ESOL) qualifications are another alternative developmental pathway, although they, too, are currently presented as stepping stone qualifications by government. As their name indicates, these qualifications focus upon English skills (oral as well as written) for those who are learning English as a second language. New ESOL qualifications were developed and launched in 2014/2015 with increased funding rates.

In 2014, BIS acknowledged earlier NIACE research which found that intensive courses for unemployed adults often make use of ‘micro qualifications’. BIS concluded that GCSEs are unlikely to be offered in these circumstances. The report notes that NIACE’s earlier research found micro qualifications to be beneficial stepping stones before studying GCSEs.

The Foundation notes that Free Standing Mathematics Qualifications were originally intended to fit between GCSEs and A-Levels, although their focus on applied maths makes them helpful for people entering vocational education who did not achieve C or higher at GCSE.

Ofqual statistics for the final quarter of 2014 state that:

- 239 Functional Skills qualifications were available (although these include ICT and are across the five different levels). Some 390,750 certificates were awarded;
- 191 ESOL qualifications were available (across multiple QCF levels) - 143,450 certificates were awarded; and,
- 14 Free-Standing Mathematics Qualifications were available - 34,800 certificates were awarded.

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107 BIS (2014b) New English and maths GCSEs: Post-16 education and skills.
Research for the Association of Colleges (AoC) in 2014 found that interviewees broadly consider the ESOL core curriculum to be sound. One of the topics which received relatively more attention was the duration of ESOL qualifications. Some respondents were concerned that longer courses are likely to have a higher drop-out rate, and that short units might be more beneficial for some learners. Alongside this, some respondents suggested that it might be useful to split three core parts of the content (Speaking and Listening; Reading; and, Writing) into separate qualifications because learners might have ‘spiky’ profiles.\(^ {110} \)

NIACE’s research on behalf of BIS, mentioned earlier, received similar feedback from providers.\(^ {111} \) The same research remarks that there are examples of providers teaching ESOL either before or alongside Functional Skills English. One motivation for teaching Functional Skills in addition to ESOL is the perception that doing so will provide a ‘smoother transition’ into either employment or further education afterwards. Functional Skills is targeted primarily at native speakers of English, and as a consequence might not suit the full requirements of those speaking English as a second language. Functional Skills is also likely to use learning materials, examination procedures and similar which are familiar to people raised in the UK but which are less familiar to many ESOL learners who were educated overseas. Some providers told NIACE that they believe Functional Skills are slightly more challenging at the higher levels than ESOL.\(^ {112} \)

### 3.3.4 Core Curricula

The core curricula for adult English and maths were published in 2001. The two documents present national standards for adult literacy, specifying activities that are also matched to the QCF at levels Entry 1 up to Level 2 (GCSE A*-C).

These national standards have informed the subsequent development of qualifications, especially those that focus upon functional ability. For example, within Functional Skills qualifications, the national standards are quoted with only minor rephrasing: one can compare the following excerpt from the Functional Skills criteria for English (1) with the subsequent equivalent phrase from the national standards for adult literacy (2):

1) ‘Adapt contributions to suit audience, purpose and situation’\(^ {113} \)

2) ‘Adapt contributions to discussions to suit audience, context, purpose and situation’\(^ {114} \).

The following activities are included within the adult standards\(^ {115,116} \):

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\(^{111}\) NIACE (2013) ESOL Learners’ Progression to Functional Skills English and GCSE English Language Qualifications. BIS.

\(^{112}\) Ibid

\(^{113}\) Ofqual (2011) Functional Skills Criteria for English

\(^{114}\) Basic Skills Agency (BSA) (2001a) Adult literacy: Core curriculum.

\(^{115}\) Basic Skills Agency (BSA) (2001b) Adult numeracy: Core curriculum.

\(^{116}\) Basic Skills Agency (BSA) (2001a) Adult literacy: Core curriculum.
### Table 2: Adult Standards for literacy and Numeracy, 2000/2001

<table>
<thead>
<tr>
<th>Maths</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Understand and use mathematical information</td>
<td>Calculate and manipulate mathematical information</td>
<td>Interpret and communicate mathematical information</td>
</tr>
<tr>
<td>• Read, understand and compare various mathematical information</td>
<td>• Generate results accurately using methods, measures and checking procedures</td>
<td>• Present and explain mathematical results clearly and appropriately</td>
</tr>
<tr>
<td>• Specify and describe a practical task or activity using mathematical information and language</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speaking and listening</td>
<td>Reading</td>
<td>Writing</td>
</tr>
<tr>
<td>• Listen and respond appropriately to extended and detailed spoken</td>
<td>• Read and understand texts of varying complexity accurately and</td>
<td>• Write to communicate information, ideas and opinions effectively and appropriately</td>
</tr>
<tr>
<td>language</td>
<td>without assistance</td>
<td></td>
</tr>
<tr>
<td>• Speak to communicate straightforward and detailed information</td>
<td>• Read and obtain information of varying length and detail</td>
<td></td>
</tr>
<tr>
<td>• Engage in discussions to make effective and appropriate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>contributions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For all English and maths qualifications, an initial ‘diagnostic’ assessment (to determine the learner’s level) is one of the evidence requirements for English and maths funding from SFA\(^{117}\).

### 3.4 Non-qualification-based approaches

Stakeholders and practitioners, whose views are discussed in more detail in chapter 5, were broadly split on the question as to whether qualifications are the “only answer” to accrediting skills and competence in maths and English for this cohort.

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\(^{117}\) Skills Funding Agency (2015a) Funding rates and formula 2015 to 2016.
Recognising and Recording Progress and Achievement (RARPA) is a framework for ensuring that progress and achievement could be evidenced for learners and teachers in learning where there is no formal accreditation. It works well for learners with learning disabilities and difficulties. Research conducted by NatSpec\footnote{http://www.natspec.org.uk/information-for-professionals/supporting-progression-rarpa/} on supporting staff who work with such learners and older research conducted by NIACE\footnote{http://www.niace.org.uk/current-work/rarpa - access March 2015} indicate a wide range of methods that can be accessed by teachers and used for learners as part of the recording progress.

Some fit for purpose methods suggested by NIACE include:

- Video and audio recordings of learners’ self-assessment
- Video and audio recordings of learners performing a skill
- Digital photographs illustrating products of learning linked to reflective writing or speaking about the process
- Use of blogs
- E-portfolios

Adriaanse, acting as a witness for the House of Commons 2014/2015 inquiry into adult maths and English (BIS Select Committee), commented that volunteer “peer support” programmes can be very beneficial for some learners. However, these comments focused upon the potential that peer support has to help adults to learn qualification content- rather than train English and maths skills entirely independently\footnote{House of Commons Business, Innovation and Skills Committee (2015) Adult literacy and numeracy.}.

Various charities offer encouragement for people to improve their English or maths skills. For example, the Reading Agency oversees a “six book challenge” which invites members of the public to pick six texts to read and then maintain a diary while reading them. This programme is supported...
through a range of actions, such as advice for organisations that wish to implement the challenge and incentives such as prizes for readers. When discussing the impact of the programme, the Reading Agency focuses upon the benefits to confidence for participants. Comparable programmes are operated by other charities, such as (amongst others) the National Literacy Trust and National Numeracy.

Given the comments of a number of stakeholders about the way in which under-confident and disillusioned young people and adults might best learn maths and English, it is entirely conceivable that a good number of this cohort require less formal, perhaps less intimidating ways of improving their skills.

For those who are intimidated by “qualifications” or the thought of going to a college or “centre” and by the learning commitment they represent, there are a number of non-qualification routes to the acquisition of competence in maths and English at this level (i.e. below Level 2).

The most common route for employees appears, from the survey, to be via their own employers. The most common means by which employers remedy maths and English skills gaps is by mentoring in the workplace or – for the larger employers – developing and running internal remedial courses.

Distance learning used to be the only other option for those wishing to improve their skills – and it remains a possibility – but these courses generally lead to qualifications and to tests and exams which may be almost as off-putting as formal college or learning provider avenues.

Today, however, there is also the option of online courses which do not lead to qualifications but which are designed to enhance specific skills without the learner needing to leave home. Many are, today, available on smart-phone and tablet apps which enable a learner to follow the courses and exercises on mobile devices if they do not have access to desktop machines.

Online courses are of two main types: those which lead to formal qualifications, and those which are an end in themselves – usually including self-assessment tests but having no end-of-course examination or certificate.

Examples of the former are LearnDirect’s own offering – including GCSEs and Functional Skills122 - and organisations such as Sheffield College which offers online tuition towards Functional Skills at the top level (Level 2)123. LearnDirect states that its courses towards maths qualification can be made up of numbers, fractions, decimals, percentages, common measure, using shape and space, or handling data (all fundamental skills listed by employers as being required in a work context by their non-Level 2 employees).

Apart from courses directed towards established qualifications, the range of online provision in maths appears to be much wider than that for English in the sense of literacy. However, finding the

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123 http://www.sheffcol.ac.uk/Courses/List/1125-Functional-Skills-English-Level-2-Online
most appropriate course is not an easy process in the UK (as opposed to some very good provision aimed at this cohort in the USA) and there is certainly far more provision for maths than for English (that is literacy as opposed to learning the language).

Maths at this level is fairly well catered for in terms of online provision even within the UK. The BBC offers bite sized courses and games to improve skills and there are “paid-for” courses through such sites as Elearn UK and ConquerMaths. The University-built “Math Tutor” offers an “arithmetic” section which covers many of the practical, work-centred skills mentioned by employers in this research.

There is, also, a great deal of coverage of maths for this cohort from US online sites, many of which deliberately project the subject in a global format. One such example is the Khan Academy, established by the hedge-fund entrepreneur Salman Khan in 2006. Its online courses are extensive and free of charge (but it does not appear to offer literacy).

Among a host of other sites offering material at this level are MathPlanet, Math.com and Whizz.com. The former offers “pre-Algebra” courses which are free of charge. Furthermore, Citizen Maths is a new, free UK-based open resource anyone can use. The concept behind it is the model of online learning, developed to help people learning maths at an intermediate level and learning that maths can be a powerful tool for solving those problems that come up at work and in life.

English, however, at least in the sense of literacy, seems to be in less abundant online supply. There is a plethora of online provision towards language (i.e. learning English) skills but far less – and sometimes fairly difficult to find – provision of literacy skills of the kind mentioned by employers who participated in the current research (i.e. such things as basic composition and writing skills, reading, vocabulary, spelling, comprehension, basic grammar, listening skills, etc.).

LearnDirect offers courses which cover the precise skills required by employers - reading, writing, spelling, punctuation, grammar, vocabulary or speaking and listening – again these lead to qualifications, with many being delivered in centres rather than online.

The BBC offers a number of very appropriate courses, particularly through its “Skillwise” portal but it is not clear how well this provision will be supported and delivered in future. Similarly Elearn UK offers a different type of provision through its “Real Talk” adult literacy course.

124 http://www.bbc.co.uk/education/topics/zwvg9j6 and http://www.bbc.co.uk/skillswise/maths/games
125 http://www.elearnuk.co.uk/course/basic-maths
126 http://www.conquermaths.com/home/
127 http://www.mathtutor.ac.uk/
128 https://www.khanacademy.org/
130 https://citizenmaths.com/whos-behind-it/
131 http://www.bbc.co.uk/learning/subjects/english.shtml; http://www.bbc.co.uk/skillswise/english
132 http://www.elearnuk.co.uk/course/literacy-adult-basic-skills
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Literacy, grammar and basic writing are available through a few online providers in the US including grammar for adults and a range of wider literacy courses (but the grammar and spelling are United States and not UK). 

In summary, there are plenty of non-qualification routes by which learners can acquire English and maths skills at levels below Level 2 and the online ones possess the immense potential advantage of making it much less intimidating, and more convenient, for young people and adults to acquire elements of the skills in easy steps, thereby potentially leading them to an easier progression to full Level 2 qualifications (and higher).

However, this advantage is offset to a large extent by the fact that the use of the Internet in itself may be a difficult process for people whose grasp of English and maths is below Level 2.

In addition, in many cases, the resources – some of which are age-related or promoted for a specific school ability range, might be embarrassing for this cohort to access in front of friends or family. Those who have failed to achieve a grade C GCSE in maths or English – whether a young person or an older adult – might not feel comfortable about accessing an online course aimed at 9 or 10 year olds even though the skills are precisely what they need to be able to progress further.

As argued by National Numeracy, a major element of the UK’s problems in low literacy and numeracy skills lies in behaviours and attitudes. From a purely technical point of view many online resources could be “rebranded” and more sensitively written in order to appeal to this cohort but there would still need to be a concentrated effort to develop and then direct adults and young people to highly targeted websites and resources. It is an effort, however, which might pay dividends in bridging the “embarrassment” gap between really low attainment and the first steps towards full Level 2 and beyond.

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4. Employer Conversations

*I work with a range of people, educated to GCSE, HND, degree level and professionally qualified. These people are generally in the age range 16-45. Sadly what I see all too often is that general educational standards are slipping in the younger population, particularly with regard to the basic skills. This is incredibly difficult to fix in the workplace.*

*Large employer*

In the course of the online survey and the parallel telephone interviews employers across England were asked a number of questions surrounding what maths and English skills they value, what qualifications they are aware of, what the existing skill levels are in these subjects in their workforces, and what actions they generally take to resolve any issues.

GCSEs were regarded as out of scope for this review, therefore, employers were not asked directly about their views on GCSEs, although by default views emerged.

All the research tools for this study stressed that the target of the investigation was young people and adults who had not (yet) attained a standard in maths or English equivalent to GCSE grades A* to C. As shorthand for this group we have used the term “cohort” in the following discussion.

4.1 An Overview

The question of “value” – where employers and learners are concerned – is a difficult one to address effectively in a time-constrained study such as the present one. For obvious reasons, the vast majority of employers and learners are not expert in the skills covered by different courses in maths and English, or, indeed, in the qualifications which seek to accredit and evidence them. Employers are primarily focused on their businesses. They have only limited awareness of educational courses and qualifications and their understanding of skills in maths and English at any level is largely empirical; based on evidence provided by recruits and existing staff. Their benchmarks are the requirements of everyday business and there is no requirement – in the normal course of events – for them to relate those business needs directly to courses and qualifications.

Learners are similarly situated where a wider view of their needs and options is concerned.

We can, however, state certain fundamental needs very clearly and with great confidence from the interviews and research conducted for this study:

1. Employers want entrants to their workforces to have possession of very good basic mathematical and English skills (see sections 4.2 and 4.3) and, while GCSEs are without doubt the best known of the maths and English qualifications at this level, there is some comment from employers who find the current GCSEs too academic for their own needs.
Some employers anticipate that the new GCSEs\textsuperscript{134}, for example, the English GCSE and its partial focus on literature skills, will not be any different in that respect and, more importantly, will still be too advanced for the roles envisaged for this cohort of staff;

2. At this level the skills employers require are not only basic maths and English skills but also abilities which underpin them – skills such as mental arithmetic, approximation, and measures in the case of maths; and skills in speaking and listening, in comprehension and précis, in writing and the underpinning skills of spelling, grammar and vocabulary in the case of English;

3. Similarly\textsuperscript{135}, learners want an education in the two subjects which – unless they have clear plans for progressing into academic subjects in higher education – provides them with the practical skills to help them progress in the world of work. Their concerns stem from employers’ perceived lack of awareness for anything but GCSEs and the subsequent impact on endorsement of other qualifications;

4. Learners also want the flexibility to develop at their own pace and in the practical subject areas most needed without having to undergo lengthy periods of study for skills which are effectively non-vocational for the roles and tasks they will be asked to perform in any foreseeable future.

There is also what has emerged as an “implied need” of learners deduced predominately from the comments of the stakeholders and practitioners but also from employers – that of confidence and access to routes which do not demoralise and disengage.

The vast majority of the employer respondents to this research mentioned the strongly negative impact on a large cohort of learners of “failure” in GCSEs without an alternative and ‘more suitable’ route to maths and English competence. We were told on many occasions that the requirement to retake GCSEs for those who do not attain grades A* to C is counter-productive, in that it tends to completely disengage young people, particularly those who fail to achieve a grade C on one or even more subsequent attempts.

The anticipation is that the reformed GCSEs will have an even greater impact in this respect and that the new course/qualifications will be more suited to those seeking academic progress through to higher education.

A further research problem lies in the knowledge base of employers themselves. Establishing this base was outside the remit and time allowed for this project but it is an important consideration when interpreting the feedback\textsuperscript{136}. Clearly not all employers are fully competent in maths and English themselves and this may have influenced some employers’ understanding of skills gaps. That is, an employer who has a narrow understanding of maths and English may not be able to contemplate and articulate the full range of skills which his or her business may – in reality – require. They may also tend to over-state the skills of their existing workforce.


\textsuperscript{135} Sections highlighted in blue are mainly concerned with Learner feedback

\textsuperscript{136} In March 2015 Aviva released the results of their own research project which claimed that two-thirds of adults cannot cope entirely with primary-school maths. See Aviva “Tackling Numbers” https://www.aviva.co.uk/sponsorship/premiership-rugby/form/tackling-numbers/?source=Z02b&entry=140472&cmp=eml-c_c_ejhne-27012015-feature-numbers_article-Z02b--

Recruitment practice

A key area of interest in discussions with employers was recruitment. It was not common practice with the majority of the employers we interviewed to take on school leavers aged 16, but among those that do, particularly the larger employers, it is with a view to put them on an Apprenticeship. Our discussions indicate that recruitment practice is largely divided between those who use GCSEs as a filter and those who do not but instead look for aptitude, ability to communicate and confidence. ‘GCSE maths doesn’t help you in a workplace environment’ (large employer).

A financial services employer explained they no longer use GCSEs as a filter, perhaps somewhat exceptionally compared with other financial services employers, as it was not proving useful for them. One impact of this is they have a wider pool of young people with different abilities and skillsets leading to a more diverse workforce which, for the employer, is of value. The other driver is that the workplace has far more automation than before thus requiring less mathematical skills at the lower job roles.

As shown in the Employer Perspectives Study carried out by UKCES in 2014, maths and English at GCSE A* to C are said to be of ‘critical’ value to 21% of employers, valued slightly less than work experience (23% of employers). What was also of interest in that survey was that around half of employers placed a significant or critical value on recruits having achieved a particular level of academic (49%) or vocational (50%) qualification. The research suggested that this may indicate an increasing trend of greater recognition of vocational qualifications.

It is a varied and mixed picture: for instance a number of sectors set entry requirements of GCSE, Grades C and above for Apprenticeships, and a brief review of the Trailblazer Apprenticeships reveals this entry requirement is valid for Apprenticeships in Aerospace Engineering, Financial Services, Dental Technician, and Paralegal. The Automotive Retail Apprenticeship Framework states that entry is GCSE maths and English at Grade C or above OR Functional Skills Level 2.

The child care sector is finding the policy requirement particularly difficult. The Early Years Educator is a Trailblazer Apprenticeship aimed at childcare and nursery workers. Here the new requirement that apprentices achieve GCSE A* to C in English and maths (for the present on exit from the Apprenticeship, but from 1 August 2015 on entry to the Apprenticeship) appears to be having a major dampening effect on applications to the Apprenticeship. Colleges, employer-based and private training providers report reductions in applications this year of 75% or even 90% compared with previous years. A major employer of nursery staff predicts this will create a major skills shortage of childcare workers in the short to medium term impacting severely not only on the sector itself but also on the end users of nurseries, if they struggle to recruit qualified workers.

Some stakeholders pointed to the fact that for the last few years the biggest cohort of Apprenticeship starts have consistently been from within the 19 to 24 age band (31% to 36% from 2011 through to 2013). Taking GCSEs as adults to complete an Apprenticeship may prove challenging for this group of learners.

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137 The proportion of employers placing critical or significant value on academic qualifications in 2012 was 44% (similar to the 43% seen in 2010); in 2014 this has increased to 49%, whereas the comparative figure for vocational qualifications is 50%.

Maths and English skills

Given that nothing could be done in this research to assess the maths/English skill and level of understanding of employers two research-lines were used to question them about their employees’ skills: one on the overall skills of greatest concern to them as employers at this level and the other on their appreciation (however much their own collective base was unknown) of the maths and English skills of their existing workforces.

Almost half of employers say that English skills are of the greatest concern with respect to employees who do not have GCSE A* to C. A further quarter of those surveyed say that both English and maths are of equal concern to them. Around a sixth pointed to maths as their greatest concern (Figure 3).

Perhaps the most important statistic is that the vast majority of larger companies are concerned about one or the other of these two subjects at this level – 95% - as well as some 85% of small to medium enterprises (SMEs) (Figure 4).

Figure 3: Skills of Greatest Concern

![Bar chart showing skills of greatest concern](chart.png)

Base: 504

Some light can be shed on these results by the qualitative interviews carried out with employers. They indicate that the relatively heightened concern with English may be due to the fact that English skills are more widely used (and missed) at this level. Examples given by employers centred on the way in which they compensate for missing skills. With maths the tendency is to use electronic aids (EPOS till systems, calculators, etc.), whereas this is not as easy with deficiencies in written and spoken English.

One small employer (tourism business – 20 employees) explained their situation:

“Although speaking from limited experience, young people in vocational education seem to have better speaking and listening skills – which are the most important English/maths skills for us. The
young people who are not in vocational education have noticeable problems with (for example) looking customers in the eye and talking in a confident voice. These skills are not developed by sitting an exam – so maybe GCSEs are not the answer, unless they are supported with workplace experience”.

Figure 4: Skills of greatest concern (by size of company)

Half of larger companies surveyed are concerned about English skills at this level and a fifth state that maths skills are a concern.

On the whole, employers are quite satisfied with the maths and English skills of their workforces (Table 3) but larger companies are slightly less satisfied than smaller ones. Both are very slightly less satisfied with English skills than with maths.

As a corollary question the respondents to the online survey were asked how satisfied they are with the maths and English skills of entrants from various levels of education: those entering straight from school, those entering from college education, and those coming into the companies from University (Table 4).

For the employers’ scoring of the skills of entrants straight from school (and these might well have been interpreted to also include those with GCSE A* to C) was a poor to fair average rating of 6.6 out of 10 for maths and 6.8 out of 10 for English (Table 4).

Respondents reported that just under an average of 11% of their workforces had English as a second language.
Table 3: Extent to which employers are satisfied with existing workforce skills

<table>
<thead>
<tr>
<th></th>
<th>Maths Rating</th>
<th>English rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>All respondents</td>
<td>7.5</td>
<td>7.3</td>
</tr>
<tr>
<td>Larger companies</td>
<td>7.4</td>
<td>7.2</td>
</tr>
<tr>
<td>SMEs</td>
<td>7.6</td>
<td>7.4</td>
</tr>
</tbody>
</table>

Base: 635

Following this up in a later question (see Table 4) we asked employers what their assessment was of the skills of their workforces in maths and English with relation to the level at which they had joined the company – that is entrants straight from school at 16, entrants from a college education, and entrants having completed a university education. At each level, the scores (rating scale of between 1 – lowest satisfaction and 10 – highest satisfaction) awarded by employers for school, college and university entrants were almost identical. So, with respect to school level entrants, employers say that their English and maths skills score virtually identical marks.

Table 4: Rated satisfaction with maths and English skills from different levels of entrant

<table>
<thead>
<tr>
<th></th>
<th>Maths</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ALL</td>
<td>Larger</td>
</tr>
<tr>
<td>From School</td>
<td>6.6</td>
<td>6.9</td>
</tr>
<tr>
<td>From College</td>
<td>7.2</td>
<td>7.4</td>
</tr>
<tr>
<td>From University</td>
<td>8.1</td>
<td>8.1</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>

Base: 419

4.2 What Maths Skills do Employers Value

Responses about workforce competence in specific skills areas at this level indicate the areas of weakness and also illustrate the range of skills required by employers – and, therefore, by learners who wish to hit the ground running in the world of work. The data also show the probable difference between the workforces of larger and smaller companies (possibly due to the greater attraction for recruitment purposes of the larger companies).
There is also the possibility that employers do not necessarily have a common perspective on what might count as ‘basic’ skills. Without structured lab tests to establish the conceptual and attitudinal framework being used by employers we may be looking at a number of very different reference scales for their expectations. The only measure of skills which could be in any sense considered “standard” for all employers (because it is widely known) is the GCSE. However, many stakeholders say that, although GCSE is widely known, employers do not genuinely understand the nature of the skills which GCSE tests and the knowledge the exams cover. This means that, without detailed and careful further research it is impossible to say whether employers en-masse have a reliable grasp of what skills they need and which courses or qualifications are best suited to provide them.

One large transport employer (250+ employees), for example, told us that their job-roles at this level do not require ‘good’ maths and English skills as the roles are manual or office based. The company went on to say that every employee must have a GCSE in maths and English but that they did not specify a C or above - “any higher is not required”.

Clearly the company believes that it is managing quite well without higher grades but two immediate questions might be whether, under those circumstances, the employees themselves can have the best chance of a full career progression, and whether the company can draw on sufficient skill to underpin promotion and upward progression for its staff.

Employers, generally, scored basic maths (arithmetical skills) at around 7.7 out of 10 (workforce competence) but almost all other mathematical skills were awarded much lower average scores – indicating greater need with respect to the current workforce and new entrants. These issues were very clearly underlined in in-depth interviews with employers. A great many emphasised what they see as extremely poor quality skills of young people emerging from school – particularly in the key areas of need (Figure 5). The greatest areas of need are:

- Mental arithmetic
- Understanding of measurements, units, ratios and volume
- Ability with percentages
- Capability with visual data
- Solving maths problems

Further interviews with employers underlined these needs but also revealed some underlying issues.

Many employers said that their staff were poor at such supporting skills as approximation and a “feel for number”; for example, being able to approximate the answer to a specific maths problem so that any result from a calculator or till could be evaluated as being in the right order of magnitude or completely wrong.

Other employers mentioned specific examples of very poor general understanding around numbers including staff who did not know where commas should be placed in a long number and whether a given multiplication is correct, and another who did not know how many weeks there are in a year.

Significantly, a number of employers (and this also emerged from discussions with some stakeholders/practitioners) questioned the effectiveness of grade C and even grade B in GCSE at preparing young people for more practical and applied uses of maths. It is often forgotten that a
Making Maths and English Work for All

A high proportion of university graduates do not possess a maths or English qualification above GCSE and several employer comments indicated that these staff can also be severely hindered in their careers by their lack of mathematical or English language ability.\(^{139}\)

One large employer called for a Level 2 Core Maths (available in 2015 but only at level 3) to be introduced at an earlier stage to young people (ideally 14) because of its applied focus.

**Figure 5 Workforce competence in maths**

Some of the typical maths issues raised by employers – drawn from hundreds of qualitative responses included:

(Note: green-shaded text represents employer feedback).

- **It’s the attitude to maths that appals me, ”oh look at me, aren’t I cool - I’m rubbish at maths” - It’s like a badge of honour.**

- **We work in a fast-paced environment where mental arithmetic and the understanding of percentages is a valuable asset - some school leavers don’t seem to be able to think in this way even if they have a C at GCSE and have the luxury of a calculator at hand - never mind the ones we find ourselves taking that have less than a C.**

- **Whilst all staff have good passes in the subjects at GCSE and above, their inherent skills are still weak. Graduates who cannot work out a percentage or write a well worded email, are certainly not capable of putting together a presentation or technical report. And the quality of skills of a school leaver we took on as an apprentice with grade B passes in maths and English was appalling.**

\(^{139}\) An issue at the forefront of minds of those, including employers, involved in the design of Core Maths – a new qualification available for first teaching from 2015.
We regularly need to have extra training added for basic maths and English to get the apprentices to a level that is suitable to start the courses.

They have no sense of orders of magnitude (e.g. million and billion are about the same to many of them).

Poor mental arithmetic.

Too much reliance on devices that calculate for them, so that if the calculation is not correct, it is not readily recognised as such.

Basic things like adding VAT or simply doubling a number is beyond the scope of many non-office workers.

Most of our British educated staff struggle with, or more often are frightened of, maths. Most do not understand the basic rules of maths.

Sales staff often have a poor grasp of mental arithmetic and rely on tills and calculators. As result, because they are not able to cross check mentally, obvious errors are sometimes missed.

Education system doesn’t teach basic arithmetic to a good enough level, too little done re mental arithmetic. Industry uses mm & metres, schools teach cm. that doesn’t help low achievers at all.

4.3 What English Skills do Employers Value

Skills in English were rated overall as poorer than those in maths with spelling, grammar, and punctuation scored at a level of “poor” to “fair” at best. During the interviews, employers complained in an almost unanimous voice about the speaking and listening skills of school leavers, about their lack of ability to construct sentences, about their inability to compose letters or emails and at their lack of vocabulary. Several employers said that the lack of competence of people at this level (and some well above this level) meant that emails and letters, and even oral explanations, had to be “translated” for customers by more senior staff. A number of companies said that they use pre-constructed templates for letters and emails in order to avoid communication problems caused by a lack of English skills at this level (and above) – see Figure 6.

While “reading” and “following instructions” achieved scores for the existing workforce of “good” (7 to 7.5 out of 10) the fundamental skills were rated as “poor” to “fair”. Writing scored just under 6.5 on average and spelling 6.3 but grammar and punctuation both scored less than 6 out of 10. It should be noted – as one respondent pointed out – that the maths and English demands of employers of staff at this level are generally of a fairly low order, and that some employers (actual proportion not known) use various types of automation and support from senior staff to remove from junior staff the necessity to compose emails and letters, to perform mental arithmetic, to calculate measurements, and so on.
In interviews, employers stressed that the average entrant from school exhibited a poor grasp of practical English skills, such as:

- Composition of documents of more than a few paragraphs
- Vocabulary
- Spelling
- Speaking

But perhaps more worryingly, many said that younger staff lack the ability to use words correctly, to construct meaningful and comprehensible emails and letters, and to be able to explain matters orally so that customers could understand them.

**Speaking properly, pronouncing words in full and with proper syntax, i.e. a need for Queen’s or Oxford English with customers.**

**Large employer**

*Currently, the young people who come to do work experience are not close to where I need them to be- there are obvious errors in grammar, spelling and punctuation as well as a lack of confidence. Perhaps more could be done to prepare young people to use English in the workplace?*

**Small employer <50 employees**

**Figure 6 Workforce competence in English (rated)**

Some of the typical English issues raised by employers – drawn from – hundreds of qualitative responses included:
They seem to be unable to articulate an argument of more than one assertion. Their use of words such as "like" and "cool" (rather than something more precise) is a symptom. They know effectively no grammar. Clients often have no idea what the junior member of staff has told them.

In general, those who have done science are in contact with reality and for that reason tend to use better spoken English than those who have done only humanities. That surprises me, but is true. The College students are little better. For those who are University graduates, the critical factor is which University (and sometimes which department) produced them. One cannot trust the possession of a degree on its own to tell us anything.

School leavers do not know how to approach different styles of communication - email, letters or conversations with stakeholders. Grammar when writing and text speak within verbal communication are huge issues.

Modern methods of teaching do not encourage good spelling and basic grammar. There is too much reliance on spellchecking devices and speed is favoured over quality of work produced.

Quality of hand writing often is poor, spelling is often atrocious and grammar is on occasions also poor.

Lack of basic composition, spelling and grammar competence.

They are all incapable of writing coherent structured grammatical documents, we have to template every communication.

... a ridiculously low range to their vocabulary

Employees/prospective employees often lack the ability to concentrate for more than few seconds, read anything lengthy, explain or summarise what they've read, or write explanations in clear unambiguous language.

We have had to ensure extra steps are included to proof read letters etc. and train on how to write formal letters and reports, emails that are still structured.

It is sometimes surprising that having been educated for at least 10 years, some people still have poor spelling and grammar.

Apart from obvious spelling and grammatical errors, there are also more fundamental misuses of phrases and concepts that make interpreting documents and emails hard work.

Poor grammar and clarity leading to poor communication and mistakes. Poor spelling and punctuation creating bad impression to customers.

Unable to convey a precise meaning or instruction in written form.

Basic hand writing seems to be a thing of the past.
Those educated in the UK often lack quality English skills, frequent poor spelling and badly constructed sentences.

The majority of our younger staff despite them having a degree and GCSE English cannot construct a coherent letter or report. Their level of written communication is extremely poor.

Poor communication skills due to lack of basic knowledge of grammar and structure. Failure to repeat instructions - messages become more like a game of Chinese whispers.

4.4 Remedying Skills Gaps

Skills gaps in maths and English at this level are generally dealt with through in-house mentoring (around a third of employers) with around four in ten employers sending the employees on external courses or bringing in specialist trainers (Figure 7). In this respect there is very little difference between larger companies and SMEs as to the means used to remedy English & maths deficiencies. Employers said that they rate the effectiveness of whatever measures they take at just over 7 out of 10 – that is “fair” to “good”.

The finding from this survey that employers tend to use ad-hoc and internal methods is supported by the conclusions of the recent study on Effective Practices in Post-16 Vocational Maths, where the research noted that ‘the majority of employers interviewed do not have any set training requirement for maths skills for apprentices aged 16-19. It depends on the sector context’.

Faced with these skills gaps in new and existing staff employers tend to use a combination of methods to remedy them. As has already been pointed out, some employers have instituted formal internal training schemes, some have created “templates” and scripts to ensure that junior staff send meaningful emails and letters and convey the correct messages when dealing with customers orally, and others use a variety of approaches as illustrated in Figure 7.

Mentoring – using in-house resources – is the most popular. We are told that this can vary from a simple session with a senior colleague to teach a particular element of, for example, creating an email, to a more extended period of informal tuition.

Just under a quarter of companies say that they send staff out for external tuition and a further 15% bring in trainers from outside the company.

Assessing the costs of remedial work was outside the remit of this study but they must be significant when staff time, external course costs, and external tutors are considered.

Assessment methods used by employers were also not researched in any detail within this study but is an obvious mechanism to establish what the skills profile of employers’ workforces are, and what their skills and training needs are. Employers are, naturally, sometimes defensive about enquiries as to their staff’s skills needs and the existence of skills deficiencies in the workplace. Often other
means toremedying these skills gaps are taken that do not lead to a qualification and many more online, self-evaluation tools are appearing to help individuals upskill themselves in functional maths and English skills (see section 3.4).

Employers did point to the difficulty they have in understanding the qualifications and what skills that means the recruit/new entrant or young adult possesses. This message was again reinforced in the Effective Practices\textsuperscript{141} research where it was explained that it is essential to understand the individual learner’s competency level. One interviewee for that research noted that ‘the challenge is ensuring we don’t make assumptions of knowledge [and] we don’t over-assume that ability to add up a column of numbers or do straight forward calculations in the head. It isn’t necessarily there.’

\textbf{Figure 7 Remediying skills gaps in maths and English}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure7.png}
\caption{Remedying skills gaps in maths and English}
\end{figure}

Base 867 responses (respondents could tick more than one option)

A minority of both larger companies and SMEs expect their employees to pursue qualifications to address their English & maths needs. Only around a third of SMEs and about 45% of larger companies would expect their people at this level to pursue qualifications (Figure 8).

Three quarters of employers we spoke to in interviews believe that action is needed at national level to meet the need to improve maths and English skills for people who have not achieved grades A*-C at GCSE (77% of larger companies say that this is necessary).

\textsuperscript{141} Effective Practices in Post-16 Vocational Maths, Education and Training Foundation, 2015 – page 22
4.5 Employers and Qualifications

Employers were asked to what extent they value qualifications of any variety as a benchmark of competence with respect to maths and English and for those within the target cohort. Their scores averaged around 7.5 out of 10. Larger employers value qualifications slightly less highly than SME employers (Table 5).

Table 5 Employers scores for qualifications as benchmarks

<table>
<thead>
<tr>
<th></th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larger employers</td>
<td>7.4</td>
</tr>
<tr>
<td>SMEs</td>
<td>7.6</td>
</tr>
</tbody>
</table>

The average score for this “value” – at around 7.5 out of 10 – is at the moderately high end of the scale. We would expect enthusiastic agreement with this statement as scoring an average of around 8.5 and above.

Employers are not very familiar with almost all non-GCSE\textsuperscript{142} qualifications with the exception of Functional Skills (Figure 9). More than a third of employers say that they are very familiar with these qualifications – a proportion which rises to around 43% of employers who are either “very” or “somewhat” familiar with Functional Skills (Figure 10).

\textsuperscript{142} Note on the qualifications list above: this was made into a ‘generic’ list ie it incorporates the QCF qualifications but without the full titles that would identify AOs (thus creating a list too long for employers to contemplate in a survey). Examples were provided of the different QCF titles in the questionnaire.
Functional Skills qualifications are easily the most well-known of non-GCSE qualifications in maths and English at and below Level 2, but the fact remains that two-thirds of employers are not aware of them and over half do not know of them at all.

Where other non-GCSE qualifications are concerned, employer awareness is extremely poor. None of the non-GCSE/Functional Skills qualifications are well known and therefore understood by any more than 8% of employers (Figure 10) and none are known even ‘somewhat’ by more than about a third.

“I had never heard of these qualifications, but I firmly believe that vocational and non-GCSE qualifications are important as people develop in different ways and at different times and GCSE’s certainly do not suit all. My problem is that, there seem to be so many of these qualifications and I have to admit that I do not understand what they all are and what level of competence these apply to.”
The question of awareness – or the relative lack of it – was checked again by an interview question. Less than 40% of SMEs and just over 40% of larger companies could say that they were aware of the Functional Skills qualifications prior to being interviewed (Figure 11).
This awareness among 47% (of the larger companies) as shown in Figure 12 is likely explained, to some degree, by the fact that larger employers may well have apprentices and therefore are more familiar with Functional Skills due to their inclusion in Apprenticeship frameworks.

**Employers and GCSEs**

Although the GCSEs were regarded as out of scope for this study, nonetheless discussions with employers about the cohort without Grade C and above in maths and English GCSE indicated a confirmed and strong brand awareness of GCSEs. However, conversations pointed to little clarity about their content or syllabus.

Many employers see GCSEs as the best option for clarifying the apparent confusion of qualifications at this level and improving standards of maths and English, but not all employers in this study were of the view that GCSEs are the only answer or regard them as the gold standard for young people.

Those not so pro-GCSEs mainly cited the inappropriateness to business life and the modern workplace with some pointing to poor standards (of the current GCSEs). Often employers, who are more familiar with the English education system and qualifications, perhaps primarily because of their involvement with Apprenticeships, describe the GCSEs as being a surrogate for the gold standard. Some also queried why there is such a focus on GCSEs.
Making Maths and English Work for All

Comments included:

*We have found that the possession of GCSE Maths has almost no predictive value. European and Asian students seem to be from 1 to 3 years ahead of those from the UK. In addition, they (UK students) have never had to deal with failure. For our work, failure is the norm, and one has to tackle most problems several times before succeeding.*

*Most of our British educated staff have low esteem when it comes to maths and English. My view is that GCSE passes are really not worth the paper they are written on - unless they are A* or perhaps A. B or below shows very little mastery.*

*Employees sometimes fail to see why things like good spelling, grammar and punctuation are important. They have been through school and college and they’ve passed exams etc. so how can it possibly matter now?*

4.6 Employers and Functional Skills (FS) qualifications

Although a minority of employers are aware of Functional Skills qualifications (around 43%) those who were aware of them, and even a few who were not aware, had generally positive views. There were a number of comments which were mirrored by about a quarter of practitioners and stakeholders who suggested the need for greater rigour in the Functional Skills qualifications.

*Functional skills make potential employees extremely useful from day one, theoretical skills are fine but can mean that young people have to learn how to work.*

*Just keep making Functional Skills more relevant, more rigorous and keep the pressure on awarding organisations to stop trying to make things easy to pass.*

Employers see the strengths and the weaknesses of Functional Skills in almost the same way as do stakeholders and practitioners. Their strengths are largely that they are more work-related and of relevance, and, therefore, are potentially more motivating and encouraging to learners.

A few employers also stressed that this type of qualification can be seen as underpinning and developing the confidence of those who believe they have “failed” (in not attaining at least a grade C in maths and English) and who may have become further demoralised by one or more subsequent failures.

Specific Support for Functional Skills Qualifications (The British Army)

The Army is an example where Functional Skills are credible alternatives to GCSE qualifications. They are an important feature in the support the Army provides for soldiers to improve their English speaking and listening (S&L), literacy and numeracy (L&N) skills.
Making Maths and English Work for All

Soldiers need appropriate abilities in both L&N to enable them to assimilate their Army training and education, and to carry out their day-to-day duties (briefings, reading orders, measurements of distance, time, etc.) effectively, both in barracks and on operations - at times, under combat conditions.

In 2013/14, over 15,600 maths and English qualifications at Level 1 and Level 2 were achieved by Army personnel of which 4,500 were standalone – not within an Apprenticeship. In order to pass muster the Functional Skills provision and qualifications must be relevant/realistic. These qualifications ensure soldiers truly master the core L&N skills and work so much better for the Army than GCSEs.

The introduction of Functional Skills English and maths provision and qualifications across all the Armed Forces during 2012 represented a welcome opportunity. The shift in emphasis from simply learning how to do something to choosing and using skills to solve problems underpins the practical approach embodied in military training and complements well the soldiers’ day to day work. The use of Functional Skills has had much positive impact on the Army’s L&N teaching and learning, and actual skills development. More demanding than the Skills for Life qualifications they replaced, Functional Skills have gained support from tutors, commanders and learners alike.

The Functional Skills qualifications are considered to be robust and their assessment rigorous (though the Army welcomes the recent Ofqual recommendations to further improve these qualifications143). Their focus on mastery of the core, transferable L&N skills (including English S&L skills) meet Army requirements.

The much broader breadth of the GCSE English & maths curricula is considered far less suitable and relevant – except for those soldiers whose highly technical roles demand it. Access to on-demand assessment (both paper and e-versions) with short registration and marking turn-round times offered with Functional Skills qualifications is especially attractive to the Army, as these arrangements can be more readily accommodated into its intensive training regimes. On the other hand, accommodating the current GCSE assessment arrangements would present significant, if not insurmountable, challenges.

The Army strongly supports the continued endorsement of Functional Skills qualifications as nationally recognised measures of core English and maths skills (from Entry Levels to Level 2). Promoting and ensuring the marketable status of these qualifications amongst employers, the FE sector and other stakeholders is essential – especially for those Army personnel seeking second careers on leaving the Service. As with many other employers, the Army adopted Functional Skills provision and qualifications during 2010-12. Further change, so soon after their national introduction, will lead to confusion and would not be welcomed. Further detail about training provision in the Army is provided in Appendix 2.

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143 Ofqual, Improving Functional Skills Qualifications. Ofqual. 2015
The weaknesses of Functional Skills are seen by some employers as their perceived lack of comparability to GCSEs, their perceived lack of rigour, and that the structure of the Functional Skills qualifications is somewhat confusing and ambiguous (the existence of five different qualifications all leading to a “Level 2” qualification and the use of the word “Level” in a different way for the three lower “Entry” qualifications).

Practitioners’ views, as well as information provided by an awarding organisation, confirmed that the band for a grade D in GCSE is usually very large, covering a wide range of attainment from those who have narrowly missed a grade C to those who should be a grade E, if the bands were more logically structured.

**Strengths and weaknesses of Functional Skills (employers’ views)**

[FS qualifications] act as a stepping stone progressing the learner slowly upwards towards GCSE. They can build confidence in the learner.

More work-based and practical than a GCSE. They are employer qualifications.

It can prove to some that they are better than they think.

Schools don’t bother as they [FS qualifications] are not in the performance tables, when in fact a significant minority of school age children would clearly benefit [from them] rather than being made to get a grade D/E GCSE …Functional Skills are a far better indicator of competence than GCSE grade C.

I would question that the Level 2 is equivalent to a GCSE C to A*.

Apprentices can achieve the (Functional Skills) qualification fairly easily.

Essential pre-requisite to progression on construction Apprenticeships in absence of GCSEs, allows highly motivated and competent but not necessarily academic trainees to progress.

Our company has had experience of apprentices failing Functional Skills but in their workplace environment can produce good levels of maths and English.

Of the 43% of employers who said that they are aware of Functional Skills some 87% (rounded) regard them as “very” or “fairly” useful to the world of work (Figure 13).
Not many suggestions for alternative names to Functional Skills were put forward by employers. Those who were more familiar with the qualifications, perhaps because of their involvement with Apprenticeships, stressed they felt it was time for stability and avoid confusing the marketplace further by changing their names again. A name change could further undermine the confidence that was building up in support of the qualifications.

Employers were also split on the matter of whether new qualifications are required to meet their business needs. Around a third wants a new qualification which would suit all sectors, in other words
be generic (as opposed to being tailored to specific sectors) but over a third wants to improve existing qualifications. The least popular way forward is new sector-specific qualifications (Figure 15).

**Figure 15: Action needed to meet business needs**

![Bar chart showing action needed to meet business needs]

In many ways this picture mirrors the situation with regard to employers’ views about qualifications in general. Employers have mixed views about what they want from qualifications, which are of course a proxy for skills, and what they perceive as being necessary action to improve the skills their employees have.

Employers’ final comments on maths and English skills included the following indicative sample:

[Pupils] have been allowed by the Education System to accept the "I'm no good at Maths/English" excuse and [therefore] fail to understand their importance for allowing career progression. How are they managing to leave school with such poor levels of attainment?

We have turned down too many applicants who have the correct attitude and aptitude, solely because their poor levels of literacy or numeracy would make them too much of a liability.

If teaching and schools had done a better job we would have employees with the basic skills they need for life.

Schools have far too much focus on the exam rather than the skills. Stop making grade C the bar - it's a poor grade yet seems to be accepted as a level of competence - it isn't.

Yes, it is a shame the younger generation have not got an equivalent or higher standard than older generations. Sympathy that they have been let down by the education system.
4.7 Summary of Employer views:

In a modern, digital workplace there is a clear and vital role for adequate maths and English - literacy and numeracy skills, given the impact of technology on workplace skills and on the working practices of many sectors. For example, in more and more circumstances communications (digital communications) are the primary mechanism by which businesses differentiate themselves (e.g. through customer service). Employers need young people to have good written and oral communications skills and a firm grasp of basic numeracy skills.

Perhaps not surprisingly, employers find the system for qualifications and their equivalencies confusing. A recent evaluation of the Trailblazer Apprenticeships, (a new Apprenticeship designed by employers for their sector or specific occupations144) noted that some employers have confused Personal, Learning and Thinking Skills with Functional Skills while talking about embedding functional skills within qualifications. Our own survey for this study revealed a few employers believe key skills are still present within Apprenticeship frameworks.

While many agree that there has to be an improvement in maths and English skills, employers we spoke to are somewhat confused about why the link has been made from these skills to the focus on GCSEs. They explain this phenomenon by the fact that GCSEs are already largely used as a filter for recruitment and partly because of the sheer strength of the brand.

But some of the employers tell us this is because GCSE seems to be the only choice of qualification – there appears to a great many employers to be no alternative. Around 43 per cent of employers in this survey, (47% of larger employers), are somewhat or very familiar with Functional Skills qualifications, in spite of their being relatively new (fully introduced around 2010/2011). Some stakeholders told us that this can be regarded as a success in a world in which a new qualification can take 5 to 10 years to bed down and gain wide recognition. Although not confirmed through this research, but other work conducted by AELP, for example, could support this, it is likely employers with apprentices have greater familiarity with Functional Skills qualifications.

There is no doubt that GCSEs are largely successful for a proportion of those who sit them. In the 2013/2014 academic year 461,300 pupils sat English GCSEs and 334,600 achieved a grade C or above (73% of the total); and 574,700 pupils sat mathematics GCSEs and 396,100 achieved a C or above (69% of the total). Of those who sat maths and English GCSEs, 64% achieved Grade Cs or higher145.

Notwithstanding concerns expressed by employers and practitioners about the competence of those with grades C for the current GCSEs, these statistics point to a significant cohort for whom GCSE may not be appropriate.

Employers interviewed were largely of the opinion that learners should be provided with different options around what they need to learn. It is also fair to point out there are employers who think this is not their responsibility whether their employees have these skills. This is dependent on the sector and job roles as to whether maths or English or neither is of concern.

5. Stakeholder/Practitioner Conversations

All the research tools for this study stressed that the target of the investigation was young people and adults who had not (yet) attained a standard in maths or English equivalent to GCSE grades A* to C. We have used the term “cohort” as shorthand for this group in the following discussion.

Altogether over 700 individuals, stakeholders (229) and practitioners (489), contributed to the research through the online survey, workshops, interviews, focus groups, and webinars. Stakeholders ranged from subject-specific Associations, awarding organisations, unions, funding and inspection agencies, and, employer and teacher representative bodies.

Practitioners consisted of a wide variety of people mainly from Further Education where learners can experience a range of qualifications and programmes including Apprenticeships, Vocational and academic qualifications – mainly for young adults – post-16. Practitioners were also from adult and community learning (ACL) where the provision of maths and English GCSE offers an important and necessary addition to more common provision of Entry level/Level one provision, but where GCSEs are not core business.

Practitioners encompassed all levels and job roles from subject tutors to Heads of Department and Vice-Principals. Details are contained in Appendix A1.

The questions they were asked focused on qualifications and courses on maths and English including an extensive range of non-GCSE offerings.

It must be stressed that a great many stakeholders and practitioners took the trouble to contribute comments and further clarifications on the online survey and these were supported by hours of discussion at group sessions and during telephone interviews.

5.1 The GCSE and non-GCSE Routes

Without question the importance of maths and English to people in their personal and working lives was not underplayed in Making maths and English work for all. People recognised that GCSEs have become the de facto indicator and recruitment filter tool for employment at a certain level.

Although a small proportion of stakeholders and practitioners support this “single qualification” approach, as shown in Figure 16, the vast majority (88% in the survey, and the vast majority of other stakeholders and practitioners with whom conversations took place) expressed a wish for there to be an alternative, or a number of alternative, ways by which competence in maths and English in this cohort could be accredited.

The small number of stakeholders who are of the opinion that GCSEs – and particularly the revised GCSEs - represent the most important measure of adequacy and competence, believe that, should
learners be allowed to follow non-GCSE qualifications, this would hinder progression and promotion in their later careers.

As can be seen in the chapter on the qualifications landscape (section 3.3) and also in Figure 22 (following chapter 6 Conclusions), there are a number of ways by which students and pupils can attain enhanced maths and English skills. A new route has already been put in place with the introduction of the Core Maths qualifications at level 3: these provide an alternative relevance to Higher Education. This complexity is sometimes criticised by employers and practitioners alike but each course meets very specific needs in the market-place for skills. Some are aimed at very specific populations such as those who do not have English as their first language (ESOL), while others are designed to provide small stepping stones to skills which take individually, by their very nature, less time to undertake ("bite-sized" courses) or to assist learners undertaking GCSE or Functional Skills as the short qualifications can be adapted.

Most of these routes lead to a “qualification” of some sort or another but the qualification is generally of secondary concern to the successful attainment of additional skills in English and maths.

Stakeholder and practitioners are in little doubt that they believe there should be a number of routes to maths and English competences in addition to GCSEs. They see it as an opportunity to think about different routes rather than all roads leading to GCSEs, particularly for those people who suit different assessment methods (Figure 16). Figure 16: Views on the need for alternative routes to GCSE (Stakeholders and practitioners)

For the most part the argument for additional routes besides the GCSE route rests on the view that the GCSEs are insufficiently practical and work-related to be of value for this cohort of pupils and students. Many of the respondents mentioned the parallel fact that aptitudes and ambitions differ

146 http://www.acme-uk.org/policy-advice/policy-projects/post-16-mathematics
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across the population of young people and adults needing higher level skills in English and maths, and that a work-related and practical approach to the subjects will help learners who see themselves as having “failed”.

Disengagement with the subjects was a major factor put forward in support of additional routes. The argument is that the academic nature of the GCSEs can have a very lasting effect of demoralising students who repeatedly fail to achieve the grade C boundary and may actually have the opposite effect to that intended.

By disillusioning students the process can lead to complete disengagement and the persistence of low ability within the cohort through whole careers. The recently completed NIACE report on learners within this cohort reinforces this point most strongly. The ‘GCSEs or bust’ argument is seen as counter to the fact that people learn in different ways, with GCSEs working only for a proportion of learners, and far less so for adults.

Wolf acknowledged the accepted view that, pedagogically, it is pointless to keep trying to teach the same course, in the same way, to people who have not already succeeded, but she also referenced the existence of evidence that varying teaching approaches can be a route to success, emphasising that we should, at least, permit a second attempt at a qualification.

(Text in sand colour represents feedback from stakeholders and practitioners).

Practitioners at one workshop pointed out that for those people who struggle with GCSEs should not be held to imply they do not have the capacity to improve their maths and English skills.

- The GCSE is not designed to prepare students for the world of work – this is not its purpose “they are not employment readiness qualifications” (Awarding Organisation)
- “Having a (GCSE) grade C does not necessarily equip people for the world of work” (Prison education provider)

A further argument – mentioned a few times in the responses to the online survey and a good many times during telephone interviews and workshops was that qualifications per se, although valuable in many circumstances, should not be the main focus for this cohort. Instead, we were told, the focus should be on skills and ability.

“Learners are not taught in school the skills of learning, the skills of thinking, the skill of living, so by the time they get to FE, we have very little time and money to turn somebody around” (ESOL educational specialist)

147 NIACE 2015, Engaging Learners in GCSE maths and English, February 2015
A stakeholder pointed out that, overall, the message should be about teaching people the skills and not the qualifications: they believed there is too much of a focus on GCSEs or Functional Skills for this cohort; it should be about improving their maths and English skills and filling in the gaps, helping individuals. It is about teacher’s attitude and approach.

Some of the reasoning behind the strength in feeling by the many practitioners and stakeholders who contributed comments on this subject was as follows:

... those who have not achieved a C grade at GCSE should be offered the CHOICE to [either] re-sit GCSE or to move onto Functional Skills.

Forcing young people to re-sit a GCSE which doesn’t even cover the basics of good English speaking, reading and writing skills is pointless and demotivating to students.

We must consider ESOL students, students with very low basic skills.

GCSEs are designed for full time Key Stage 4 pupils with two years to prepare. They should not be imposed on adults in this way.

Those who have repeatedly attempted a GCSE ... are not likely to achieve a C just by trying the same exam again. They instead need a qualification that demonstrates that they possess the skills relevant to getting on at work.

The FE sector cannot be expected to turn these students around in one year considering all the years at previous education have failed.

While qualifications are good, sometimes people get qualifications without actually acquiring the skills. Whereas if we de-emphasise qualifications and concentrate more on skills development, employers might actually get people applying for jobs with the right skills. Those who then want to get the qualifications can do so.

We desperately need some kind of "applied English/Maths" skills course because learners arrive at our college with appalling maths and English skills. It is frankly schools which are letting them down.

Not all GCSE Maths elements are relevant in everyday life, to say it bluntly.

A great many participants pointed to what they perceive as the deficiencies of the school system while an almost equal number stressed the need for the Functional Skills suite to be enhanced in rigour and usability in order to provide higher skills for learners and greater value for them and their employers when they transition to the world of work.

Practitioners working in offender learning wished to reinforce the message that the GCSE criteria are not of benefit to a number of learners. Those working in this sector were critical of the need to understand literature (unless it’s a particular interest), as it simply results in disengagement with the
They explained that the greater need for those in offender learning is for functional maths and English so that they gain workable skills and they can apply these skills in a working context. Adults need to see the relevance to their lives – a point of equal relevance to young offenders.

Reinforcing the NIACE research yet again, one teacher working in prisons explained:

young offenders need to have maths and English made fun and current and up-to-date, learning needs to consider their interests and build project work around their interests.

Embedding came up in conversations about maths and English, meaning how students can be supported in their maths and English learning by vocational teachers. The conversations were not about vocational teachers teaching these skills but about ensuring they have an awareness of the importance of maths and English so that they can promote this with students within the vocational context and encourage them to work with maths and English teachers to support this learning. Many examples of good practice are beginning to emerge, although this is not a new subject in many ways, and in fact a wealth of literature exists on this topic.

5.2 New or Enhanced Qualifications?

While a small majority of the stakeholder/practitioner respondents in the online survey feel that there is no need for new qualifications, a proportion – almost 4 out of 10 - say they thought new qualifications were required (Figure 17). This online survey finding was probed in greater depth at the workshops and telephone interviews. While there is a small minority who feel that entirely new qualifications are required, it seems that the majority of stakeholders and practitioners in reality want to see improvements and enhancements in the Functional Skills suite.

These improvements include such aspects as smoothing the steps from one stage of the qualifications to the next; increasing their rigour to provide greater certainty for employers; (a few suggested) creating a grade structure for Functional Skills, and perhaps developing a Level 3 version to take the suite of practical, work-related qualifications to a level equivalent to an “A” Level.

The vast majority of participants called for “no change” fearing yet another round of new developments and new qualifications when, as they see it, a) the situation is already complicated enough, b) where Functional Skills qualifications are concerned, the system is not broken and, c) employers are only just beginning to get used to them and to understand their role.

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149 See for example the library at NRDC, and literature such as: Institute of Education: You wouldn’t expect a maths teacher to teach plastering…” Casey. H, et al. NRDC, 2007

67 | Page
Figure 17: Are new qualifications needed?

Stakeholder and practitioner respondents made a number of comments on the subject of “qualifications” for this cohort.

A Functional Skills type qualification using real life and work settings to test the necessary mathematical and/or English skills is essential for these students. [But] change is desirable, the functional skills qualification in its current format is flawed.

I think that Functional Skills Qualifications offer an important stepping stone for people who have, for whatever reason, missed out on the basics: times tables and the four rules in maths, and sentence structure and language sense in English. By embedding these basics in a structure that extends on into ‘real’ maths and English, they provide a starting point in a learner journey which is particularly valuable in the context of returning to work or improving one’s work status.

I believe that Functional Skills are a huge step forward from the structures that preceded them: Skills for Life and Basic Skills, which were, in my view, inadequate, as they were over-simplified and designed around administrative convenience.

It is not always easy to find GCSE classes and students may have to take English literature as part of their qualification. The English literature element is not relevant to general use of English. Functional Skills offer a more flexible alternative with frequent opportunities for assessment.

5.3 Stakeholders/Practitioners and non-GCSE qualifications

Understandably, the familiarity of stakeholder and practitioner with Functional Skills is very high. Well over 80% said they are very familiar, with a further 11% ‘somewhat familiar’ with the suite of qualifications (Figure 18).
And they also rate them highly (a number of questions required respondents to “rate” various things using a scale of 1 to 10, where 1 was always the lowest score and 10 always the highest).

Stakeholders and practitioners returned relatively high ratings for Functional Skills qualifications when compared with other non-GCSE qualifications. They rated both maths and English Functional Skills qualifications at well over 8 out of 10. Their most common rating response for these qualifications was 10 out of 10 (Figure 19).

It is important to stress, however, that their feelings about Functional Skills were not unquestioning. A great many respondents, both to the online survey and to the groups and interviews, stressed the twin needs:

1. not to change the fundamental approach and even the name too much, if at all; but,

2. to enhance the status and rigour of the courses and qualifications so that both learners and employers receive greater value from them; learners in terms of achievement, skills and self-respect, and employers in terms of greater certainty in the qualification’s robustness, reliability and applicability.

Their strengths and weaknesses are discussed further below but first we also asked stakeholders and practitioners their views on the value of a range of non-GCSE qualification types.
Practitioner’s views on ‘other’ qualifications were, in the main, focused mainly on the Functional Skills qualifications but views did emerge on the other types. Many practitioners were keen to stress that this review is about making maths and English work for all which includes ESOL students, those in prisons/secure estate, seeking work and young adults/adults already in work.

When considering those different segments of the same cohort then these other qualifications also play a major part of the picture.

Level 1/Level 2 certificates, commonly known as regulated IGCSEs and unregulated IGCSEs in maths and English count as equivalents to GCSEs for the purposes of recognising prior attainment in the 16 to 19 maths and English condition of funding. In discussions, IGSCEs were often ‘dismissed’ somewhat as being those qualifications largely used by independent schools and, therefore, broadly in the same category as GCSEs. In this study very few stakeholders and practitioners talked to us at length about them. This is not the picture for all and, indeed, one provider explained how, in fact, they offer both Functional Skills English and IGCSE English.

‘these two qualification work well together. The IGCSE is the next step up from the level 2 FS as it is a larger qualification and allows for grading and extends the skills from the Functional Skills English qualification’.

The bite-sized OCF units/qualifications are generally well-liked for their linked strengths in, firstly, being able to match a spikey profile by which individual learners can be supported as their needs dictate, and, secondly, to supplement specific ‘troughs’ in knowledge e.g. “data handling” and
enable quick progression to the next stage. Their method of assessment is also attractive in that it is less examination-focused.

Achievement across these smaller qualifications is a huge motivator and encourages future learning. Practitioners explained that being able to offer Entry level bite-sized units, for example, also helps learners prepare for, in particular, Functional Skills. Typically the users will be adults (post-19). The ‘bite-sized’ qualifications are useful for ESOL learners as they help “teach the language of maths” and “explore different subjects and demonstrate the maths skills in different subjects”.

Some pointed out that while there is an issue in getting Functional Skills recognised, recognition for the bite-sized QCF qualifications is actually even harder.

ESOL qualifications have just been renewed and are now available as QCF qualifications. They have also been the focus of various other research studies with much more time spent on their issues, strengths and weaknesses than this study has been able to.

One key point about ESOL that was often highlighted in this research is that providers cater for an extremely diverse set of ESOL learners, ranging from highly educated and proficient learners tackling a new language to those who have had little or no experience of schooling and are not literate in their own languages. This profile is important to remember as there are ESOL learners who go into high-skill level occupations, for example, dentistry, and, therefore, should not be ‘trapped’ in an educational route labelled as for those who have ‘failed’ in school.

Various ESOL experts point to the ESOL pedagogy as being such that it should be used as a template – they believe it helps learners navigate the structure of the Functional Skill qualifications, which are often not helped by the levels. A lack of understanding of the levels is another major issue.

Another study for the Association of Colleges (AOC) by the National Research and Development Centre for adult literacy and numeracy (NRDC) and NIACE in 2013 pointed to the fact that with ESOL, in particular, the nature of provision and the progression routes is often influenced by considerations about availability of funding and qualifications for different types of programmes, rather than the assessed needs of the individual learner.

5.4 Strengths and Weaknesses of Functional Skills

The stakeholders and practitioner respondents were fully aware and vocal on both the strengths and the weaknesses of the current Functional Skills offer. Some examples of the latter in brief include: perceived “gaps” between the various levels, the perceived lack of rigour in the setting and marking of the tests and examinations. There are also practical weaknesses, too, including the broadly non-existent recognition by higher education institutions aligned to a further issue of a lack of UCAS points.

Much stemmed from discussions around the ‘purpose’ of Functional Skills. There was agreement at various workshops and webinars that when Functional Skills were first introduced they were not as

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150 AOC, ESOL Qualifications and Funding: Issues for Consideration, 2013 prepared by NRDC and NIACE
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popular among employers (mainly those cognisant of Apprenticeships and the predecessor qualifications - key skills). But this, largely, stemmed from the fact they were replacing the popular key skills in 2010/2011.

Providers explained that key skills were, in the main, a tick box exercise and much easier to complete. They do not compare well and, indeed, should not be compared with the Functional Skills qualifications. The latter are beginning to gain awareness and credence by employers, according to the conversations with the sector, particularly those employers who use Apprenticeships.

One major retail–fast food employer explained that Functional Skills are invaluable for their large intake of young people, usually entering their first job, often from a cohort known as NEETs – Not in Education, Employment or Training. The applicability of Functional Skills is so regarded because the qualifications are practical and relevant to the work the young people are doing on a day to day basis. Their provider helps directly with contextualising the skills to their workplace. That works well, albeit, this employer wishes to have the assessment contextualised too (see below).

The overriding concern practitioners have was that, in treating Functional Skills as an ‘alternative’ for those who have ‘failed’ their GCSEs, will not help their cause as an increasingly widely-accepted qualification. This is also an issue for some learners.

Raising awareness among employers of the value of Functional Skills is recommended by the majority of the awarding organisations participating in the study. They view the use of terminology such as ‘stepping-stone qualifications’ or ‘alternatives’ as demonstrating a lack of understanding of these qualifications among practitioners and employers.

This presentation of Functional Skills as an inferior sub-set of GCSEs has, inevitably, been created by their use as a remedial measure. Many AO representatives want to override the view of ‘GCSE or bust’ and the unofficial hierarchy placing GCSEs above Functional Skills.

They recognise that establishing an alternative maths and English qualification as a reliable standard of functional education is essential to increasing its value in the eyes of employers.

The notion of seeking parity of esteem between qualifications of very different purposes was viewed as a concern by one group of major AOs, asserting that this drive can have the effect of turning qualifications into ‘look-alikes’ instead of recognising their distinctive purpose and value.

“The view that ‘if you don’t have a GCSE, there’s nothing for you’ is wrong.”

Although AOs praise Functional Skills’ contextualised approach to maths and English learning and assessment, they, too, identified a number of weaknesses:

- The five different levels can be confusing – there should be clearer distinction between Entry Levels and Level 1 and 2. There were mixed views over how to achieve this: possibly by renaming the Entry Level qualifications, although others were keen not to introduce change, instead preferring to maintain continuity as they are regarded as still bedding in;
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- Teaching specifications are set out to facilitate contextualised delivery at the pace of the learner, therefore, assessments must be accessible to a wide range of learners who have been taught in different ways and who have vastly different levels of ability. However, the examinations have to be quite generic. This is at odds with the methods by which learners are taught; while they develop contextualised maths and English skills, they must demonstrate these in an assessment set in a non-specific environment.

A general lack of stability and consistency in the vocational education landscape is blamed for the misunderstanding of Functional Skills qualifications. AOs, like the majority of stakeholders and teaching practitioners, request that very few changes are made to Functional Skills over the next few years so they may become more established:

“Having defined the broad expectations, it is about having the confidence to leave them alone”

There are many elements of Functional Skills that really appeal, particularly to adults because they can see the relevance of what they are learning. The focus being applied and the content being relevant to a wider proportion of learners; problem solving skills are developed which in many ways was the original intention for the Functional Skills qualifications.

The strengths or arguments for Functional Skills have been well developed in many other reports.

Other practitioner comments:

**Functional Skills are the best standalone qualifications I’ve seen in my career ... They should be tweaked/developed not replaced.**

As a teacher of GCSE and FS maths I consider FS to be the more appropriate exam for many students. i.e. those who do not wish to go onto HE.

Don’t mess with the concept, it works. Just tighten the marking so employers can have faith in them.

All students should study FS. The problem solving aspect is needed for all students. I have had students with a B at GCSE fail FS maths at Level 2.

Functional Skills, even though I didn’t like them to begin with, have grown on me, and are a lot more likely to succeed going forward than any notion of a GCSE being a mandatory outcome in an apprenticeship.

Essentially, they are about working maths and working English – which is what employers want.

When asked directly in the survey, the practitioner and stakeholder participants listed a great many weaknesses for Functional Skills of which the following is just a selection from a large sample:
Skills [in Functional Skills] are not always relevant to subject young person is learning.

Badly written exam papers.

There are differences between questions from different awarding bodies. These should be more standardised.

“Entry Level” is a very misleading title – gets confused with national Level 1, 2 and 3 qualifications

Many students would benefit from a more robust study, and examination, of English grammar - though more time must be allowed for this study of the basics

Calculator use weakens learners’ number sense.

The exams are written badly - students cannot understand what they are being asked to do.

Level 2 functional skills are too much of a jump up from the Level 1.

The jump between Entry Level 3 and Level 1 is too great.

Too verbose, the language and cultural contexts used can be unavailable to some learners without those experiences or knowledge. E.g. "Gymkhana" in a functional maths exam.

No standardisation across awarding bodies. Every awarding body seems to have its own belief of what functional skills should look like when exam setting.

Qualification is a Level 2, but doesn’t require the same effort/ work as a GCSE, so should be classed as a GCSE C maximum.

... could be an even better qualification if tailored even more to what is required in the workplace.

There is a tendency for colleges to ‘bank’ students on lower qualifications than they are capable of in order to limit failure rates at a higher level. For example I’ve had students pass level 1 in December with a very high mark, it would have been less ‘risky’ for me to merely keep them on that qualification for the remainder of the year.

Not well known enough yet so employers don’t ask for them so learners don’t value them. It is a constant battle to win them over, especially when they have already been put off maths by GCSE and/or poor maths teaching at secondary school.

The last comment above is typical of situations described by a number of providers.
Contextualisation: an unresolved issue

A major employer raised the issue of ‘contextualisation’. The employer referenced earlier strongly advocates contextualised assessment (currently the scenario-based aspects of the examinations are generic). AOs have the challenging task of developing a range of different scenarios for assessment that can be understood for those in the large range of settings in which Functional Skills qualifications are used – offender learning, employment, college, ESOL learners and so on.

However, some feedback on assessment suggests a need for some modernisation\(^{151}\). Other stakeholders pointed to some AOs offering multiple choice questions in Functional Skills (English) assessment which may prejudice the attempt at improving rigour.

One expert witness attending the Steering Group for the review was another strong advocate for contextualised assessment which could assist with the point about relevance to the learner particularly for young people. A set of fixed contexts for example technology (covering manufacturing, construction etc.), health, business services as well as general, to cover those not being taught within a context, may be a way forward.

There was no consensus among stakeholders and practitioners on sector-contextualisation for assessment. Contextualisation would have to be more deeply explored in further research.

A number of practitioners also commented on the difficulty with which learners with specialist needs or those in the justice system often have with interpreting the Functional Skills exam questions. The issue can be with the English used and the problem solving element; the latter makes it difficult for the learners to identify what the question is asking them to do. This issue is also well-rehearsed in the NIACE/NRDC study completed for the AoC\(^ {152}\).

Figure 20: Barriers to greater take-up of Functional Skills (stakeholders/practitioners)

Base 444 (1007 responses)

\(^{151}\) AOs are already looking at the rigour of assessment as a result of the recent Ofqual report on their Review of Functional Skills, 2015.

\(^{152}\) AoC, ESOL Qualifications and Funding: Issues for Consideration, 2013 prepared by NRDC and NIACE
It is clear from Figure 20 that stakeholders and practitioners feel the major barriers standing in the way of the more general uptake of Functional Skills qualifications are, in fact, the lack of wider awareness of the qualifications (especially among employers), the perceived difficulties in progression to, and from, the suite of qualifications (complicated by the Entry levels, and that there are no Level 3 Functional Skills), and the existence of “too many competing qualifications”.

Another potential barrier added to the debate through the conversations is whether Functional Skills do or should carry UCAS points. It is understood that although they did previously while there was some overlap with Key Skills, they now do not, a factor regarded as a further barrier to recognition by, and progression to, higher education.

The title of Functional Skills

One question in the survey and further discussion at webinars and workshops considered the potential issue of the name “Functional Skills”.

Employers also were asked to what extent they see the name as being user friendly – in the sense of being adequately descriptive and attractive to potential learners and employers (Figure 14).

The vast majority of participants – including employers – were clear that the name is probably adequately descriptive and there were very few specific complaints about it except from a few practitioners who regard it as being vague, “abstract” and imprecise, with some questioning what functional means and another small group saying the name is demeaning.

The consensus is, however, for the name to be retained, not least to provide employers with continuity, but more particularly with reassurance they are here to stay (Figure 21).

One train of thought was for the constituent maths and English qualifications to be seen as more explicitly work-ready qualifications, and to rename them, purely for marketing purposes to aid recognition, as:

- Functional English, and, Functional Maths

There were a number of other suggested names (see below) but none had more than two or three supporters and none carries the advantage of continuity with the current courses and qualifications.

Certificate in practical maths/English skills


“Workplace English”, “Workplace maths” at Level 2 and above

English/Maths for Work or English Skills / Maths Skills

Business Mathematics and Business English
5.5 Learner Conversations

One group of apprentices stressed they were keen to learn the basics of maths and English for job-requirements, spelling/reading quickly and accurately in English, and mental arithmetic in maths. They were not interested in topics such as Shakespeare and algebra, commenting that irrelevant topics are off-putting. The views were mixed about how much maths and English to study although they were all agreed that the subjects are of vital importance. One said people should be encouraged to study them as high as possible until they struggle to go further; yet others said that having studied maths and English at GCSE at school, after school learning is over and if their first attempt failed, they should be given a choice as to what they continue to study afterwards. The study of literature came up frequently as being not at all relevant to work.

The apprentices felt that everyone of their peer group would be fairly well aware of the importance of English and maths skills; for example, they know to talk differently when amongst friends to being in a business setting.

A group studying Functional Skills thought it was a positive experience overall, although one learner was worried that there is a slight stigma attached to it. The teaching of Functional Skills was described as a different approach from that encountered at school. Learners were positive about having a smaller class size, greater access to support, from having more at stake (it is needed for their apprenticeships), and feeling less shy about asking questions. One learner explained that he had been put into a low-performing class at school, and his peers had been disinterested and disruptive, which impacted upon his ability to study. In contrast the Functional Skills class was an overall far more helpful environment.

The learners identified some practices/activities which they found helpful while studying Functional Skills:

- working with relevant examples when learning the topics;
- accessing one-to-one tuition when needed;
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- explaining topics in the classroom and their thinking to each other after attempting a task.

The learners were able to list skills needed in work that they had studied at GCSEs:
  - Being accurate
  - Angles (not specifically stipulated in the Criteria for Functional Skills\(^{153}\))
  - Fractions
  - Graphs (ditto)
  - Percentages
  - Quantities and volumes (ditto)
  - Ratios
  - Shapes, circumferences, perimeters and areas

The comments made by this group of learners for this study indicated some useful insights on Functional Skills that have also been illustrated in, and have resonance with, the recent NIACE study on learners\(^{154}\).

5.6 Stakeholder/Practitioner views summarised:

- Primarily post-16 learners in particular should have access to qualifications that suit their particular needs, some suggested that learners should be asked to choose for themselves which route they would wish to follow. Disengaged learners, particularly those who have had negative learning experiences in the past, may need to be supported to develop an identity. ‘The reasons that learners disengage from learning are diverse, and therefore strategies to reengage them with learning must be equally thorough so they can view themselves as being competent to deal with real-life situations’.

- GCSEs are not regarded as ‘work-ready qualifications’ and neither their delivery nor their assessment model is particularly suited to 1) adults without GCSEs at A* to C in work, or 2) to ESOL candidates, or 3) to those attempting to achieve them in less than two years.

- Logistical and large, one-off cost problems of GCSE assessment is an issue cited by a number of college leaders.

Grade D GCSE students:

- The boundaries of learners with this grade appears to be very large: including those who are near to a C and those who are far from it. This point has been reinforced many times during the discussions held during this study. The issue of learners presenting at college with a Grade D, or sometimes with a Grade C, and then, finding the results of an initial assessment show a lower grade than that with which they arrived, was also mentioned a number of times.

\(^{153}\) See Appendix 3 for details of the Criteria

\(^{154}\) NIACE 2015, Engaging Learners in GCSE maths and English, February 2015
Initial assessment is a topic of conversation that not many have had during the MMEW, but there is some evidence to suggest that this is worthy of future research to investigate if it could be better data-mined and utilised for this critical transition of exiting school and preceding to a next step. These data help identify where a student’s or new employee’s weaknesses lie. Knowing the exact details of pass or fail grades from GCSEs could help young adults become more independent by encouraging them to take responsibility for their own learning needs. Such an approach could encourage a focus on post-16 learning of specific skill improvements rather than ‘qualifications’.

There appears to be a need to move away from this language of ‘failure’ and towards learning skills rather than passing a test.

Many participants are of the view that a continuous (i.e. more than the one) re-sit approach is demotivating and may have the opposite effect to that which is intended. It could disengage learners from maths and English altogether.

GCSEs at grade C or higher are not always achievable for every learner – “grade D is not ‘C but needs another year’s experience’”. The value of a grade C came up for question by some respondents, including employers. Non-GCSE qualifications are regarded as more appropriate for some learners.

In contrast, some stakeholders were anxious to point out that by following routes other than GCSEs, learners could be unwittingly cutting off their future, as yet un-formed, progression and promotion possibilities.

Alternative qualifications:

While the conversations largely centred on Functional Skills, all QCF qualifications appear to have a place and a purpose. Bite-sized/unitised (QCF) qualifications are based on the core curriculum with multiple, small single level qualifications and used to provide a pathway to building competence in English or mathematics; each unit typically addresses a narrowly focussed curriculum.

Practitioners were keen to point out that each assessment is a positive step for a candidate, even when failed as it provides clear formative assessment i.e. highlights very specific learning requirements. There does appear to be a myriad of such qualifications (and QCF units) but the resulting 'suite' of qualifications is not a substitute for either GCSE or functional skills, but enables a stepping stone approach. Practitioners said they are valuable as a pathway with 'banked achievements', leading to whichever of GCSE or functional skills is most appropriate for the learner.

Mention of Free Standing Mathematics qualifications was infrequent within these discussions.

ESOL qualifications continue to provide a valuable route to Functional Skills and GCSEs despite the complex funding backdrop. An expert witness suggests that their existence points to higher standing by England in the PIAAC study comparative with other countries due to the more effective system in place to address the literacy and numeracy needs of its migrant population in England: ‘a system that has come under increasing pressure in recent years.’
Functional Skills:

- Functional Skills started out as a mastery model (pass fail, single level) underpinned by a synoptic assessment model covering a limited curriculum of skills that are applicable in a wide range of employment and social settings. They emerged with a number of purposes but over time those purposes may have become confused, not least given the recent headline in 2014 that they are a stepping stone. Their history of superseding the portfolio-based key skills within Apprenticeships may have over-shadowed their initial introduction.

- Functional Skills are relatively well-regarded (with some caveats) amongst stakeholders and practitioners, and have the potential for long life, to be retained as long as various improvements highlighted here, and by Ofqual, are fully considered and their rigour enhanced.

- Practitioners see them as valuable and well received qualifications for adults and those in work. They are about practical skills which mirror those skills the employers say they want. They work particularly well where the skills being taught can be reinforced through regular practice.

- The flexibility in assessment is very well liked and is one of the features that employers and practitioners and a number of stakeholders were keen to emphasise. They would wish for the mix of assessment (on-line and paper-based assessments) to remain, not least as it suits a range of adults in different circumstances, far more than the one assessment window as per GCSEs.

Changes to Functional Skills:

- Functional Skills English, in particular, appears to be operating at a lower standard and needs to be tightened up; in order to be seen as genuinely equivalent with the standard for GCSEs the standard must be raised. In many ways, the important skill sets mentioned by many employers of speaking and listening could become a market opportunity for Functional Skills, although they are difficult to assess. The Criteria for Functional maths may well warrant reviewing against the skills employers say they need (section 4.2).

- There is little appetite or enthusiasm for changing the pass/fail to a grading system.

- No name change – the sector is desperate for stability and conscious what messages this sends to employers if there are more name changes. ‘Caution against change for change’s sake – learners and employers need stability to have confidence in measures of attainment’¹⁵⁵.

- The approach of contextualisation is essential during the teaching. The model of ‘show me you can apply this to other situations’ is appropriate. Although on balance the consultation pointed to a view that if assessment was applied to one sector/context it could result in a too narrow a focus and discourage the advantage of having transferable skills; this issue is not yet fully explored or resolved.

¹⁵⁵ FE Week, Kirstie Donnelly MBE, UK managing director at City & Guilds, January 2015
Other emerging points:

- Stakeholders and practitioners agreed that employers need help with understanding the qualification world. Functional Skills should be promoted/marketeted as ‘working qualifications’ for instance.

- There needs to be a ‘shared language’ to help employers understand the world of qualifications including: their purposes/intention, equivalences and progression, especially if more development work akin to Trailblazers and Tech Level vocational qualifications involving employer participation is expected, along with a model of employer-directed funding.
6. Conclusions

These conclusions relate to the current study and its main focus of attention: young people and adults who have not yet attained a standard in maths and English equivalent to, at the least, the existing GCSE C grade. This population is termed “the cohort” throughout the report and these conclusions.

1. In common with many recent studies this one confirms that maths and English skills are of critical importance to employers at all levels of staff role and ability. Although where this cohort is concerned employers appear to be adopting internal strategies to ameliorate the most serious consequences of skills gaps (e.g. through mentoring/training, written templates, scripts for phone conversations, and checking of calculations by senior staff).

2. Where non-GCSE qualifications are concerned Functional Skills are the ones of which the highest proportion of employers are aware (around 41% of smaller companies and 47% of larger ones).

3. There is evidence from practitioners and employers in this research that Functional Skills standards in the two subjects for this cohort – although performing a good job at present - need to be improved and that, in the light of forthcoming changes to the GCSE format, attention should focus on the next most recognised qualification-set – Functional Skills.

4. At present around 6 out of 10 employers appear not to be aware of Functional Skills courses and qualifications but this proportion is much higher where other non-GCSE qualifications in maths and English are concerned.

5. Most stakeholders and practitioners are clear that the existing non-GCSE offerings at this level – including ESOL and certificates – have a role to play for different segments of the cohort (e.g. for such groups as NEETs, offenders, those with special educational needs such as dyslexia and other learning difficulties). This finding supports the overall aim of the review in that this is about making maths and English work for all.

6. Although, there is evidence of the main non-GCSE qualification – Functional Skills, as currently prescribed for apprenticeships, being used as a stepping-stone towards GCSE maths and English, the majority of providers and stakeholders confirmed that this confuses the purposes of Functional Skills. They, instead, should be viewed as a genuine alternative route to maths and English competence.

7. Employers who are aware of Functional Skills say that they are useful in the world of work.

8. However, feedback from employers and practitioners alike indicates that:

   a. The Functional Skills qualification range needs greater clarity of purpose in order to give it higher currency with employers and to avoid perceptions with employers and learners that Functional Skills are simply a “consolation prize” awarded by an essentially GCSE-focused system.
b. The standards on which they are based should be raised – particularly at Level 2 – in order to enhance their value to employment and to underpin their status and credibility vis-à-vis GCSEs.

c. The qualifications need to be reviewed against employer skills needs (as documented in this report, in the core curriculum, and in other reports – such as the CBI report of 2006 that led to the Functional Skills development, and other sources) and be even more closely aligned to work-skills (i.e. the curriculum content based on what employers need for their workforces).

d. The Criteria for Functional Skills 2012 may need reviewing – particularly with respect to the progression steps between lower level Functional Skills qualifications and the ones above them. Practitioners are specifically concerned at the perceived leap between Level 1 and Level 2 qualifications and at the gap between FS Level 2 and even the current GCSE qualification.

e. Minor changes should be considered to the titles of the Functional Skills qualifications, potentially as a marketing tool in the first instance to introduce a more outward-facing form of terms: Functional Maths and Functional English as opposed to the more confusing and cumbersome current protocol of a Functional Skills qualification which then has the postscript English or maths. This would emphasise their purpose which is that these are ‘working maths’ and ‘working English’ qualifications.

9. In the light of a lack of widespread awareness of Functional Skills employers need help with understanding the value, purpose and approach of the qualification-set, so that they can understand more clearly the degree to which a learner has been successful in mastering the practical and applied English and maths skills required for work.

10. There needs to be a shared language so that employers can understand and be helped with the concept that other qualifications exist at the same level of GCSEs. What this means in practice is that the existence and purpose of various maths and English qualifications need to be clarified and widely communicated in a coherent way. This is imperative for employers to be able to interpret what the achievement of a grade B or C (or 4 or 5 for the reformed GCSEs) means the young person knows, and, equally, what a Pass at Functional Skills Level 2 in Functional Maths shows the person can do. This conclusion also links to the point made by a number of stakeholders that initial assessment is a key part of the process and more should be done to ensure learners receive, acquire and hold onto the details of their strengths and weaknesses as identified in the results from various qualifications.

11. A potential picture of the various routes as they stand now but with some minor changes/suggested improvements is provided in the Figure below.
Figure 22: Simplified view of GCSE/non-GCSE maths and English qualification environment

Notes:
Functional Skills qualifications are shown with a proposed new “branding” which uses the term “Stage” to make different levels clearer to employers and learners while still retaining the formal titles for administrative purposes.
Arrows represent flows of entrants to various types of qualification. Their width provides an approximation of the relative size of the flow but is not intended to be exact.

Due to the complexity of the system – for example, a single column such as “QCF/ESOL” encompasses a large number of qualifications at all levels from Entry Level 1 up to QCF Level 2 – no attempt has been made to specify every qualification within the diagram’s remit.
Appendices
A1: Respondents

Employers Respondent profile:

Please note that – in the sector breakdown – “manufacturing” includes engineering and engineering construction.

The Employer Profile

![Pie chart showing the distribution of employer respondents by region.]

- South West: 3.70%
- South East: 10.80%
- London: 13.60%
- Eastern England: 20.70%
- East Midlands: 15.00%
- West Midlands: 9.80%
- Yorkshire & Humberside: 7.40%
- North East: 8.00%
- North West: 10.80%

Base: 646

![Pie chart showing the distribution of respondent size bands.]

- 0-4: 42%
- 5-19: 4%
- 20-49: 9%
- 50-249: 37%
- 250+: 8%

Base: 646
Stakeholders and Practitioners Profiles:

Employment by Broad Ethnic Group (%):

- White: 86%
- Mixed: 7%
- Asian/Asian British: 4%
- Black/Black British: 3%
- Other: 1%

Base: 625

Organisation Type:

- FE College: 40%
- Adult and community learning: 35%
- Private training provider: 20%
- Other: 10%
- Voluntary sector: 5%
- Professional/industry body: 5%
- Awarding organisation: 5%
- Union: 5%
- Offender learning: 5%

Base: 718
Making Maths and English Work for All

Job Role

- Functional Skills/Skills for Life tutor: 30%
- Subject lead/Head of Dept: 20%
- Other: 15%
- Curriculum leader: 10%
- Vice Principal or Senior Manager: 10%
- Training/Education Policy Lead: 7%
- Principal or Chief Executive: 7%
- Subject tutor (other than maths or English): 5%
- Teaching assistant: 4%
- SEN or LLDD teacher or tutor: 3%
- Employer Engagement Officer: 3%
- Union representative: 2%

Practitioners/Stakeholders by Region

- East of England: 16%
- East Midlands: 10%
- London: 12%
- North East: 15%
- North West: 12%
- South East: 10%
- South West: 10%
- West Midlands: 12%
- Yorkshire and the Humber: 11%

Base: 718
Making Maths and English Work for All

Length of Time in Role

- Under a year: 15%
- 1 to 5 years: 40%
- 6 to 10 years: 25%
- 11 to 20 years: 15%
- Over 20 years: 10%

Base: 608

Specialist Area

- Maths only: 16%
- English only: 19%
- Both maths and English: 65%

Base: 564
A2 The Army’s use of Functional Skills

Soldiers need appropriate abilities in both L&N to enable them to assimilate their Army training and education, and to carry out their day-to-day duties (briefings, reading orders, measurements of distance, time, etc.) effectively, both in barracks and on operations - at times, under combat conditions.

Army L&N Context

The Army’s provision that ‘enables individuals to maximise their potential’ has been devised and fine-tuned to cater for the typical profile of the Army’s annual 6,000 to 8,000 young recruits into soldier rank. The L&N profile of the new recruits has been broadly similar, for the last ten years. This is reflected in the 2013 L&N profile below.

2013 Recruit L&N Profile – based on initial L&N assessment for all recruits (irrespective of qualifications held), conducted at recruit selection.

<table>
<thead>
<tr>
<th>Army</th>
<th>Literacy</th>
<th>Numeracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>EL2</td>
<td>237</td>
<td>3.2</td>
</tr>
<tr>
<td>EL3</td>
<td>2602</td>
<td>35.2</td>
</tr>
<tr>
<td>L1</td>
<td>3031</td>
<td>41.0</td>
</tr>
<tr>
<td>L2</td>
<td>1518</td>
<td>20.6</td>
</tr>
<tr>
<td>Total</td>
<td>7388</td>
<td>100%</td>
</tr>
</tbody>
</table>

2014 Recruit L&N Profile – based on initial assessment at recruit selection for all, except those holding Level 2 Eng/Maths qualifications156.

<table>
<thead>
<tr>
<th>Army</th>
<th>Literacy</th>
<th>Numeracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>EL2</td>
<td>205</td>
<td>3.11</td>
</tr>
<tr>
<td>EL3</td>
<td>1426</td>
<td>21.65</td>
</tr>
<tr>
<td>L1</td>
<td>2540</td>
<td>38.57</td>
</tr>
<tr>
<td>L2</td>
<td>2415</td>
<td>36.67</td>
</tr>
<tr>
<td>Total</td>
<td>6586</td>
<td>100%</td>
</tr>
</tbody>
</table>

Currently 87,000 strong, the Regular Army has the benefit of circa 6,000 Foreign and Commonwealth recruits, and 700 Gurkhas, many of whom (around 6%) require ESOL support. Being largely representative of modern Britain’s society, the new Army recruits bring with them a mixture of positive and negative experiences of schools and GCSEs.

156 The change in arrangements not to conduct initial assessments amongst those applicants already holding Level 2 Eng & maths qualifications was implemented during 2013.
As part of initial Phase 1 recruit training and Phase 2 specialist trade training, the focus is very much on train in not select out - any failure experienced at school is not taken as any indicator of the future. L&N provision is made available to all those personnel with identified L&N needs, at any stage in their career.

Progressive L&N Standards.

The Armed Forces recruit all their personnel at the lowest rank and promote staff from within. Most join aged 16–25 year. The minimum L&N recruit entry standard is Entry Level 2. Sound English S&L skills, as echoed by many employers as part of this MMEW research, are considered by the Army to be critically important. As such, a higher standard of S&L skills (Level 1) is imposed at recruitment to ensure recruits are better placed to take advantage of Phase 1 recruit training. The Army’s aim is for all personnel to achieve at least Level 1 L&N standards within three years of joining the Service. Army policy has set these Level 1 standards as the minimum L&N requirement for promotion to the rank of Corporal; and Level 2 for promotion to Sergeant and above. Anchoring L&N standards within the Army’s HR strategy in this way has significantly improved engagement with potential learners and their Commanding Officers. The Army also has a reservist force set to increase to 30,000 by 2020. Reservists are required to meet the same L&N recruit entry standards as Regular recruits and from Apr 18, they must meet the same standards required for promotion.

Provision Delivery.

As part of military training, over 95% of all trainees undertake accredited Apprenticeship programmes within their first two years of Army service. All Army L&N provision is expected to lead to nationally recognised qualifications and individual programmes are developed to explicitly meet this goal. Most Army personnel now attain their L&N Level 1 qualifications through the Apprenticeship route; some also achieve L&N Level 2 qualifications through their apprenticeship programme. However, L&N support is also organised and delivered regionally through the Army’s network of four Phase 1 training units, Army Education Centres (AECs) and e-Learning Centres (e-LCs) in the UK and overseas. 40 fully qualified, specialist MOD Basic Skills Development Managers (BSDMs) work across the AEC and training network to ensure that soldiers have the correct L&N qualification to perform in rank and for promotion.

Tailored Provision.

The Army’s L&N support service provides initial and diagnostic assessment of individuals’ needs, the maintenance of individual learning plans and the provision of contextualised learning support programmes. All L&N provision is delivered or supported by specialist L&N staff (both in-house and externally funded). To meet the needs of individual learners, a mix of delivery methods has been developed (e.g. individual and group tuition, coaching and mentor support, distance learning, class-based tuition and ICT-based support). Teaching staff and the chain of command work collaboratively to organise effective blended learning solutions for each individual. The Army has sought to embed L&N support across its Phase 1 and Phase 2 training, wherever practicable. The benefits are fully

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157 Currently around 7000 soldiers achieve their Apprenticeships each year – representing, on average, a completion rate of over 80%. Failure to complete, in the main, comprises those who exit the Apprenticeship to move to another Army trade or those who leave the Service. The latter are re-engaged, back on programme, on return to in-barracks duties. With the latest expansion of the Army Apprenticeship programme, completions are anticipated to rise to about 8500 per year.
recognised. However, the training regimes, unit routines and operational commitments within the Field Army have dictated the widespread adoption of short, intensive L&N programmes. These are supported by “bite-sized” interventions beforehand to ensure learners are “programme ready” in order to take full advantage of the L&N courses. The programmes are made directly relevant to the soldiers’ jobs with the use of resources contextualised to Army settings. Such purposeful programmes improve learners’ motivation and progress. Critically, L&N skills are practised and frequently reinforced through on-the-job application, following completion of these programmes.

The Army’s whole organisational approach to the improvement of L&N skills lies at the heart of its L&N delivery and the high levels of engagement by Army learners and their line managers. At the same time, it operates a clear “grow your own talent” policy that builds on a Service culture of training and development, supported by an ethos that generates high expectations of success.
A3 Summary comparison between GCSE content and Functional Skills Criteria

This comparison is provided solely to demonstrate the criteria content approaches of two very different qualifications.

Comparison of GCSE English and functional skills.

Ofqual (2014) GCSE Subject Criteria for English, as compared to: Ofqual (2011) Functional Skills Criteria for English

General

<table>
<thead>
<tr>
<th>GCSE</th>
<th>Functional English level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>analyse spoken and written language, exploring impact and how it is achieved;</td>
<td></td>
</tr>
<tr>
<td>express ideas and information clearly, precisely, accurately and appropriately in spoken and written communication;</td>
<td></td>
</tr>
<tr>
<td>form independent views and challenge what is heard or read on the grounds of reason, evidence or argument;</td>
<td></td>
</tr>
<tr>
<td>understand and use the conventions of written language, including grammar, spelling and punctuation;</td>
<td></td>
</tr>
<tr>
<td>explore questions, solve problems and develop ideas</td>
<td></td>
</tr>
<tr>
<td>engage with and make fresh connections between ideas, texts and words;</td>
<td></td>
</tr>
<tr>
<td>experiment with language to create effects to engage the audience;</td>
<td></td>
</tr>
<tr>
<td>reflect and comment critically on their own and others’ use of language.</td>
<td></td>
</tr>
</tbody>
</table>

Speaking and listening/Speaking listening and communication

<table>
<thead>
<tr>
<th>GCSE</th>
<th>Functional English level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>present and listen to information and ideas;</td>
<td>Consider complex information and give a relevant, cogent response in appropriate language;</td>
</tr>
<tr>
<td></td>
<td>Present information and ideas clearly and persuasively to others;</td>
</tr>
<tr>
<td></td>
<td>Make significant contributions to discussions, taking a range of roles and helping to move discussion forward;</td>
</tr>
<tr>
<td>respond appropriately to the questions and views of others;</td>
<td>Adapt contributions to suit audience, purpose and situation;</td>
</tr>
</tbody>
</table>
participate in a range of real-life contexts in and beyond the classroom, adapting talk to situation and audience and using standard English where appropriate;

select and use a range of techniques and creative approaches to explore ideas, texts and issues in scripted and improvised work.

### Reading

<table>
<thead>
<tr>
<th>GCSE</th>
<th>Functional English level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>understand how meaning is constructed through words, sentences and whole texts, recognising and responding to the effects of language variation;</td>
<td>Select and use different types of texts to obtain and utilise relevant information;</td>
</tr>
<tr>
<td></td>
<td>Read and summarise, succinctly, information/ideas from different sources;</td>
</tr>
<tr>
<td></td>
<td>Identify the purposes of texts and comment on how meaning is conveyed;</td>
</tr>
<tr>
<td>evaluate the ways in which texts may be interpreted differently according to the perspective of the reader;</td>
<td>Detect point of view, implicit meaning and/or bias</td>
</tr>
<tr>
<td></td>
<td>Analyse texts in relation to audience needs and consider suitable responses;</td>
</tr>
<tr>
<td>read a rich range of prose, poetry and drama, including a text from the English, Welsh or Irish literary heritage, a play by Shakespeare and a text from a different culture or tradition;</td>
<td>In three or more texts (SIC)</td>
</tr>
<tr>
<td>understand how texts from the literary heritage have been influential and significant over time;</td>
<td></td>
</tr>
<tr>
<td>explore how texts from different cultures and traditions may reflect or influence values and assumptions.</td>
<td></td>
</tr>
</tbody>
</table>

### Writing (accurately and fluently)

<table>
<thead>
<tr>
<th>GCSE</th>
<th>Functional English level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject content</td>
<td>Coverage and range</td>
</tr>
<tr>
<td>choosing content and adapting style and language to a wide range of forms, media, contexts, audiences and purposes;</td>
<td>Present information/ideas concisely, logically and persuasively;</td>
</tr>
<tr>
<td></td>
<td>Present information on complex subjects clearly and concisely;</td>
</tr>
<tr>
<td></td>
<td>Use a range of sentence structures, including complex sentences, and</td>
</tr>
</tbody>
</table>
Making Maths and English Work for All

| paragraphs to organise written communication effectively. | Punctuate written text using commas, apostrophes and inverted commas accurately; |
| Ensure written work is fit for purpose and audience, with accurate spelling and grammar that support clear meaning in a range of text types. |

| adapting form to a wide range of styles and genres. | Use a range of writing styles for different purposes; |

Comparison of GCSE mathematics and functional skills.


**Number**

**Structure and calculation**

<table>
<thead>
<tr>
<th>GCSE</th>
<th>Functional Mathematics level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>order positive and negative integers, decimals and fractions; use the symbols $=, \neq, &lt;, &gt;, \leq, \geq$</td>
<td>Understand and use positive and negative numbers of any size in practical contexts.</td>
</tr>
<tr>
<td>apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative; understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals)</td>
<td>Carry out calculations with numbers of any size in practical contexts, to a given number of decimal places.</td>
</tr>
<tr>
<td>recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions; use conventional notation for priority of operations, including brackets, powers, roots and reciprocals</td>
<td></td>
</tr>
<tr>
<td>use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theorem</td>
<td></td>
</tr>
</tbody>
</table>
use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theorem

calculate with roots, and with integer and fractional indices

calculate exactly with fractions, surds ) and rationalise denominators and multiples of π; simplify surd expressions involving squares (e.g. \( \sqrt{12} = \sqrt{4 \times 3} = \sqrt{4} \times \sqrt{3} = 2 \sqrt{3} \))
calculate with and interpret standard form \( A \times 10^n \), where \( 1 \leq A < 10 \) and \( n \) is an integer.

<table>
<thead>
<tr>
<th>Fractions, decimals and percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GCSE</strong></td>
</tr>
<tr>
<td>work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 or 3/8); change recurring decimals into their corresponding fractions and vice versa</td>
</tr>
<tr>
<td>identify and work with fractions in ratio problems</td>
</tr>
<tr>
<td>interpret fractions and percentages as operators.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measures and accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GCSE</strong></td>
</tr>
<tr>
<td>use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate</td>
</tr>
<tr>
<td>estimate answers; check calculations using approximation and estimation, including answers obtained using technology</td>
</tr>
<tr>
<td>round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures); use inequality notation to specify simple error intervals due to truncation or rounding</td>
</tr>
<tr>
<td>apply and interpret limits of accuracy, including upper and lower bounds</td>
</tr>
</tbody>
</table>
### Algebra

**Notation, vocabulary and manipulation**

<table>
<thead>
<tr>
<th>GCSE</th>
<th>Functional Mathematics level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>use and interpret algebraic notation, including:</td>
<td></td>
</tr>
<tr>
<td>ab in place of a × b</td>
<td></td>
</tr>
<tr>
<td>3y in place of y + y + y and 3 × y</td>
<td></td>
</tr>
<tr>
<td>a² in place of a × a, a³ in place of a × a × a, a²b in a place of a × a × b</td>
<td></td>
</tr>
<tr>
<td>a/b in place of a ÷ b</td>
<td></td>
</tr>
<tr>
<td>coefficients written as fractions rather than as decimals brackets</td>
<td></td>
</tr>
<tr>
<td>substitute numerical values into formulae and expressions,</td>
<td>Understand and use simple formulae and equations involving one- or two-step operations.</td>
</tr>
<tr>
<td>including scientific formulae</td>
<td></td>
</tr>
<tr>
<td>understand and use the concepts and vocabulary of expressions,</td>
<td></td>
</tr>
<tr>
<td>equations, formulae, identities, inequalities, terms and factors</td>
<td></td>
</tr>
<tr>
<td>simplify and manipulate algebraic expressions (including those</td>
<td></td>
</tr>
<tr>
<td>involving surds and algebraic fractions) by:</td>
<td></td>
</tr>
<tr>
<td>• collecting like terms</td>
<td></td>
</tr>
<tr>
<td>• multiplying a single term over a bracket</td>
<td></td>
</tr>
<tr>
<td>• taking out common factors</td>
<td></td>
</tr>
<tr>
<td>• expanding products of two or more binomials</td>
<td></td>
</tr>
<tr>
<td>• factorising quadratic expressions of the form x² + bx + c,</td>
<td></td>
</tr>
<tr>
<td>including the difference of two squares; factorising quadratic</td>
<td></td>
</tr>
<tr>
<td>expressions of the form 2axbx+c++</td>
<td></td>
</tr>
<tr>
<td>• simplifying expressions involving sums, products and powers,</td>
<td></td>
</tr>
<tr>
<td>including the laws of indices</td>
<td></td>
</tr>
<tr>
<td>understand and use standard mathematical formulae;</td>
<td></td>
</tr>
<tr>
<td>rearrange formulae to change the subject</td>
<td></td>
</tr>
<tr>
<td>know the difference between an equation and an identity;</td>
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</tr>
<tr>
<td>argue mathematically to show algebraic expressions are equivalent,</td>
<td></td>
</tr>
<tr>
<td>and use algebra to support and construct arguments and proofs</td>
<td></td>
</tr>
<tr>
<td>where appropriate, interpret simple expressions as functions with</td>
<td></td>
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<tr>
<td>inputs and outputs; interpret the reverse process as the</td>
<td></td>
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<tr>
<td>‘inverse function’; interpret the succession of two functions as</td>
<td></td>
</tr>
<tr>
<td>a ‘composite function’.</td>
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</tbody>
</table>
### Graphs

<table>
<thead>
<tr>
<th>GCSE</th>
<th>Functional Mathematics level 2</th>
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</thead>
<tbody>
<tr>
<td>work with coordinates in all four quadrants</td>
<td></td>
</tr>
<tr>
<td>plot graphs of equations that correspond to straight-line graphs in the coordinate plane; use the form ( y = mx + c ) to identify parallel and perpendicular lines; find the equation of the line through two given points, or through one point with a given gradient</td>
<td></td>
</tr>
<tr>
<td>identify and interpret gradients and intercepts of linear functions graphically and algebraically</td>
<td></td>
</tr>
<tr>
<td>identify and interpret roots, intercepts, turning points of quadratic functions graphically; deduce roots algebraically and turning points by completing the square</td>
<td></td>
</tr>
<tr>
<td>recognise, sketch and interpret graphs of linear functions, quadratic functions for positive values of ( k ), and the trigonometric functions (with arguments in degrees), and for angles of any size, simple cubic functions, the reciprocal function ( y = \frac{1}{x} ), with ( x \neq 0 ), exponential functions ( y = k^x )</td>
<td></td>
</tr>
<tr>
<td>sketch translations and reflections of a given function</td>
<td></td>
</tr>
<tr>
<td>plot and interpret graphs (including reciprocal graphs and exponential graphs) and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration</td>
<td></td>
</tr>
<tr>
<td>calculate or estimate gradients of graphs and area under graphs (including quadratic and other non-linear graphs), and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts</td>
<td></td>
</tr>
<tr>
<td>recognise and use the equation of a circle with centre at the origin; find the equation of a tangent to a circle at a given point.</td>
<td></td>
</tr>
</tbody>
</table>

### Solving equations and inequalities
### GCSE

<table>
<thead>
<tr>
<th>Solve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation); find approximate solutions using a graph</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Solve quadratic equations (including those that require rearrangement) algebraically by factorising, by completing the square and by using the quadratic formula; find approximate solutions using a graph</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Solve two simultaneous equations in two variables (linear/linear or linear/quadratic) algebraically; find approximate solutions using a graph</th>
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</table>

<table>
<thead>
<tr>
<th>Find approximate solutions to equations numerically using iteration</th>
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</table>

<table>
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<tr>
<th>Translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Solve linear inequalities in one or two variables, and quadratic inequalities in one variable; represent the solution set on a number line, using set notation and on a graph</th>
</tr>
</thead>
</table>

### Sequences

<table>
<thead>
<tr>
<th>Generate terms of a sequence from either a term-to-term or a position-to-term rule</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions, Fibonacci type sequences, quadratic sequences, and simple geometric progressions ($r^n$ where $n$ is an integer, and $r$ is a rational number &gt; 0 or a surd) and other sequences</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Deduce expressions to calculate the $n^{th}$ term of linear and quadratic sequences</th>
</tr>
</thead>
</table>

### Ratio, proportion and rates of change

<table>
<thead>
<tr>
<th>Change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units</th>
</tr>
</thead>
</table>
### Making Maths and English Work for All

<table>
<thead>
<tr>
<th>(e.g. speed, rates of pay, prices, <strong>density</strong>, <strong>pressure</strong>) in numerical and algebraic contexts</th>
<th>Understand, use and calculate ratio and proportion, including problems involving scale.</th>
</tr>
</thead>
<tbody>
<tr>
<td>use scale factors, scale diagrams and maps</td>
<td>Use, convert and calculate using metric and, where appropriate, imperial measures.</td>
</tr>
<tr>
<td>express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1</td>
<td></td>
</tr>
<tr>
<td>use ratio notation, including reduction to simplest form</td>
<td></td>
</tr>
<tr>
<td>divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio; apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations)</td>
<td></td>
</tr>
<tr>
<td>express a multiplicative relationship between two quantities as a ratio or a fraction</td>
<td>Understand, use and calculate ratio and proportion, including problems involving scale.</td>
</tr>
<tr>
<td>understand and use proportion as equality of ratios</td>
<td></td>
</tr>
<tr>
<td>relate ratios to fractions and to linear functions</td>
<td></td>
</tr>
<tr>
<td>define percentage as ‘number of parts per hundred’; interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively; express one quantity as a percentage of another; compare two quantities using percentages; work with percentages greater than 100%; solve problems involving percentage change, including percentage increase/decrease and original value problems, and simple interest including in financial mathematics</td>
<td></td>
</tr>
<tr>
<td>solve problems involving direct and inverse proportion, including graphical and algebraic representations</td>
<td></td>
</tr>
<tr>
<td>use compound units such as speed, rates of pay, unit pricing, <strong>density</strong> and <strong>pressure</strong></td>
<td></td>
</tr>
<tr>
<td>compare lengths, areas and volumes using ratio notation; make links to similarity (including trigonometric ratios) and scale factors</td>
<td></td>
</tr>
</tbody>
</table>
construct and **understand** that $X$ is **inversely proportional to** $Y$ is equivalent to $X$ is **proportional to** interpret equations that describe **direct** and **inverse proportion** $1/Y$

interpret the gradient of a **straight line graph** as a rate of change; **recognise** and interpret **graphs** that illustrate **direct** and **inverse proportion**

interpret the gradient at a point on a curve as the instantaneous rate of change; apply the concepts of **average** and instantaneous rate of change (gradients of chords and tangents) in numerical, **algebraic** and graphical contexts

**set up**, **solve** and interpret the answers in growth and decay problems, including compound interest and work with **general iterative processes**.

**Geometry and measures**  
**Properties and constructions**

<table>
<thead>
<tr>
<th>GCSE</th>
<th>Functional Mathematics level 2</th>
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</thead>
<tbody>
<tr>
<td>use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries; use the standard conventions for labelling and referring to the sides and angles of triangles; draw diagrams from written description</td>
<td></td>
</tr>
<tr>
<td>use the standard ruler and <strong>compass constructions</strong> (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); use these to construct given figures and solve loci problems; know that the perpendicular distance from a point to a line is the shortest distance to the line</td>
<td></td>
</tr>
<tr>
<td>apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles; understand and use alternate and corresponding angles on parallel lines; derive and use the sum of angles in a triangle (e.g. to deduce and use the angle sum in any polygon, and to derive properties of regular polygons)</td>
<td></td>
</tr>
<tr>
<td>derive and apply the properties and definitions of: special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus; and triangles and other plane figures using appropriate language</td>
<td></td>
</tr>
</tbody>
</table>
### Making Maths and English Work for All

| Use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS) |
| Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including Pythagoras’ Theorem and the fact that the base angles of an isosceles triangle are equal, and use known results to obtain simple proofs |
| Identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection, translation and enlargement (including fractional and negative scale factors) |
| Describe the changes and invariance achieved by combinations of rotations, reflections and translations |
| Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment |
| Apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results |
| Solve geometrical problems on coordinate axes |
| Identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres |
| Construct and interpret plans and elevations of 3D shapes. Recognise and use 2D representations of 3D objects. |

### Mensuration and Calculation

| **GCSE** | **Functional Mathematics level 2** |
| Use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.) | Find area, perimeter and volume of common shapes. |
| Measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings |  |
### Making Maths and English Work for All

<table>
<thead>
<tr>
<th>Formulae</th>
<th>Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of triangles, parallelograms, trapezia; volume of cuboids and other right prisms (including cylinders)</td>
<td>Find area, perimeter and volume of common shapes.</td>
</tr>
<tr>
<td>Circumference of a circle = $2\pi r = \pi d$, area of a circle = $\pi r^2$; calculate: perimeters of 2D shapes, including circles; areas of circles and composite shapes; surface area and volume of spheres, pyramids, cones and composite solids</td>
<td></td>
</tr>
<tr>
<td>Calculate arc lengths, angles and areas of sectors of circles</td>
<td></td>
</tr>
<tr>
<td>Apply the concepts of congruence and similarity, including the relationships between lengths, areas and volumes in similar figures</td>
<td></td>
</tr>
<tr>
<td>The formulae for: Pythagoras' theorem, $a^2 + b^2 = c^2$, and the trigonometric ratios, $\sin \theta = \text{opposite}/\text{hypotenuse}$, $\cos \theta = \text{adjacent}/\text{hypotenuse}$, and $\tan \theta = \text{opposite}/\text{adjacent}$; apply them to find angles and lengths in right-angled triangles and, where possible, general triangles in two and three dimensional figures</td>
<td></td>
</tr>
<tr>
<td>The exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and $90^\circ$; know the exact value of $\tan \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and $60^\circ$</td>
<td></td>
</tr>
<tr>
<td>Know and apply the sine rule, $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$, and cosine rule, $a^2 + b^2 = c^2 - 2bc \cos A$ to find unknown lengths and angles</td>
<td></td>
</tr>
<tr>
<td>Know and apply Area = $\frac{1}{2} ab \sin C$ to calculate the area, sides or angles of any triangle</td>
<td></td>
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### Vectors

<table>
<thead>
<tr>
<th>GCSE</th>
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<tbody>
<tr>
<td>Describe translations and 2D vectors</td>
<td></td>
</tr>
<tr>
<td>Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representation of vectors; use vectors to construct geometric arguments and proofs</td>
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</tbody>
</table>
## Probability

<table>
<thead>
<tr>
<th>GCSE</th>
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</thead>
<tbody>
<tr>
<td>record describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees</td>
<td>Use probability to assess the likelihood of an outcome.</td>
</tr>
<tr>
<td>apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments</td>
<td></td>
</tr>
<tr>
<td>relate relative expected frequencies to theoretical probability, using appropriate language and the 0 - 1 probability scale</td>
<td></td>
</tr>
<tr>
<td>apply the property that the probabilities of an exhaustive set of outcomes sum to one; apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one</td>
<td></td>
</tr>
<tr>
<td>understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size</td>
<td></td>
</tr>
<tr>
<td>enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams and tree diagrams</td>
<td></td>
</tr>
<tr>
<td>construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities</td>
<td></td>
</tr>
<tr>
<td>calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions</td>
<td>Use probability to assess the likelihood of an outcome.</td>
</tr>
<tr>
<td>calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams.</td>
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</table>

## Statistics

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<thead>
<tr>
<th>GCSE</th>
<th>Functional Mathematics level 2</th>
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<tbody>
<tr>
<td>infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling</td>
<td>Use statistical methods to investigate situations.</td>
</tr>
<tr>
<td>Interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numeric</td>
<td>Collect and represent discrete and continuous data, using ICT where appropriate.</td>
</tr>
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<tr>
<td>Construct and interpret diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use</td>
<td>Use and interpret statistical measures, tables and diagrams, for discrete and continuous data, using ICT where appropriate.</td>
</tr>
<tr>
<td>Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through:</td>
<td>Use statistical methods to investigate situations.</td>
</tr>
<tr>
<td>• Appropriate graphical representation involving discrete, continuous and grouped data, including box plots</td>
<td>Use and interpret statistical measures, tables and diagrams, for discrete and continuous data, using ICT where appropriate.</td>
</tr>
<tr>
<td>• Appropriate measures of central tendency (median, mean, mode and modal class) and spread (range, including consideration of outliers, quartiles and inter-quartile range)</td>
<td></td>
</tr>
<tr>
<td>Apply statistics to describe a population</td>
<td>Use statistical methods to investigate situations.</td>
</tr>
<tr>
<td>Use and interpret scatter graphs of bivariate data; recognise correlation and know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing</td>
<td></td>
</tr>
</tbody>
</table>
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A4 Behavioural view of mathematics
As provided by National Numeracy available on their website.
A5 Bibliography


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