



Young People's  
Learning Agency

# Value Added for 16-18 Learners: Learner Achievement Tracker Handbook

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## **Further information**

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## **Acknowledgements**

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# 1 Introduction to Value Added for 16-18 Learners

## What is the Value Added (VA) measure?

- 1.1 VA for 16-18 learners aims to show the progress of individual learners relative to the average progress made by similar learners nationally for the same qualification and subject, taking prior attainment into account. Here, 'prior attainment' refers to the qualifications attained by a learner up to the end of Key Stage 4 (typically GSCEs). Statistical analysis has shown that prior attainment is the best predictor of future performance in post-16 qualifications for learners in this age group. A calculation based on prior attainment that compares learner performance for a given subject and qualification helps us to:
  - predict learner attainment and, on the basis of the expected attainment, establish target grades (or pass rates) to which learners and school or colleges may aspire;
  - make judgments about whether learners at a particular school or college are performing at, below, or above a nationally average group of learners taking the same qualification and subject, and having the same prior attainment.
- 1.2 VA for 16-18 learners is designed to show the progress for learners on different types of qualifications (the scope of the measure is described further in *Section 2: Scope of the VA Measure for 16-18 Learners*).

VA uses statistical methodologies; its calculation is based on a statistical technique known as multi-level modelling (MLM) that accounts for both learner- and school or college-level effects.

- 1.3 The VA measure is intended for use by:
  - schools or colleges, to help them assess and improve their performance based on information about learner progress at subject, qualification, and subject sector area levels;
  - Ofsted, to inform their initial ideas on the progress of learners, and to support judgments about school or college performance;
  - the Department for Education (DfE), the Young People's Learning Agency (YPLA) and other stakeholders, to inform policy-making and performance monitoring.

## The Learner Achievement Tracker

- 1.4 The LSC developed the Learner Achievement Tracker (LAT) to enable schools or colleges to:
  - View their VA reports for the purposes of reflection and improvement. The LAT went online in 2005, and has been used by schools or colleges and key stakeholders from across the sector since this time. In April 2010, responsibility for the tool, its production and development, transferred to the YPLA. The Data Service produces the LAT VA reports on behalf of, and to the specification set out by the YPLA.
- 1.5 The LAT is a piece of software specifically designed to allow users to access and make use of the outputs from the calculation of VA for 16-18 learners. The data

from the calculations are produced as a variety of reports that show a school or college's performance against national average performance. The LAT allows users to access information about individual learners' achievement. The main types of output are:

- summary reports, showing the average performance of the school or college's cohort of learners in a subject, qualification, or sector subject area, relative to national average performance and given the cohort's overall prior attainment;
- national comparison reports, showing the average performance of a school or college's cohort of learners in a subject, relative to national average performance, over a continuous range of prior attainment;
- ad hoc national comparison reports, showing the average performance of a selected cohort of learners in a subject, relative to national average performance, over a continuous range of prior attainment;
- national chances charts, showing the chances of a learner with a given prior attainment achieving a particular outcome in a given qualification at a nationally average school or college.

The above types of reports are detailed below in Table 1.

1.6 It is important to note that the LAT is primarily designed to provide VA information for:

- each qualification subject in scope. While some aggregation of the data is possible, for example, by qualification type and by subject sector area (SSA), caution should be exercised when interpreting outputs at these levels. This is especially the case where the school or college offers only few subjects in the qualification or SSA. Please note, also, the LAT does not provide a school or college-level VA score (that is, a single VA score covering all of the school or college's provision). In this respect, the VA reports are intended to complement the Department for Education's (DfE's) School and College contextual value added (CVA) school or college-level measure.

**Table 1: The online LAT Reports**

<b>Summary Reports</b>	<b>Value Added (VA)</b> For each school or college, one report showing the VA scores for each qualification type (for example, A-levels).
	For each qualification type, one report showing the VA scores for each subject, as well as an overall qualification score (for example, A-level English, A-level Mathematics, and A-level History, as well as the overall score for all A-level subjects offered by the school or college).
	For all qualifications, one report showing VA scores for each Sector Subject Area (SSA).
<b>National comparison reports</b>	Reports showing the performance of a school or college's learners in a given qualification subject (for example, A-level History or NVQ Level 3 Hairdressing Services), compared to the national performance for that qualification subject, taking into account the prior attainment of the school or college's cohort of learners.
	Ad hoc national comparison reports allowing the user to select subsets of learners of each qualification aim and to produce national comparison reports for the selected learners.
<b>Chance charts VA</b>	Charts showing the chances of learners with given prior attainments achieving a particular outcome in a given qualification at a nationally average school or college (for example, the chances of a learner with a given prior attainment achieving grades A to E in A-level History or passing or failing a NVQ).

1.7 The LAT provides a powerful tool to assist school or colleges, the YPLA and other stakeholders in making judgments that help answer the following questions:

- Which schools and colleges are particularly effective in maximising the performance of their learners?
- Is a given school or college performing better (or worse) than the national average in the qualifications they offer, with respect to the prior attainment of their learners?
- Are there courses/subject areas within a school or college's provision in which the school or college is particularly strong or in which they are underperforming?

- Are there areas of provision in which learners with particularly low or high prior attainment do especially well or badly?
- Given their prior attainment, are learners being matched appropriately to programmes of learning?
- What levels of achievement can be expected from the current cohort of learners?
- What are the appropriate target grades to set learners in a particular subject, given learners' level of prior attainment?

## **Developments for 2009/10**

### **Improved Reporting**

1.8 The development of the LAT has been, and continues to be influenced through consultation and dialogue with schools and colleges from across the sector to ensure that the application and presentation of the VA reports are appropriate for all intended audiences. In response to comments from across the sector, the YPLA has made two improvements to LAT VA reporting arrangements for 2009/10:

- **Improved reporting for consortia** – for 2009/10, those schools and colleges that are part of a consortia arrangement will be able to access reports via the online LAT that show their VA performance both at consortia level and also, additionally and new for this year, at an individual institutional level. In other words, their contribution to the overall consortia VA performance is disaggregated and shown separately. All reports will be placed on the Provider Gateway, access to which is controlled via provider UPIN. Therefore a provider that is a member of a consortium will need to set up Provider Gateway access using their own UPIN in order to see their own reports. Consolidated data for the whole consortium will be accessed, as now, using the UPIN of the primary consortium member.

Requests for Provider Gateway access should be directed to the Data Service help desk. The Data Service can be contacted by email: [servicedesk@thedata.org.uk](mailto:servicedesk@thedata.org.uk)

- **Additional Reporting** – the YPLA has designed some new complementary reports that present LAT VA data in a simpler and more intuitive way than the on-line LAT. These reports contain the following features:
  - Showing multiple years data
  - Breakdowns by age
  - Colour coding of statistical significance
  - Separate reports for consortia and individual schools and colleges.

These reports will be available in pdf format via the provider gateway.

## **LAT VA ready reckoner**

A number of providers have advised the YPLA that they would find it beneficial to have access to LAT Value Added data earlier in the year. In response to this we have developed a ‘ready reckoner’ tool which enables schools, academies and colleges to model their LAT VA outcomes based on their own information about examination results.

The tool is accessible from <http://www.ypla.gov.uk/aboutus/ourwork/qa/lat-vatool/>

## **Using the LAT reports for quality improvement**

- 1.9 Answering the questions posed in paragraph 1.7 helps stakeholders view a detailed picture of the strengths and weaknesses of schools’ and colleges’ performance, which can focus support on quality improvement. For instance, if the LAT shows that performance in a particular subject is lower than the national average, then stakeholders may wish to target school or college resources and quality improvement planning at that subject. For a subject in which performance is particularly good, there may be opportunities to disseminate effective practice more widely across the school or college. Similarly, there may be areas of provision where learners with particularly high or low prior attainment are not achieving as well as other learners within the school or college, and some targeted support for individual learners may be appropriate to help them improve their achievements.
- 1.10 Outputs from the LAT VA reports, together with the new ready reckoner, are useful in:
  - contributing to self-assessment reports;
  - setting out quality improvement strategies in development plans;
  - collating information about a school or college’s performance, to inform inspection or other quality assurance processes.
- 1.11 The following sections provide information about:
  - the scope of the VA for 16-18 learners
  - the data used in VA for 16-18 learners
  - the interpretation and application of LAT VA reports.

## **2 Scope of the VA Measures for 16-18 Learners**

### **What do we mean by 16-18 learners?**

- 2.1 For the purposes of the VA measures, a cohort of learners is defined as those who completed their course between 1 September and 31 August in the previous academic year. For VA, ‘16-18’learners’ are those learners who were aged 16, 17 or 18 on 31 August at the start of the year in which they *completed* a post-16 qualification.

### **Which post-16 qualifications are included in the scope of the VA?**

- 2.2 VA covers most of the larger qualifications taken by 16-18 learners and approved under Section 96 of the *Learning and Skills Act 2000*, including vocational and non-graded qualifications. VA for 16-18 learners measures attainment in Level 3 graded qualifications.
- 2.4 Currently, the VA reports include the qualifications listed in Table 2. Coverage of these qualifications results in approximately 90 per cent of 16-18 learners in the post-16 sector being included in the measures.
- 2.5 The YPLA will review the scope of qualifications to be included in the LAT VA measures on an annual basis, and will apply a minimum learner volume criteria; graded Level 3 qualifications with more than 5 entries will be included.
- 2.6 The YPLA will also review the scope of institutions on an annual basis where a LAT report is produced. All Institutions with more than 10 graded Level 3 qualification entries that are in scope for LAT VA will have a report created and published on the provider gateway.

**Table 2: Qualifications included in the LAT**

<b>Measure</b>	<b>Qualification</b>
Value Added	A-level AS-level GCE AS-level Double Award International Baccalaureate Advanced Extension Award Free Standing Maths Vocational GCE Single Award (VCE A) Vocational GCE Double Award (VCE DA) Applied GCE Single Award Applied GCE AS level Applied GCE Double Award BTEC National Award BTEC National Certificate BTEC National Diploma OCR National Certificate OCR National Diploma at Level 3 OCR National Extended Diploma at Level 3 ABC Diploma in Foundation Studies (Art and Design) CACHE Diploma in Child Care

## **QCA points**

- 2.7 The Qualifications and Curriculum Authority (QCA) developed a system for assigning point scores to all Section 96 qualifications approved for 14–19 learners. The point score system is used to measure achievement in all qualifications included within VA for 16-18 learners, and to measure prior attainment in VA for 16-18 learners. The QCA is now The Qualifications and Curriculum Development Agency (QCDA).

### **Inclusion of fails data in the VA measure: rebased QCA points**

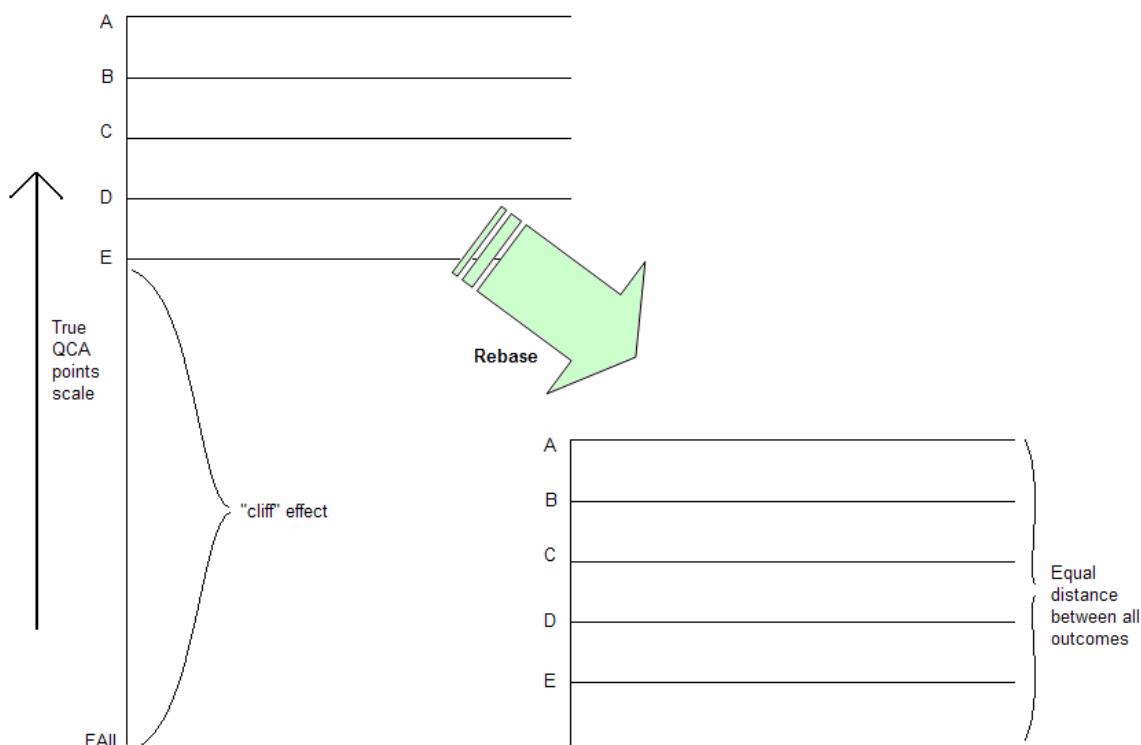
- 2.8 A standard QCA points score would mean unequal gaps between the lowest achievement possible in a qualification and a fail (always zero points) - please see Figure 1 (p.11). For this reason, the LAT uses a rebased QCA points system, approved by QCA, that allows fails to be included in the reporting of outcomes, **but which retains the scale and validity of the graded score**. For Level 3 qualifications, the rebasing procedure makes use of a scale equivalency (for example, an AS-level is equivalent to 0.5 of an A-level), and is identical to the rebasing methodology employed in the DfE's School and College CVA measure. For convenience, grades are reported alongside rebased QCA points in the LAT's national comparison charts. Standard and rebased QCA point scores for some of the Level 3 qualifications included in the scope of VA are listed in Table 3.

**Table 3: Example of standard and rebased QCA points for post-16 outcomes for Value Added**

A-Level/ Vocational GCE Single Award			AS-Level/Vocational GCE AS Single Award			Vocational GCE Double Award (VCE DA)			BTEC National Diploma		
Outcome	QCA Points	Rebased QCA Points	Outcome	QCA Points	Rebased QCA Points	Outcome	QCA Points	Rebased QCA Points	Outcome	QCA Points	Rebased QCA Points
A*	300	180	A	135	75	AA	540	300	DDD	810	450
A	270	150	B	120	60	AB	510	270	DDM	757.5	397.5
B	240	120	C	105	45	BB	480	240	DMM	705	345
C	210	90	D	90	30	BC	450	210	MMM	652.5	292.5
D	180	60	E	75	15	CC	420	180	MMP	600	240
E	150	30	Fail	0	0	CD	390	150	MPP	547.5	187.5
Fail	0	0				DD	360	120	PPP	495	135
						DE	330	90	Fail	0	0
						EE	300	60			
						Fail	0	0			

- 2.9 Please note, for the VA measure, prior attainment points are not rebased. For an explanation of how prior attainment is calculated, see paragraphs 2.12 to 2.18.

**Figure 1: Rebasing visualised**



### Banding of QCA points

- 2.10 For some LAT outputs, QCA points have been split into bands to present the VA information. National chances charts use banded prior attainment to indicate the expected performance of a (please see *Section 6: National Chances Charts*).
- 2.11 For purposes of the LAT, prior attainment includes all Section 96 approved qualifications at Level 2 and below, taken up to Key Stage 4. Table 5 shows the scope of qualifications included for learners at different ages.
- 2.12 By measuring prior attainment up to two years before a learner's outcome attainment, 18-year-old learners with any attainment at Level 2 and below at age 16 (for example, GCSE re-sits) will have this taken into account.

### How is prior attainment calculated?

- 2.13 The starting point for the VA calculations is the average attainment of the learner at the start of the programme of study. The prior attainment is calculated as the average of the learner's attainment at Level 2 and below (that is, Key Stage 4), up to two years before the learner's outcome for 17 and 18-year-olds, and up to one year before the learner's outcome for 16-year-olds; this is converted into QCA points, as described in paragraphs 2.14 to 2.18
- 2.14 Prior attainment is calculated by adding together the total QCA points attained for applicable qualifications, and dividing the total by the size of the qualifications completed by the learner. GCSEs are given a size of 1 in the QCA points system.

GNVQ Levels 1 and 2 (Foundation and Intermediate) are assigned a size of four, and are therefore treated as if they are the equivalent of four GCSEs.

**Table 5: Scope of qualifications included in prior attainment for 16-18 learners**

<b>Age of learner*</b>	<b>Measure</b>	<b>Prior Attainment will include:</b>
16	VA	Level 2 qualifications and below up to age 15 (that is up to one year before)
17	VA	Level 2 qualifications and below up to age 16 (that is up to two years before)
18	VA	Level 2 qualifications and below up to age 17 (that is up to three years before)

Age at the beginning of academic year in which qualification completed.

**Prior attainment examples:**

**Example 1**

2.15 Learner A takes 10 GCSEs at 15, and progresses to complete a Level 3 at age 17. The prior attainment will be the average of the total QCA point score divided by a volume of 10 (that is, 10 GCSEs with a size of one).

**Example 2**

2.16 Learner B takes four GCSEs at age 15 and an intermediate GNVQ at age 16. As one GNVQ is equivalent to four GCSEs, the prior attainment is the total QCA points score divided by a volume of eight (that is, four GCSEs with a size of one, and one GNVQ with a size of four).

**Example 3**

2.17 Learner C attains two Bs, three Cs and a U at GCSE at age 15 and an intermediate GNVQ at age 16:

- first, add together the corresponding QCA points (Table 3): the learner's total point score is  $(2 \times 46) + (3 \times 40) + (1 \times 0) + (1 \times 160) = 372$  QCA points)
- the total is then divided by the size of the qualifications attempted:  $372 \div 10$  (GCSE=1 and intermediate GNVQ=4) = average prior attainment value of 37.2 QCA points.

**Example 4**

2.18 Learner D attains six GCSEs at grade C at age 15, and a merit in an intermediate GNVQ at age 16. The learner then progresses to take an A-level at age 18. The prior attainment for this learner is calculated for all attainment up to, and including, age 16:

- all six GCSEs are assigned 40 points
- an Intermediate GNVQ merit is assigned 184 points (the equivalent of four GCSEs)

- total prior attainment is divided by the total size of all qualifications attempted: ((six GCSEs x 40 QCA points) + (184 for the GNVQ)) ÷ (six GCSEs + the equivalent of four GCSEs) = 42.4 QCA points.
- 2.19 For convenience, the LAT includes a **prior attainment calculator** for quick and easy conversion of qualifications and grades into average QCA points. This can be used in conjunction with the **chances charts** to predict the possible grades that learners are likely to attain based on previous attainment at the same school or college. For more information on the chances charts, see *Section 6: National Chances Charts*.

## 3 Data for Value Added for 16-18 Learners

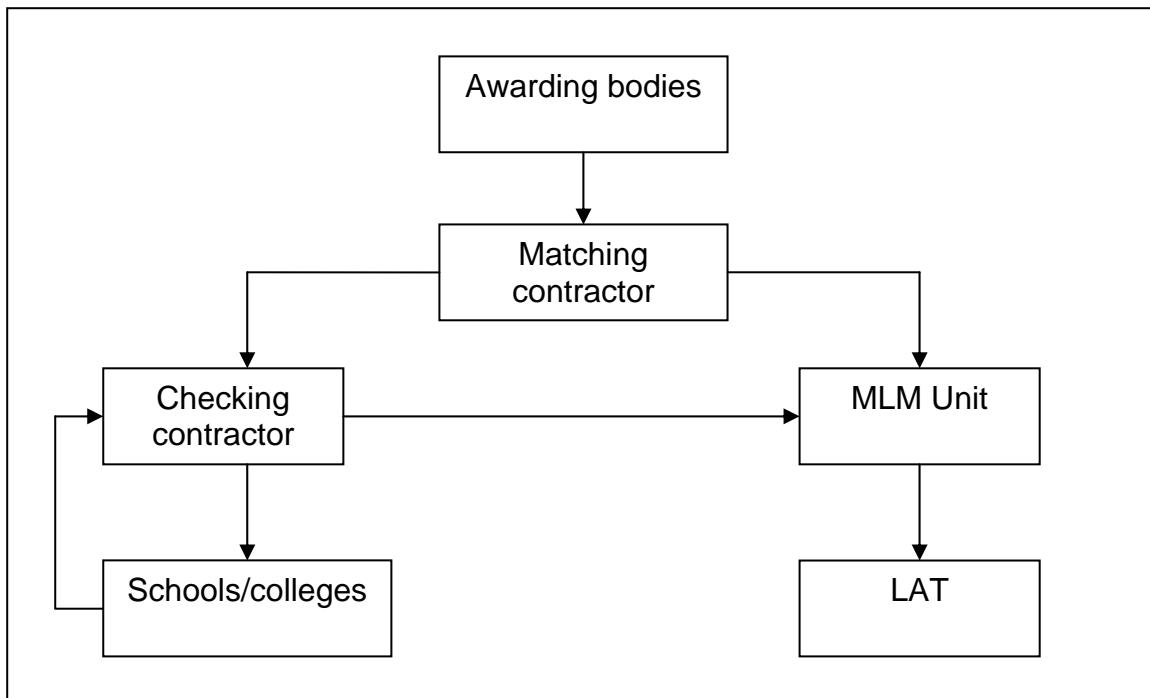
### Data coverage and data release

- 3.1 The data used to calculate VA scores cover all outcomes for learners achieving post-16 qualifications that were in scope during the prior academic year. For information on scope, please see *Section 2: Scope of the VA Measure for 16- 18 Learners*. Unamended VA data are released during November following summer examinations, and Amended VA scores in January of the next year

### Data source, preparation and calculation

- 3.2 Figure 2 shows the data flow for the calculation of VA for 16-18 learners. The data used to calculate the VA measure are obtained directly from awarding bodies. Attainment data for post-16 qualifications are subsequently matched to attainment information on pre-16 qualifications, using forename, surname, date of birth and gender. There is an opportunity for school or colleges to amend this data as part of the DfE's Achievement and Attainment Tables (AAT) checking exercise. Please refer to DfE website for further details:  
<http://www.education.gov.uk/performancetables/>
- 3.4 Once the data has been matched, it is credibility checked. For some qualifications, graded attainment is provided by the awarding body, and the grades converted to QCA points. Further information on QCA points can be found in *Section 2: Scope of the VA Measure for 16-18 Learners*. Discounting rules are applied to the data set to identify whether an individual has already taken a qualification in the same subject/framework; paragraphs **3.7 to 3.9** have more information on this.
- 3.5 The data is then fed into the multi-level modelling (MLM) software to calculate the “national lines” that give a picture of the average national performance. The national lines are in turn fed into the LAT calculation engine, where school or college VA scores based on the national data set are calculated. The national data set is loaded into the LAT, together with the national line information. These inputs form the basis of the VA data produced in the LAT outputs.

**Figure 2: Data source and flow for the calculation of VA and DT for 16-18 learners**



**Are schools or colleges able to check the accuracy of the data used to calculate VA for 16-18 learners?**

3.6 In November of each year an ‘unamended’ version of the LAT VA reports are published on the provider gateway. The reports are described as ‘unamended’ as they are constructed from awarding body data before it has been checked by schools and colleges themselves. This year the data checking exercise ran from 27 September to 15 October. The website can be accessed via the link below.

<https://tableschecking.education.gov.uk/>

In January of each year, following November ‘unamended’ version, the reports will be re-run to take account of amendments and published as final amended reports.

### Discounting

- 3.7 Some qualification aims are not counted in the calculation of the VA measure. These qualifications are said to be discounted. If a qualification (for example AS-level) can form part of a larger and/or higher level qualification (for example an A-level), and the learner takes both qualifications during the period of study, then the lower level qualification (the AS-level) is discounted. Discounting across the programme of study of a learner ensures that the individual learner (and hence the learner’s school or college) are not penalised, or credited, for the same performance twice.
- 3.8 Discounting is also applied to National Awards and National Certificates (as these qualifications can then be counted towards a National Diploma) and to Applied A/AS-Levels (if these are used as part of an Applied A/AS-level double award).

Discounting is not applied across qualification types, even if these are taken in the same subject. For example, a National Diploma in Engineering would not discount an Applied A-level in Engineering.

- 3.9 The DfE and the QCA develop and validate the rules as to which qualifications discount which other qualifications, and in which subjects.

#### **Treatment of AS-level qualifications in the calculation of the VA scores**

- 3.10 VA scores for AS-levels will be generated for all 16-18 learners cashing in AS-Level results in the relevant academic year. Awarding bodies do not currently supply results for non-cashed AS-levels.

#### **Subject groupings in the calculation of the national average performance**

- 3.11 The calculation of the national average performance in VA is generally undertaken for all subjects within a qualification taken by 80 or more learners, spread across five or more different schools or colleges. Any qualification subject taken by less than 80 learners and/or delivered at less than five schools or colleges nationally in a given year is deemed to be a small subject. While the number of learners who take small subjects is low, small subjects account for a substantial proportion of the subjects taken in most qualifications, and are offered by a relatively large number of schools or colleges.
- 3.12 It is not possible to generate a reliable national average performance for small subjects. Therefore, VA scores for small subjects are calculated on the national average performance for all of the aims in the Sector Subject Area (SSA) for that subject. For example, if the national sample of 16-18 learners completing Level 2 NVQ in Community Development in a given year was 20, a school or college's performance in that subject and qualification will be compared to the national performance in all subjects and qualifications in the subject sector area Health, Public Services and Care.
- 3.13 SSA is being developed as the common subject classification for the entire sector. Table 6 shows the 15 sector subject areas. To identify which SSA a given qualification/subject belongs to, go to: <http://www.accreditedqualifications.org.uk>
- 3.14 There will be cases where the number of aims in a given qualification within an SSA itself will be less than 80, or where they will be spread across less than five schools or colleges. In these circumstances, the national average performance will be based on all of the aims taken in that qualification.

**Table 6: Level 1 Sector Subject Area Categories**

<b>SSA</b>	<b>SSA Title</b>
1	Health, Public Services and Care
2	Science and Mathematics
3	Agriculture, Horticulture and Animal Care
4	Engineering and manufacturing Technologies
5	Construction, Planning and the Built Environment
6	Information and Communication technology
7	Retail and Commercial Enterprise
8	Leisure, Travel and Tourism
9	Arts, Media and Publishing

10	History, Philosophy and Theology
11	Social Sciences
12	Languages, Literature and Culture
13	Education and Training
14	Preparing for Life and Work
15	Business, Administration and Law

- 3.15 Please note, the VA scores for small subjects will be included in the aggregate VA scores supplied to a school or college. However, such scores will be weighted by the number of aims taken and therefore will not tend to make significant contributions.
- 3.16 The following Sections 4-8 detail the types of VA reports available in the LAT, and provide help in the technical interpretation of the reports.

## 4 Value Added Summary Reports

### What do the VA summary reports show?

- 4.1 The VA summary report gives an overview of a school or college's performance across a range of provision, given a cohort's overall prior attainment, and benchmarked against national average performance. The report is available at three levels:
- for each school or college, one report showing aggregated VA scores for each qualification type (for example A-levels) offered by the school or college;
  - for each qualification type, one report showing the VA scores for each subject (for example, all A-level subjects taken by learners in the school or college); this type of summary will also show the aggregated VA score for the qualification type;
  - for all qualifications , one report showing VA scores for each subject sector area (for example, all qualifications classified as belonging to Business Administration and Law).

### Qualification VA score and 95 per cent confidence interval

- 4.2 Figure 3 shows part of a school or college's VA summary report for all *subjects* at A-level (qualification subject report). The top right of the report shows the school or college's VA score for the *qualification type* (in this example, all A-levels). The VA score is the number of attained QCA points above or below that predicted for the school or college's learners in the qualification type, based on national average performance and given the cohort's average prior attainment.<sup>2</sup>
- 4.3 In the presented example, the school or college's VA score is 3.45 points, indicating that, in general, learners taking A-levels with this school or college are achieving an average of 3.45 QCA points above that expected of learners with the same prior attainment at a nationally average school or college. For information on how the VA score is calculated, please refer to paragraphs 4.22 to 4.24.
- 4.4 The header information also contains the **95 per cent confidence interval** associated with the VA score for the qualification type. The interval is generated from the data used to calculate the qualification VA score, and shows the level of confidence we have that the score is significantly different from the national average. In Figure 3, the upper and lower bounds of the confidence interval are 6.07 and 0.83 QCA points, respectively. The confidence interval needs to be considered when interpreting the VA score. For information on how to interpret the VA score and its associated confidence interval, please see below on *How to interpret the VA score and the 95 per cent confidence interval*. For further information about confidence intervals, please refer to *Section 9: Value Added for 16-18 Learners: Further Questions*.

<sup>2</sup> At learner level, prior attainment is the average prior attainment for qualifications taken up to and including Key Stage 4. For example, a learner achieving five GCSEs at grade D will have an average prior attainment of 34 QCA points (that is,  $(34 \times 5)/5$ ). More information about prior attainment and QCA points can be found in *Section 2: Scope of the VA Measure for 16–18 Learners*.

## The VA summary chart

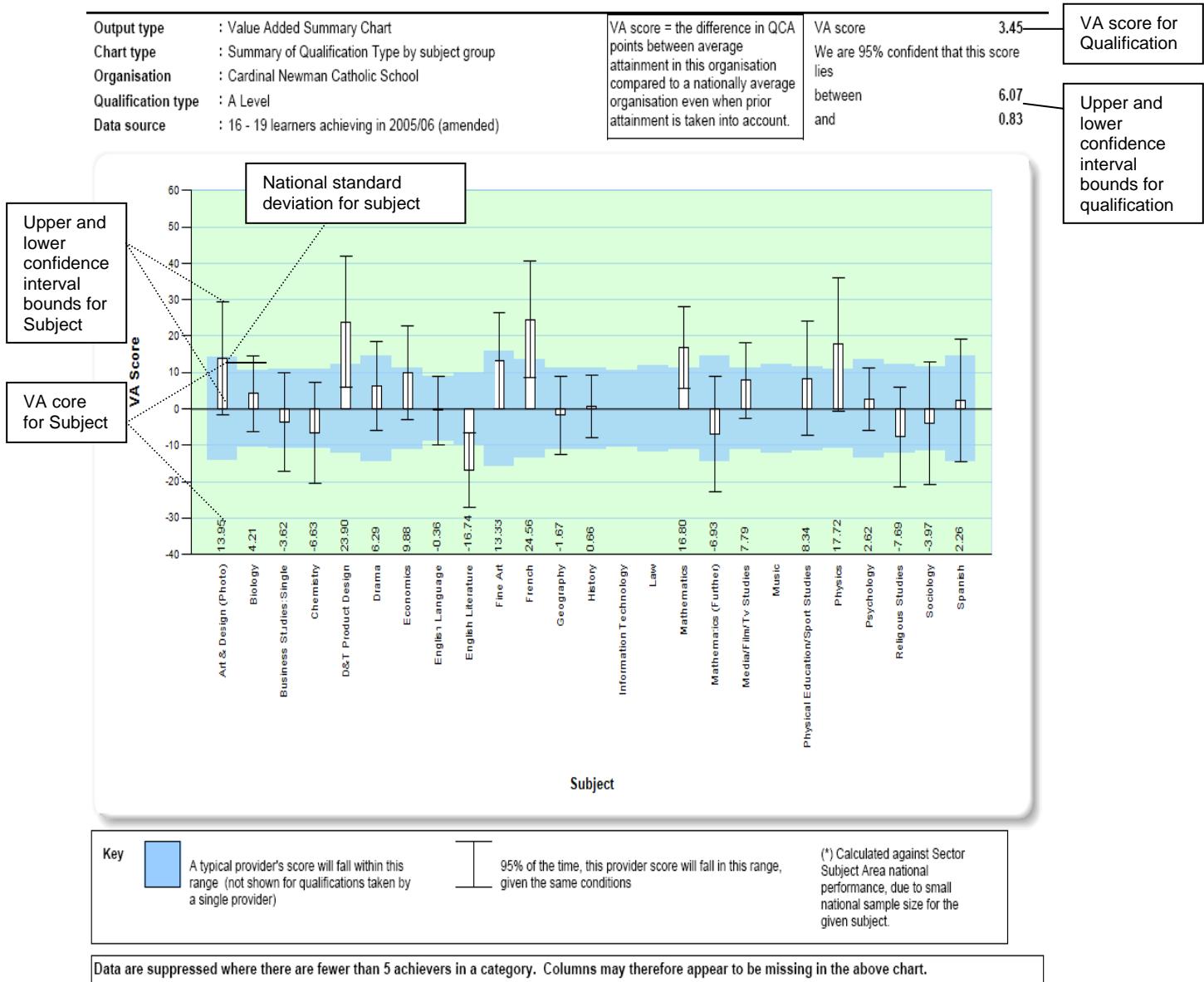
- 4.5 For all summary reports, a chart is presented below the header information. The chart shows the school or college's **VA score for each subject, qualification, or subject sector area (SSA)**, as selected. (For brevity, only subject VA scores and associated measures will be referred to in the following paragraphs). The vertical axis shows the school or college's VA score in terms of the difference, in QCA points, in the average attainment of the school or college's learners in the indicated subject, based on national performance and given the cohort's average prior attainment. The national average performance (VA score) in each subject has been normalised, and is represented by zero (0) on the horizontal axis. This is the **national line**. Please note, if the sample size of the learners in the indicated subject (or qualification or SSA) is lower than five, a VA score will not be shown. This is because statistically reliable judgments about a school or college's performance in a given subject (or qualification or SSA) cannot be made for cohort sizes less than five.
- 4.6 The white data columns, labelled along the horizontal axis, represent the school or college's VA score in each of the indicated subjects. (The VA score is read by reading off the top of data column against the VA measure on the vertical axis). The VA score for each is also given below the relevant column. For more information about the VA score and QCA points, please refer to *Section 2: Scope of the VA Measure for 16-18 Learners*.
- 4.7 The vertical line enclosed by two small horizontal lines on each column (known as the confidence interval line) represents the **95 per cent confidence interval** for the indicated subject. The interval is generated from the data used to calculate the VA score for the given subject. For information on how to interpret the VA score and confidence interval line, please see below, on *Interpreting the VA summary chart*. For further information on the use of confidence intervals, please refer to *Section 9: Value Added for 16-18 Learners: Further Questions*.
- 4.8 The blue shaded area represents one **standard deviation** from the national average result for each subject. This information is generated from the national data, and shows the spread of scores over which approximately 68 per cent, that is, two-thirds of all school or colleges offering the same subject would lie. In this sense, the blue shaded area represents the typically performing school or college for the given subject. For information about how to use the blue band in the interpretation of the charts, please see below on *Interpreting the VA summary chart*. For further information on the standard deviation blue shading, please refer to *Section 9: Value Added for 16-18 Learners: Further Questions*.
- 4.9 The VA summary reports also include a data table, presented below the chart, containing the following information:
- subject (or qualification type or subject sector area);
  - VA score;
  - 95 per cent confidence intervals;
  - national sample size and failure rate;
  - school or college sample size and failure rate;

- national standard deviation.

#### How to interpret the VA score and the 95 per cent confidence interval

- 4.10 Table 7 summarises the interpretation of the VA score and the associated 95 per cent confidence interval. If the **VA score is positive and the confidence interval is positive**, we can be confident that the school or college's VA score is different from the average and positive. In these cases, the performance of the school or college's learners in the indicated qualification is higher, on average, than the national average performance of learners with the same range of prior attainment and following the same qualification.
- 4.11 If the **VA score is negative and the confidence interval is negative**, we can be confident that the VA score is different from the average and negative. In these cases, the performance of the school or college's learners in the indicated qualification is lower, on average, than the national average performance of learners with the same range of prior attainment and following the same qualification.

**Figure 3: VA summary reports.** The chart shows the performance of a school or college's learners in A-level subjects, based on national performance and given learners' average prior attainment. Please refer to text for details.



4.12 Please note, a VA score may achieve a significant 95 per cent confidence level and be different from the norm, but that difference may be small. Also, it is important to note that the summary report does not indicate whether the national average attainment rate for a given qualification is itself high or low. To fully interpret the report, the user will need to refer to qualification success rate data, national standard deviations or the national lines of the constituent subjects (paragraphs 4.14 and 4.25).

4.13 If the **VA score is positive but the confidence interval includes a positive and a negative number**, we cannot be certain that the school or college's VA score for the indicated qualification significantly positive. If the **VA score is negative but the confidence interval includes a positive and negative number**, we cannot be certain that the school or college's VA score for the indicated qualification is significantly negative. In both these cases, we need to exercise caution when interpreting the VA score, and it may not be possible to make a conclusive judgment about performance in the indicated qualification.

**Table 7: Interpretation of the VA score and the 95 per cent confidence interval** (please refer to text for details).

VA Score	Confidence Interval	Interpretation
Positive (for example +8.0)	Between two positive numbers  (For example +5.0 to +11.0)	On average, when prior attainment is taken into account, the school or college is having a positive effect on the performance of its learners in the given qualification subject compared to the national average performance.
Negative (for example -8)	Between two negative number  (for example between -5.0 to -11.0)	On average, when prior attainment is taken into account, the school or college is having a negative effect on the performance of its learners in the given qualification subject compared to the national average performance.
Positive or Negative	Between a positive and a negative number  (for example +10.0 to – 1.2)	Care needs to be exercised when interpreting the VA score. Please refer to paragraph 4.14 for further information

4.14 There are several reasons why the confidence interval may include a positive and a negative number:

- the performance of the school or college may be very similar to national performance;

- the national sample size may be greater than 80 learners, but be still relatively small relative to the number of school or colleges;
- the school or college size may be very small (for example, fewer than seven learners);
- the distribution of results for the school or college is very variable.

In these cases it is likely that the confidence interval will be wide; that is, the upper and lower bounds will be far apart. The width of the interval gives some idea about the uncertainty of the VA score: the wider the interval the more uncertain the VA score becomes. The VA national comparison chart for the given qualification subject may help to identify the potential reasons why the confidence interval line crosses the national line. Please refer to paragraph 4.25, and *Section 5: Value Added National Comparison Charts and Ad hoc Reports*.

### **Interpreting VA summary charts**

- 4.15 The school or college's VA score and associated confidence interval, along with the national line and national standard deviation area, can be combined to produce a sophisticated understanding of absolute and relative school or college performance. Summary examples of report interpretation are given in Table 8 (p.26).
- 4.16 If the **VA score is positive, and the bounds of the confidence interval are both positive** (shown in the summary chart as the data column and its associated confidence interval line above the national line, as in Figures 4A and 4B), we can be confident that the VA score is, on average, positive. In this case, the performance of the school or college's cohort of learners is higher, on average, than the national average performance of learners with the same average prior attainment. Please note: a VA score may achieve the 95 per cent confidence level and be different from the norm, but that difference may be small (please refer to paragraphs 4.12 and 4.14).
- 4.17 If the **VA score is negative, and the bounds of the confidence interval are both negative** (shown in the summary chart as the data column and its associated confidence interval line below the national line, as in Figures 4E and 4F), we can be confident that the VA score is, on average, negative. In these cases, the performance of the school or college's cohort of learners is lower, on average, than the national average performance of learners with the same average prior attainment. Please note: a VA score may achieve the 95 per cent confidence level and be different from the norm, but that difference may be small (please see, also, paragraphs 4.12 and 4.14).
- 4.18 If the **VA score is positive, but the confidence interval includes a positive and negative number** (shown in the summary chart as a data column above the line, but with an associated confidence interval that crosses the national line, as in Figures 4C and 4D), we cannot be certain that the VA score is positive. If the **VA score is negative, but the confidence interval includes a positive and negative number** (shown in the summary chart as a data column below the line, but with an associated confidence interval line that crosses the national line, as in Figures 4G and 4H), we cannot be certain that the VA score is negative. In both cases, we need to exercise caution when interpreting the VA score (please refer to paragraph 4.14).

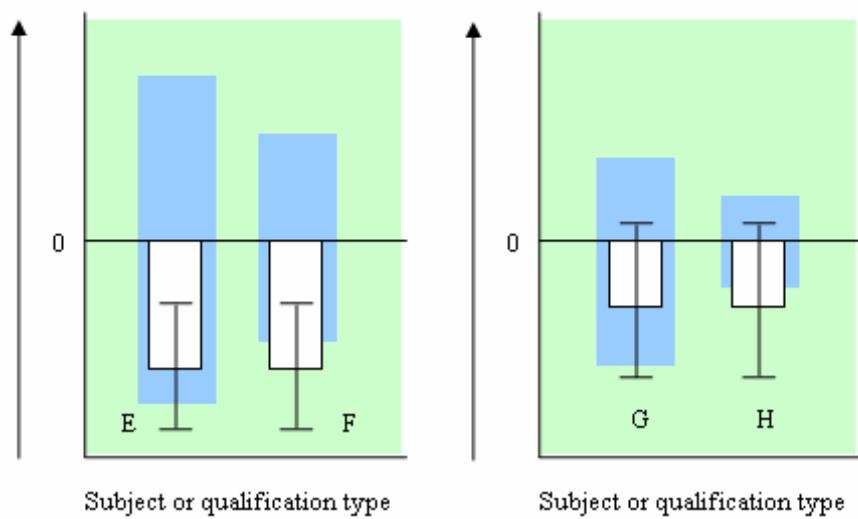
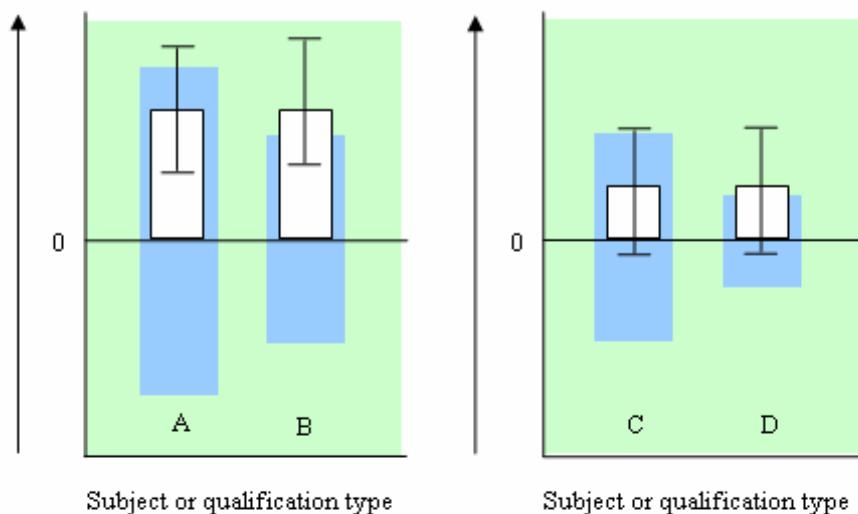
- 4.19 **If the VA score is positive, and the bounds of the confidence interval line are above the one national standard deviation area**, we can be confident that the school or college's VA score for the given learner cohort is positive, and above the VA score of the typically performing school or college for the indicated subject. **If the VA score is negative, and the bounds of the confidence interval line are below the one national standard deviation area**, we can be confident that the school or college's VA score for the given learner cohort is negative, and below the VA score of the typically performing school or college for the indicated subject.
- 4.20 **If the VA score is either positive or negative, and is within the blue shaded area, and the confidence interval is within the blue shaded area**, this indicates that the school or college's VA score for the given learner cohort is, respectively, significantly positive or negative, but that the school or college's VA score is within the spread of VA scores for a typical school or college in the indicated subject.
- 4.21 **If the VA score is either positive or negative, and is within the blue shaded area, but the confidence interval crosses the blue shaded area**, this indicates that the school or college's VA score for the given learner cohort is, respectively, significantly positive or negative, but we cannot be certain that the school or college's VA score is within the spread of VA scores for a typical school or college in the indicated subject. This reinforces the need to assess the size of a score as well as its significance.

#### **How is the Qualification VA score calculated?**

- 4.22 VA summary reports for all qualifications are produced by combining the scores from all subjects within each qualification type, and weighting these scores according to the number of learners in each subject. The overall VA score for all subjects is then presented in each case.
- 4.23 The national line for each subject with a qualification is calculated using multi-level modelling (MLM) - a statistical technique that accounts for both learner and school or college level VA effects. For further information about MLM, please refer to the annex to this VA/DT guide, *Multi-Level Modelling- An Introduction*. Technical information about MLM is available on the YPLA website:  
<http://www.ypla.gov.uk/aboutus/ourwork/qa/mlp/>

- 4.24 It is not possible to generate a reliable national benchmark for qualification subjects that have relatively few learners. Therefore, VA scores for small subjects are calculated against either SSA or qualification (please refer to *Section 3: Data for Value Added for 16-18 Learners*). Please note, while VA scores for small subject cohorts are not shown, their data are included in the calculation of the national benchmarks.

**Figure 4: Diagrammatic examples of Valued Added summary charts to illustrate report interpretation**



**Table 8: VA summary chart interpretations** (please refer to text for details)

VA Score	Confidence interval (confidence interval line)	National standard deviation (blue band)	Interpretation
Positive	Confidence interval line wholly above national line	-	On average, when prior attainment is taken into account, the school or college is having a positive effect on the performance of its learners in the given qualification subject compared to the national average performance.
Negative	Confidence interval line wholly below national line	-	On average, when prior attainment is taken into account, the school or college is having a negative effect on the performance of its learners in the given qualification subject compared to the national average performance.
Positive (or Negative)	Confidence interval line crosses national line	-	Care needs to be exercised when interpreting the VA score (please see paragraph 4.14 for further information).
Positive (or Negative)	Confidence interval line wholly above (below) national line	Confidence interval line wholly above (below) the one national standard deviation area	On average, when prior attainment is taken into account, the school or college is having a positive (negative) effect on the performance of its learners in the given qualification subject compared to the national average performance. The school or college's performance is within the spread of scores of the typically performing school or college.
Positive (or Negative)	Confidence interval line wholly above (below) national line	Confidence interval line wholly <i>within</i> the one national standard deviation area	On average, when prior attainment is taken into account, the school or college is having a positive (negative) effect on the performance of its learners in the given qualification subject compared to the national average performance. The school or college's performance is within the spread of scores of the typically performing school or college.
Positive (or Negative)	Confidence interval line wholly above (below) national line	Confidence interval line crosses the one national standard deviation area	On average, when prior attainment is taken into account, the school or college is having a positive (negative) effect on the performance of its learners in the given qualification subject compared to the national average performance. The school or college's performance may or may not be within the spread of scores of the typically performing school or college.

## **How can VA summary reports be used for quality improvement?**

- 4.25 The summary reports provide an immediate and clear opportunity to assess where there are particular strengths and areas for improvement within the provision of a particular school or college. It is anticipated that a wide range of users, including senior managers, governors, heads of department and staff involved in quality assurance will find these outputs invaluable in indicating where good practice might be identified and disseminated, and conversely, where there are areas which might benefit from additional quality improvement initiatives.
- 4.26 Summary reports provide the first indication of how particular areas have performed in a given academic year, but they only give a VA score against a cohort's overall prior attainment (that is, they do not show how a school or college's learner cohort is performing across the range of prior attainment). For subjects within individual qualifications, this information is available in the VA national comparison reports. These reports can be used to produce a detailed picture of how the school or college has performed (please refer to *Section 5: Value Added National Comparison Charts and Ad hoc Reports*).

## **Further Information on the VA summary reports**

- 4.27 Further information on using the VA summary reports can be found <http://www.ypla.gov.uk/aboutus/ourwork/qa/lat-va-tool/> see presentations 1 and 2.

## 5 Value Added National Comparison Reports and Ad hoc Reports

### What do the VA national comparison reports show?

- 5.1 The VA national comparison report shows the school or college's performance in the indicated qualification subject against nationally average performance, across a continuous range of prior attainment.
- 5.2 A national comparison chart for a *subset of learners* can be obtained using the ad hoc reports wizard. For more information on ad hoc reports, please refer to paragraph 5.27.

### Qualification VA score and 95 per cent confidence interval

- 5.3 Figure 5 shows part of a VA national comparison report for a school or college's cohort in A-level English. The top right corner of the report shows the **VA score**, that is, the number of attained QCA points above or below that predicted of the school or college's learners in the qualification type, based on national performance and given the learners' average prior attainment<sup>3</sup>. In this example, the VA score is -6.85 QCA points, indicating that learners following this aim with this school or college achieve, on average, about a 1/4 of an A-level grade lower than they would have achieved in a nationally average school or college. (Note: 30 QCA points are equivalent to one A-level grade –this can be inferred from the scale of the vertical axis). Please note: a VA score will not be shown if the sample size of learners taking the qualification subject is lower than five. This is because statistically reliable judgments about a school or college's performance in a given qualification subject cannot be made for cohort sizes less than five.
- 5.4 Also indicated in the top right corner is the **95 per cent confidence interval** associated with the VA score for the subject. The interval shows the range of VA scores within which we can be confident that the school or college's true VA score lies. The confidence interval needs to be considered when interpreting the VA score. For information about to interpret the VA score and its associated confidence interval, please refer to Section 4 of this guide (paragraphs 4.10 to 4.14, and Table 7, p.22) on *How to interpret the VA score and the 95 per cent confidence interval*. For further information on the use of confidence intervals, please see Section 9: *Value Added for 16-18 Learners: Further Questions*.

### The VA national comparison chart

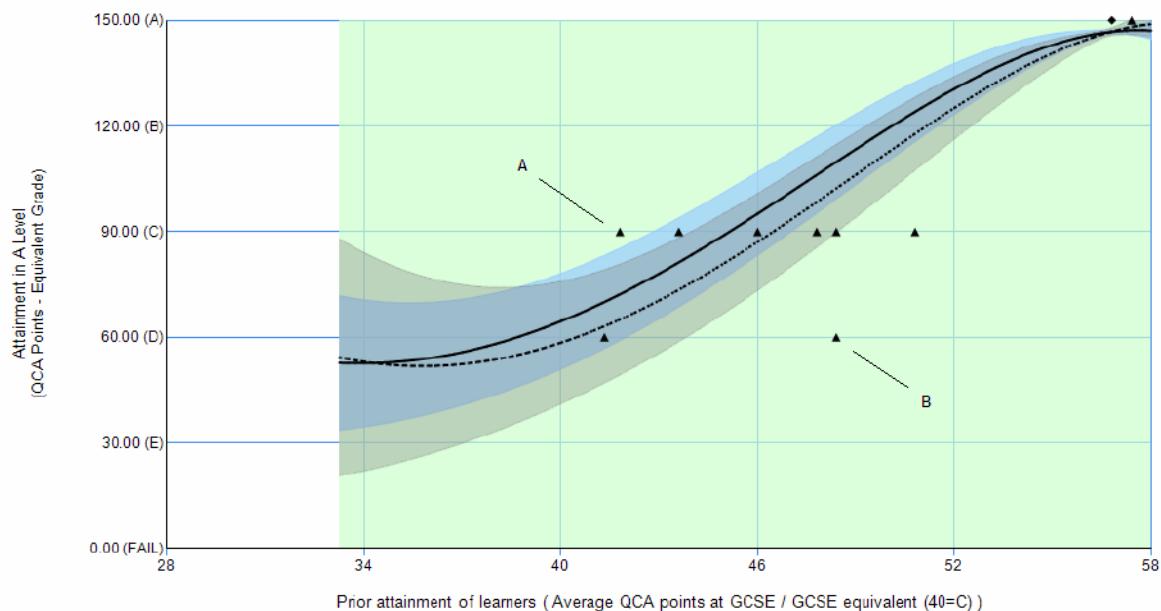
- 5.5 Below the header information is the national comparison chart, showing the average VA attained in the indicated subject across a continuous range of prior attainment, which provides a more sophisticated interpretation of how the school or college is contributing to the attainment of learners with different levels of prior attainment.
- 5.6 The horizontal axis shows a continuous range of **prior attainment** of the school or college's learners taking the qualification subject in the previous academic year. The range of this axis will vary according to the spread of prior attainment within each cohort. The vertical axis shows the **attainment** of the school or college's learners that took the qualification subject in the previous academic year. The outcome is given as a grade, and is also shown in rebased QCA points

(for example, grade C at A-level is equivalent to 90 rebased QCA points). For further information on rebased QCA points, please see Section 2: *Scope of the VA Measure for 16-18 Learners*. Please note: a qualification subject VA score will not be shown if the sample size of learners taking the subject is lower than five. This is because statistically reliable judgments about a school or college's performance in a given subject cannot be made for cohort sizes less than five.

- 5.7 The solid line is the **national line**, and represents the average attainment of all learners in England that took the qualification subject in the previous academic year, for the indicated range of prior attainment. For example, in Figure 5, learners with an average prior attainment of 40 QCA points (that is, an average of grade C at GCSE level or equivalent) achieved approximately 60 rebased QCA points (that is, a grade D) in A-level English. Learners with a prior attainment of 52 QCA points (that is, an average of grade A at GCSE or equivalent) achieved just over 120 rebased QCA points (that is, just above a grade B) in A-level English.
- 5.8 The individual points on the chart represent **individual learners** that took the qualification subject with the school or college in the previous academic year. The points show prior attainment and achievement in the post-16 qualification. Male learners are represented by diamonds, and female learners are represented by triangles. Where two or more learners share an identical combination of prior attainment and attainment, this is presented by a square.
- 5.9 The dotted line is the **school or college line**, and represents the best estimate of the school or college's performance in the qualification subject in the previous academic year, for the indicated range of prior attainment. Please note, the school or college line will not be displayed if the sample size of learners for the given subject is lower than five. In these cases, the chart will only show the average national performance, and the individual points of learners. There will be a boxed note above the chart indicating this. However, a table containing information about the school or college's cohort of learners will be shown below the chart—please see paragraph 5.12.

**Figure 5: VA national comparison reports.** The chart shows the performance of a school or college's learners in A-level Mathematics, based on nationally average performance, across the full range of the learners' prior attainment. Please refer to text for details.

Output type	: Value Added National Comparison Chart (fails included)	VA score :	-6.85
Organisation	: A real provider	We are 95% confident	
Qualification type	: A Level	that this score lies	
Subject / Area of Learning	: English Literature	between	5.09
Provider sample size (fails shown in brackets)	: 10 (0)	and	-18.80
National sample size (fails shown in brackets)	: 37,669 (508)		
Data source	: 16 - 19 learners achieving in 2005/06 (amended)		



<sup>3</sup> At learner level, prior attainment is the average prior attainment for qualifications taken up to and including Key Stage 4. For example, a learner achieving five GCSEs at grade D will have an average prior attainment of 34 QCA points (that is,  $(34 \times 5)/5$ ). More information about prior attainment and QCA points can be found in *Section 2: Scope of the VA Measure for 16–19 Learners*.

- 5.10 The grey shaded area around the school or college line represents the **95 per cent confidence interval** associated with the school or college line for the qualification subject. This information is generated from the data used to produce the national line, and shows the range of VA scores for which we can be confident that a school or college's true VA score would lie. The grey shaded area needs to be considered when interpreting the chart. For information on how to use the grey shaded area in the interpretation of the charts, please see below on *Interpreting the national comparison chart*. For further information on confidence intervals, please refer to *Section 9: Value Added for 16-18 Learners: Further Questions*.
- 5.11 The blue shaded area around the national line represents one **standard deviation** from the national line for the qualification subject (that is, one standard deviation of all learners' achieved outcomes). The standard deviation is generated from the data used to produce the national line, and shows the spread of scores over which approximately 68 per cent, or approximately two-thirds, of all schools or colleges offering the same qualification subject would lie. In this sense, the blue band represents the typically performing school or college for the given qualification subject. For information on how to use standard deviation in the interpretation of the charts, see below on *Interpreting the national comparison chart*. For further information on the standard deviation blue band, please refer to *Section 9: Value Added for 16-18 Learners: Further Questions*.
- 5.12 The VA national comparison chart report also includes a data table, presented below the chart, containing information about:
- individual learner names;
  - individual learner gender;
  - individual learner prior attainment;
  - individual learner outcome attainment (rebased QCA points and grade);
  - VA score for individual learners.

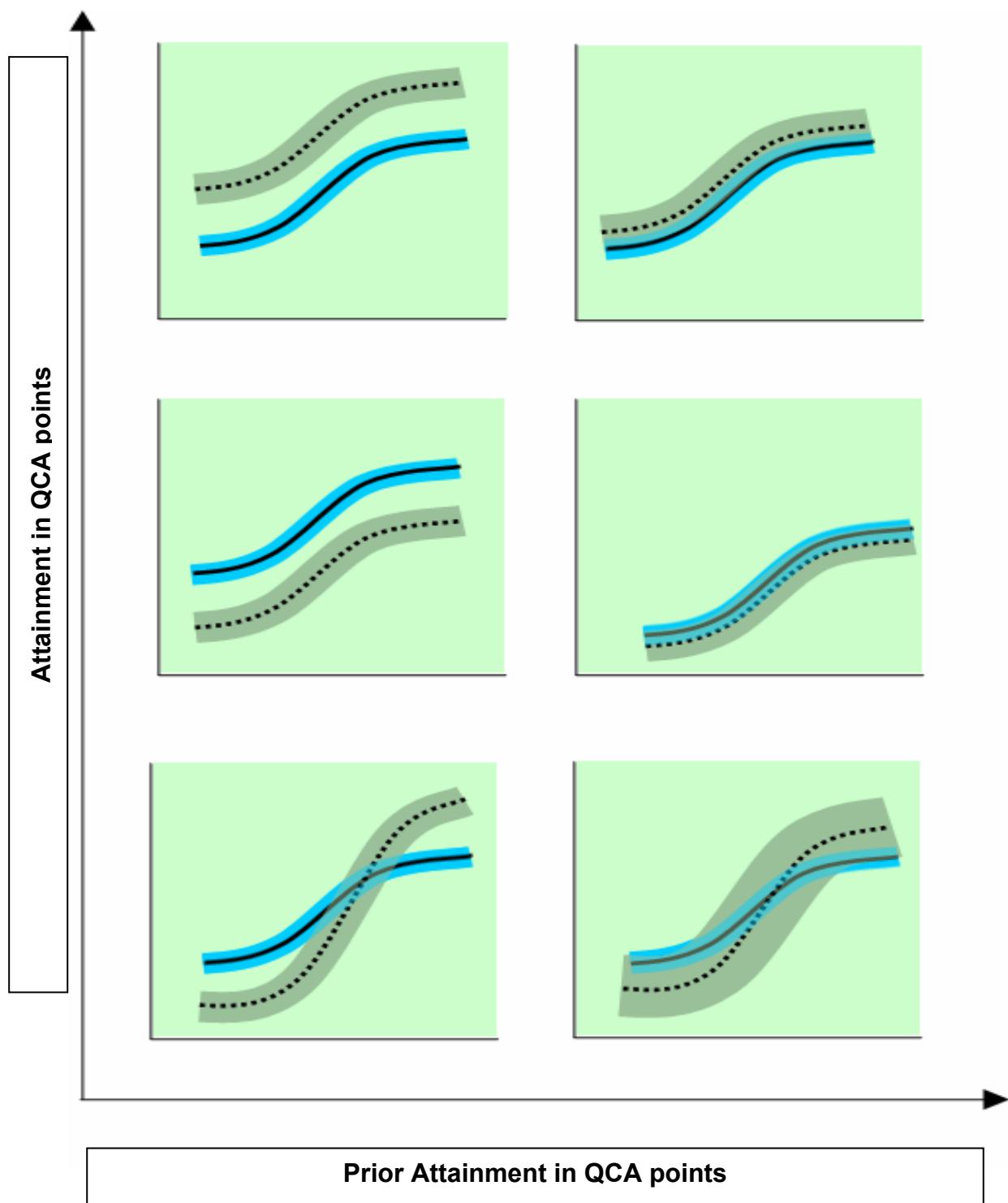
Please note: local YPLA offices and local authorities do not have access to individual learner level data and so will not see these tables.

### **Interpreting the national comparison chart**

- 5.13 The national and school or college lines, grey shaded band (95 per cent confidence interval), and the shaded blue band (national standard deviation) can be combined to produce a sophisticated understanding of absolute and relative school or college performance. Summary examples of report interpretation are given in Table 9 (p.34).
- 5.14 If the **school or college line and the grey shaded area are above the national line** (for any range of prior attainment), as in Figure 6A, we can be confident that the school or college's VA score is positive (for that range of prior attainment). In these cases, the performance of the school or college's learners in the indicated qualification subject is higher than the national average performance of learners with the same range of prior attainment and following the same qualification subject.

- 5.15 If the **school or college line and the grey shaded area are below the national line** (for any range of prior attainment), as in Figure 6C, we can be confident that the school or college's VA score is negative. In these cases, the performance of the school or college's learners in the indicated qualification subject is lower than the national average performance of learners with the same range of prior attainment and following the same qualification subject.
- 5.16 Please note, a VA score may achieve a significant 95 per cent confidence level and be different from the norm, but that difference may be small. Also, it is important to note that the summary report does not indicate whether national average attainment rate for a given qualification is itself high or low. To fully interpret the report, the user will need to refer to qualification success rate data, national standard deviations or the national lines of the constituent subjects (paragraph 5.21).
- 5.17 If the **school or college line is above or below the national line, but the grey shaded area crosses the national line** (for any range of prior attainment), as in Figures 6B, 6D, and 6F, we cannot be confident that the school or college's VA score is either positive or negative in that range of prior attainment. In these cases, we need to exercise caution when interpreting the VA score, and it may not be possible to make a judgment about performance in the indicated qualification subject (for further information, please refer to paragraph 5.20).
- 5.18 If the **school or college line and the grey shaded area are above the national line and above the blue shaded area** (for any range of prior attainment), as in Figures 6A and 6E, then we can be confident that the school or college's VA score is positive, and above that of the typically performing school or college for the indicated subject (for that range of prior attainment). If the **school or college line and the grey shaded area are below the national line and below the blue shaded area** (for any range of prior attainment), as in Figures 6C and 6E, then we can be confident that the school or college's VA score is negative, and below that of the typically performing school or college for the indicated subject (for that range of prior attainment).
- 5.19 If the **school or college line and the grey shaded area are above or below the national line, and the grey shaded area contains the blue shaded area** (for any range of prior attainment), as for a portion of Figure 6E, then we can be confident that the school or college's VA score is, respectively positive or negative, but within the range of a typically performing school or college for the indicated subject.
- 5.20 Figure 6E demonstrates a situation in which the school or college's VA score in the given subject varies against the national average, according to the prior attainment of these learners. In this example (6E), we can be confident that the school or college's VA score is positive in the case of learners who finished the qualification with high prior attainment, but negative in the case of learners who finished the qualification with low prior attainment.

**Figure 6: Diagrammatic examples of Value Added national comparison charts to illustrate report interpretation**



**Table 9: VA national comparison chart interpretations** (please refer to text for details)

VA score	Confidence interval (grey shaded area)	National standard deviation (blue shaded area)	Interpretation
Positive	Grey shaded area above national line (for any range of prior attainment)	-	When prior attainment is taken into account, the school or college is having a positive effect on the performance of its learners in the given qualification subject compared to the national average performance
Negative	Grey shaded area below national line (for any range of prior attainment)	-	When prior attainment is taken into account, the school or college is having a negative effect on the performance on its learners in the given qualification subject compared to the national average performance.
Positive (or Negative)	Grey shaded area crosses national line (for any range of prior attainment)	-	Care needs to be exercised when interpreting the VA score. Please see paragraph 5.21 for further information.
Positive (or Negative)	Grey shaded area above (below) national line (for any range of prior attainment)	Grey shaded area wholly above (below) the one national standard deviation band	When prior attainment is taken into account, the school or college is having a positive (negative) effect on the performance of its learners in the given qualification subject compared to the national average performance. The school or college's is above (below) that of the typically performing school or college.
Positive (or negative)	Grey shaded area above (below) national line (for any range of prior attainment)	Grey shaded area is wholly within the one standard deviation band	When prior attainment is taken into account, the school or college is having a positive (negative) effect on the performance of its learners in the given qualification subject to the national average performance. The school or college's performance is within the spread of scores of the typically performing school or college.

5.21 There are several reasons why the grey shaded area may cross the national line:

- the performance of the school or college may be very similar to national performance;
- the national sample size may be greater than 80 learners but still be relatively small relative to the number of schools or colleges;
- the school or college size may be very small (for example, fewer than seven learners);
- the distribution of results for the school or college is very variable.

In the latter two cases, a wide confidence interval (that is, a confidence interval with large spread of upper and lower bounds) may be produced, meaning that the interval line is more likely to include positive and negative values.

#### **Interpretation of the learner points on the chart**

5.22 The learner points provide information about how individual learners performed in the given subject/qualification. A learner point shown below the national line, such as for learner A in Figure 5, indicates that the learner achieved a lower grade than would be expected, given their prior attainment. Similarly, a learner point above the national line, for example, learner B in Figure 5, indicates that the learner achieved a higher grade than would be expected, given their prior attainment. In this respect, the distance between the learner point and the national line indicates the VA score for the individual learner. The learner's precise VA score is given in the data table, below the chart.

#### **Using the information in the VA national comparison chart for reflection and quality improvement**

5.23 The information in national comparison charts allows school or colleges to make judgments that assist in answering the following questions:

- Are learners at this school or college making better or worse progress than would be expected when compared to the national picture?
- Do learners with a given prior attainment (for example a low or high prior attainment) make better or worse progress than expected?
- Have any learners achieved higher or lower than expected?

5.24 Answering the questions posed in paragraph 5.23 will help provide a detailed picture of the strengths and weaknesses of a school or college, which can be used to focus quality improvement strategies. For example, if the national comparison chart shows that performance in a particular subject/qualification is worse than the national average, schools and colleges may wish to target resources and quality improvement in that area. Similarly, there may be areas of provision where learners with a particularly high or low prior attainment are not achieving as well as other learners within the school or college. In such cases, some targeting of learners with a given prior attainment may be appropriate to improve their achievement in future years.

- 5.25 The charts will also show where there are areas of demonstrably good practice, in which learners are performing substantially better than the national average when prior attainment is taken into account. Schools and colleges may wish to target this type of provision, and use the practice identified in this area used to drive quality improvement across the school or college.

### How are VA national comparison charts calculated?

- 5.26 The national line/benchmark is calculated using multi-level modelling (MLM) – a statistical technique that accounts for both learner and school or college level VA effects. For further information about MLM, please see the annex to this VA guide, *Multi-Level Modelling—An Introduction*. Technical information about MLM is available on the YPLA website:  
<http://www.ypla.gov.uk/aboutus/ourwork/qa/mlp/>
- 5.27 It is not possible to generate a reliable national average performance for qualification subjects that have relatively few learners. In these cases, VA scores for small subjects are calculated against either qualification or subject sector area (please refer to *Section 2: Data for Value Added for 16-18 Learners*). Please note: while VA scores for small subject cohorts are not shown, their data are included in the calculation of the national averages.

### Ad hoc reports

- 5.28 Ad hoc reports allow the user to tailor the VA national comparison chart to include subsets of learners. The user is able to flag which learners they need to include in the calculation of VA, and compare these learners to the national average. For example, a user may want to look at learners who were taught by a particular teacher. Or, a user may wish to use the ad hoc reports facility to see if the cohort contains a learner who has performed particularly different to the other learners (an outlier). The learner could then be excluded to see what difference this would make to the overall score.

### Further Information on the VA national comparison reports and ad hoc reports

- 5.29 Further information on using the VA national comparison reports and ad hoc reports can be found on the YPLA website:  
<http://www.ypla.gov.uk/aboutus/ourwork/qa/lat-va-tool/>

## 6 Value Added National Chances Charts

### What do VA national chances charts show?

- 6.1 A national chances chart shows the probability of an individual learner achieving a certain outcome for a given subject or qualification, according to national trends and given the learner's prior attainment. Figure 7 shows the chances of a learner with a prior attainment between 40 and 46 QCA points achieving either grade A, B, C, D, or E in A-level English.
- 6.2 National chances charts for a given subject/qualification are available for 10, fixed bands of prior attainment. The LAT software does not allow chances to be displayed for customised values of prior attainment.

- 6.3 Based on national chances chart information, predictions can be made about how learners with similar prior attainment might achieve in the future. Please note, however, that national chances charts are based on the national data set, and do not take into account the difference made by a school or college to a learner's chances. In this respect, all schools and colleges see the same set of national chance charts.
- 6.4 The vertical axis shows the **probability of achieving the outcome** for the given subject/qualification, shown as a percentage. The horizontal axis shows the **grades available** in the subject/qualification.

6.5 Figure 7, using data from 2005/06 shows that, for that year:

- 5,977 of the learners who passed A-level English in 2005/06 had an average prior attainment of between 40.01 and 46 QCA points, of whom:
    - 7 per cent achieved a grade E in A-level English
    - 28 per cent achieved a grade D in A-level English
    - 38 per cent achieved a grade C in A-level English
    - 22 per cent achieved a grade B in A-level English
    - 4 per cent achieved a grade A in A-level English
    - in total, over half of this group of learners achieved grade C or higher in A-level English.
- 6.6 Please note, fails are not indicated in the VA chances chart but are indicated by the percentage remaining from the displayed total percentage in the chart. Referring to Figure 7, the remainder of  $(100-(7+28+38+22+4)) = 1$  per cent: therefore, 1 per cent of this group of learners failed A-level English for the given prior attainment. In the header information, the absolute number of fail grades is shown in the brackets next to the national band sample size (for Figure 7, the number of fails is 67).

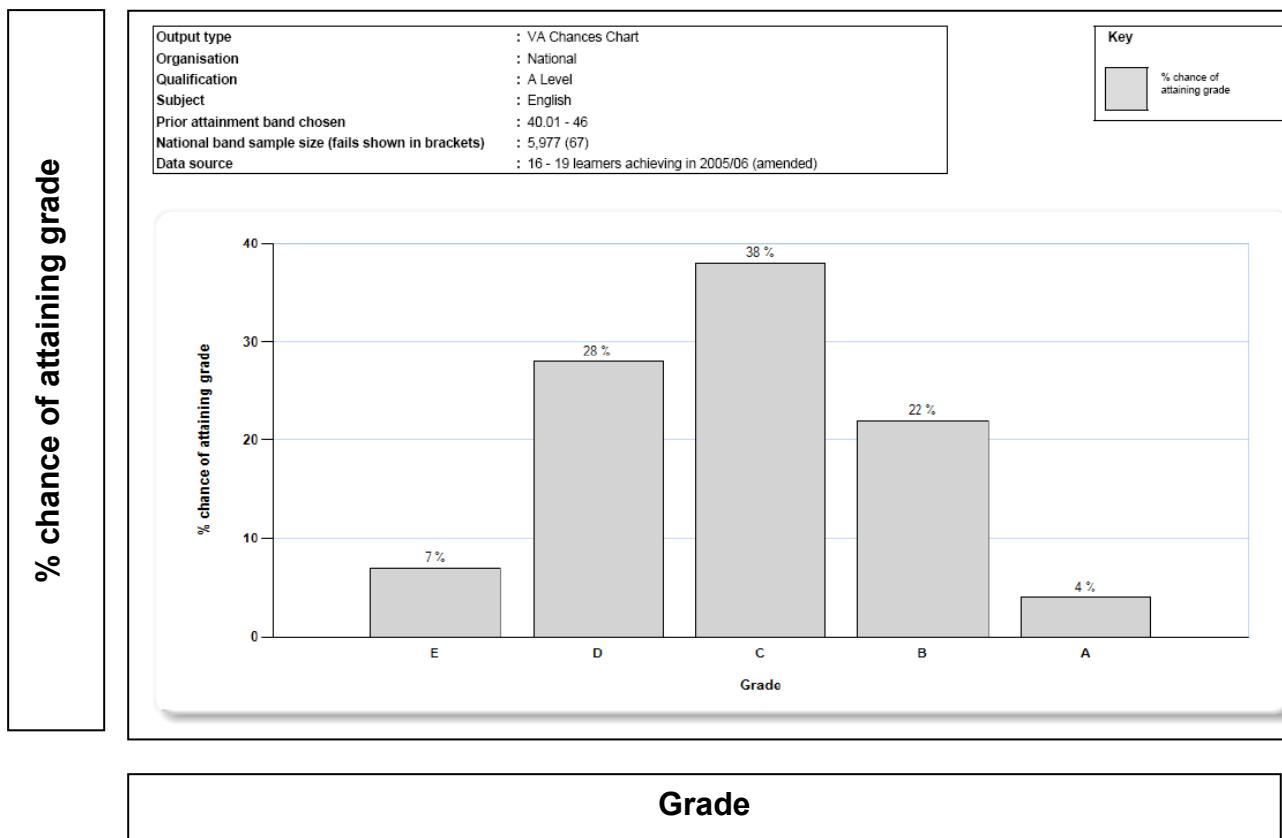
### **How can VA national chances charts be used for quality improvement?**

- 6.7 VA chances charts can be used to support learner progress by helping:
- tutors to establish challenging but realistic targets to which individual learners may aspire;
  - to monitor a learner's progress throughout their course and judge whether it is in line with expectations;
  - to judge whether a learner is likely to need extra help and support to achieve their aims;
  - to help inform decisions about the selection of the most appropriate course for the individual learner.

NOTE: the chances charts should be used in combination with other factors, and their use is not recommended as the primary tool for recruitment.

- 6.8 The chances charts need careful use: tutors will need to bring their professional judgment to the charts to ensure that the charts are used as a motivational tool, where appropriate, to encourage learners to realise their potential. The charts could have a demotivating effect on individual learners if the chance of the individual achieving the desired grade or qualification is low. Chances charts only take into account the average prior attainment of the learner: other factors will influence the actual grade that the learner attains, and a personal tutor may wish to build discussion of these factors into their motivational target-setting process. The VA chances chart should provide a powerful tool to enable school or colleges to monitor the progress of individual learners towards their given target.

**Figure 7: Value Added national chances chart.** The chart shows the chances of an individual learner with average prior attainment of between 40.01 and 46 QCA points attaining each of the possible grades in A-level English. Please see text for further details.



### How are VA national chances charts calculated?

- 6.09 VA chances charts are calculated in a different way from VA national comparison charts. The VA chances charts are based on data from learners who pass their qualification only, and do not take into account those learners who failed the given qualification. The outcome grade of each learner in their post-16 qualification within the national sample for the given subject/qualification is grouped into bands of prior attainment. The LAT then counts the number of learners achieving a particular grade for a given prior attainment band, and converts this number into a percentage of the sample size for the given prior attainment.

## 7 Value Added 16-18 learners: Further Questions

### *Why has the YPLA chosen to use a subject-based methodology?*

- 7.1 Statistical analysis has shown that the relationship between prior attainment of learners and their actual achievement varies for different subjects and qualifications. Schools and colleges offer a wide variety of subject and qualification mixes. A subject-based methodology that reflects the varied relationships between prior attainment and achievement gives the fairest picture of provision across the sector. The subject-based approach also allows schools and colleges to look at the performance of their performance in a particular

subject and qualification, against the national average performance for that subject and qualification.

***If the entire programme for a school consisted of a single qualification type (such as A-levels), would the LAT's VA score for this programme be the same as the DfE's school or college-level School and College CVA measure?***

- 7.2 The LAT is primarily designed to provide VA information for each qualification subject in scope. The LAT does not supply a school or college-level VA core (that is, a single VA score that covers all of the school or college's provision). In this respect, the VA reports are intended to complement the DfE's School and College CVA measure.
- 7.3 Although we could expect a school or college with a programme consisting only of A-levels to have a LAT VA score similar in size and direction to the school or college-level score produced by the DfE's School and College CVA calculation, it is unlikely that the precise score would be the same for the two statistical procedures. This is partly due to certain statistical effects of aggregation, and partly because the DCSF measure incorporates contextual variables (for example, learners' socio-economic backgrounds).

***Why doesn't the calculation take into account other factors such as socio-economic grouping or gender?***

- 7.4 It is widely acknowledged that there are many other factors besides prior success that will affect a learner's ability to succeed in a given subject and qualification. These factors will include gender and socio-economic grouping alongside a learner's personal motivation and drive. However, statistically speaking, prior attainment has been found to be a far better predictor of performance in the main qualification taken than any other factor.

***How large does a group/class have to be to generate a reliable VA score?***

- 7.5 Group or class sizes need to consist of more than four learners for a VA score to be calculated and for a judgement to be made about the school or college's performance in that subject and qualification. The LAT outputs show the number of learners included in the national and school or college sample.

***What importance should I attach to cohort size and the VA score?***

- 7.6 Differences in cohort size between subjects/qualifications are taken into account then calculating a VA score. This means that VA scores across subjects/qualifications are directly comparable, regardless of the size of the respective learner cohort. However, for policy purposes, advisers, managers and inspectors may be concerned with the provision of a subject/qualification having a significantly negative VA score and taking in a larger, rather than smaller, cohort size.

***Why would the number of learners shown in the LAT outputs not correspond to my group size?***

- 7.7 Learners need to meet a number of criteria for inclusion of the LAT data set, for instance, have prior attainment that was obtained in England. If learners within your cohort do not meet these criteria they will be excluded.

***How does the LAT compare to other, proprietary systems for VA?***

- 7.8 During the development of the methodology used in the VA for 16-18 learners, account was taken of existing systems which cover VA for learners on graded qualifications. The most well-known of these systems are the A-Level Information System (ALIS) and the A-Level Performance System (ALPS) that use, respectively, linear regression and averages-based techniques. In contrast, the VA for 16-18 learners measures are calculated using a multi-level modelling (MLM) regression technique, an introduction to which is provided in the annex to this guide. MLM provides the following advantages over other statistical and arithmetic techniques:

- it is robust in terms of dealing with school or colleges with small cohorts of learners, so that more school or colleges can be included in the national measure;
- there is clear information about how school or colleges are performing with learners at different levels of prior attainment.

- 7.9 In addition, the LAT:

- is provided free of charge to all YPLA-funded schools or colleges and local authorities;
- covers a wider range of learners, including vocational qualifications, and compares schools and colleges' performance with the national sample of all learners taking a given subject or qualification.

***If a VA score is derived from the school or college's actual performance, why do we need confidence intervals for these scores?***

- 7.10 The school or college's VA score is generated from information from both the school or college's individual learner points and the national data sample. Specifically, in multi-level modelling, the calculation of a VA score for a school or college is derived from the school or college's actual performance in the context of estimated national average performance for the range of prior attainment and possible outcomes. Producing confidence intervals for the school or college lines

(school or college VA scores) is a standard statistical technique for accounting for both the error or “noise” in the calculation of the national line, and the variance of the school or college’s actual score around that estimated national line.

- 7.11 3 Confidence intervals can be set at different levels of statistical significance. A 95 per cent confidence interval tells us that 19 out of 20 times, the school or college’s VA score will be somewhere within the range specified:
- for example, a school or college VA score for A-level maths is +15, and the bounds of the 95 per cent confidence interval are -1 and +31. This means that 19 out of 20 times, the school or college’s VA score for A-level maths will be somewhere between -1 and +31 QCA points, but on average it will be +15 QCA points. Since the VA score will sometimes be -1 (and so, below the national average), we cannot be statistically confident that the school or college’s effect on the performance of its learners in A-level Maths is different from the national average, even though the VA score is positive

***What is national standard deviation, and how is it used in the LAT?***

- 7.12 Standard deviation is a statistical term describing the spread or “deviation” of scores around the average, such that (for most types data, including VA data) 68 per cent of data points or scores will fall within one standard deviation of the mean, 95 per cent of scores will fall within two standard deviations, and 99 per cent of scores will fall within three standard deviations. A larger standard deviation would imply a wider spread of scores, indicating more variation; a smaller standard deviation would imply that the scores are gathered more closely around the average, indicating less variation.
- 7.13 The adoption of standard deviation in the LAT provides a relative measure of school or college performance, in terms of the distance of the school or college’s VA score from the national average. As mentioned, 68 per cent or about two-thirds of data points will lie within one standard deviation of the national line (as indicated by the blue band) and, on this basis, are deemed in the LAT to indicate performance of the typical school or college performance. This means that 16 per cent of school or colleges will lie above the blue band, and 16 per cent of school or colleges will fall below the blue band, indicating the respective over- or under-performance of a school or college’s learners, compared to those in a typically performing school or college (in the given qualification and subject).

## **ANNEX - Multi-Level Modelling—An Introduction**

### **Introduction**

- A.1 The purpose of this annex is to introduce and describe multi-level modelling (MLM).
- A.2 MLM is a sophisticated statistical technique, which has the potential to provide a more valid, fair and accurate way of calculating Value Added (VA) scores than other methods.
- A.3 One statistical advantage of MLM is that it considers the effects of the school or college on learner outcome, in addition to the effect that learners have on their own outcome. Other statistical approaches such as linear regression and averages-based approaches do not directly recognise the impact that a school or college has on an individual's performance, as these approaches treat all learners identically, that is, as if all learners went to the same school.
- A.4 Additionally, MLM allows reliable scores to be calculated for small cohorts (that is, where few individual take that subject in that qualification). Other approaches do not have methods to make the necessary adjustments, therefore data from small cohorts tend to be aggregated into larger groups or ignored.
- A.5 Currently, MLM is being adopted by the DfE for calculating pre-16 VA and will be used for the calculation of VA for 16-18 year olds.

### **The Interaction of Individual and School or college effects**

- A.6 It is important to acknowledge that actual attainment of learners is broadly dependent upon two sorts of factors: individual effects and school or college effects. Individual factors describe the learners themselves: for example, age, gender, and previous results. In the context of education, the individual factor most strongly associated with attainment is the learner's ability which is typically measured in terms of prior attainment.
- A.7 Currently, the LAT does not include contextual factors such as age and gender as in individual factor.
- A.8 School or college factors relate to the school or college attended by learners. They can arise from differences in curriculum offered, recruitment and catchment area, and a host of other considerations. To appreciate how closely these two sorts of factors interact, we first must assume that both factors are independent.
- A.9 For example, if we know that every learner who ever attended school or college X, achieved four A-grade A-levels, then the fact that they attend this school or college would seem to tell us all we need to know to predict their attainment. Clearly, this is not the case, since just knowing which school or college a learner attended is not sufficient to predict their attainment.
- A.10 Similarly, if it was only individual factors that allowed one to completely and accurately predict a person's attainment, then there would be no need to know which school or college that individual attended. Everyday experience would say that this is not true: that schools or colleges do have an impact on a learner's attainment.

- A.11 As we know that both of these factors are important in predicting attainment, we need to ensure that they are both accounted for in the model used for Value Added and. The issue is trying to determine to what extent the attainment of a learner depends on their abilities and to what extent it is influenced by the school or college that the learner attends.
- A.12 The calculation undertaken by MLM specifically determines the school or college effect on the attainment of a learner, while at the same time taking into account the distribution of the prior attainment of all learners in the national cohort under analysis (for example, A-level Biology). In this sense, which school or college attends now becomes an important variable in the calculation of predicted attainment for learners in any subject.

### The case of small subjects

- A.13 Another advantage of MLM is that it allows reliable scores for the VA measure to be calculated when there are few learners in the school or college cohort. Normally, when few learners are taking a subject in a qualification in a school or college (for example, A-level Biology), other statistical approaches will tend to produce predictions that are volatile and unstable, that is they change substantially if there is any change in the data. This means that the VA score of a small subject could be very high in one year, and then the next year could be very low. Such volatility is symptom that the scores are biased and they are not clear, fair or valid indicators of performance.
- A.14 To solve this problem, the estimation using MLM is used to produce an adjustment factor (usually known as a shrinkage factor). This factor is a number between zero and one, which is used in the calculation of the average of the scores of each subject, independent of the cohort size. If the cohort is large, the shrinkage factor is close to one, and thus has no effect on the results. If the cohort is small, the shrinkage factor is close to zero, and reduces the score towards the national average. By doing this, the results of small cohorts are now more reliable and less volatile, while the scores for large groups or subjects remain virtually unchanged.

### Conclusion

- A.15 Multi-level modelling addresses some of the main limitations of other methods of modelling value added and distance travelled. It provides a valid, fair and accurate way of calculating value-added data for the purpose of reflection and improvement and school or college accountability.

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