# Working Paper: Using Data in Assessing the Quality of AP Schools


## Acknowledgments

This work was produced using statistical data from ONS. The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data.

This work uses research datasets which may not exactly reproduce National Statistics aggregates.

This publication includes analysis of the Department for Education National Pupil Database. Inferences or conclusions derived from the NPD in this publication are the responsibility of FFT Education Datalab and not the Department for Education.

The work was carried out on behalf of the IntegratEd partnership and funded by Porticus UK.


## Background

Relatively little information is published about the characteristics and outcomes of pupils who attend alternative provision in England.

Part of the reason for this is the sheer heterogeneity of the sector. Alternative provision tends to be synonymous with permanent exclusion but this is only one reason why pupils may enter the sector. Other reasons may include illness, pregnancy, lack of a school place or as a short-term intervention to improve behaviour.

Similarly, there is heterogeneity in types of alternative provision. This includes pupil referral units, alternative provision free schools/ academies and independent alternative provision settings. It may also include other types of setting (including FE Colleges and one-on-one tuition) paid for by local authorities.

In this document, we look at how administrative data on attainment and attendance available from the National Pupil Database (NPD) could be used to assess alternative provision schools for quality and to build a picture of the educational histories of those accessing alternative provision. We emphasise here that attainment and attendance are just two dimensions of quality. There are others, such as health and well-being and how well schools work with other agencies, which cannot be analysed using administrative data. Further dimensions of quality are summarised in the Centre for Social Justice toolkit.

For the most part, we talk about alternative provision (AP) schools. These are pupil referral units and alternative provision free schools and academies.

We discuss two three issues to assessing AP schools for quality, namely:

1. Which pupils to include. Unlike with mainstream schools, many pupils spend a short time in AP schools and may complete their compulsory schooling in other types of setting, including mainstream schools
2. How to take into account the variation between AP schools in the characteristics and needs of pupils

3. Which schools and settings are in scope. As a minimum, we consider pupil referral units and alternative provision free schools and academies. However, local authorities also place young people at independent alternative provision schools and further education colleges.

We make some suggestions for dealing with these issues. However, this is a working document designed to promote discussion and better ideas may emerge as a result.

## Pupils who reach the end of Key Stage 4 in Alternative Provision

Just under 8 thousand pupils are typically included in the Key Stage 4 results of alternative provision schools[1] each year[2]. Less than half achieve grade 1 or above in both GCSE English (language and literature) and maths although there has been a slight increase since reformed GCSEs were awarded for the first time in 2016/17. 1 in 3 pupils were not entered for both GCSE English and maths, with entry rates in maths tending to be lower (Table 1).

### Table 1: GCSE English and maths attainment and entry 2017 to 2019, alternative provision schools

| | % entered for GCSE | | | %9-1 Eng & | | |
|---|---|---|---|---|---|---|
| Year | English | Maths | Both | Mat | Pupils | Schools |
| 2016/2017 | 71% | 58% | 58% | 38% | 7548 | 279 |
| 2017/2018 | 71% | 63% | 63% | 44% | 7775 | 280 |
| 2018/2019 | 74% | 66% | 66% | 46% | 7552 | 281 |

However, this table does not tell the whole story.

## Independent Alternative Provision

Firstly, there are pupils in independent alternative provision, the majority placed there by their local authority. The size of this sector is unknown, largely because schools offering alternative provision in the independent sector are not identifiable in the data.

Following a crowdsourcing exercise[3], we managed to identify 150 schools classified as independent schools or independent special schools that we think are alternative provision schools although, in the case of independent special schools, it is difficult to draw a line between alternative provision schools and special schools for pupils with social, emotional and mental health needs.

Caveats about the identification of independent AP schools notwithstanding, we identified pupils who either a) reached the end of Key Stage 4 at one of these schools or b) were placed in one of these schools by their local authority at academic age 15, the final year of compulsory schooling. The pupils in b) were identified as having a current placement according to the local authority alternative provision census. This has collected details on school attended since 2017/18.

[1] Pupil referral units, alternative provision academies and free schools

[2] Note that these numbers differ to published Key Stage 4 statistics about alternative provision as we do not include pupils in education outside of the state-funded sector paid for by the local authority. The majority of these pupils are young people with education, health and care plans (EHCPs) placed in independent special schools.

[3] Some additional schools not included in the crowd sourcing exercise (e.g. new schools) have also been added following review

Table 2 shows that more than 1,000 pupils reached the end of Key Stage 4 at a school we have identified as an independent alternative provision school. Entry and attainment in English and maths GCSEs was lower than in state-funded AP although we might assume that these pupils had even more complex needs.

### Table 2: GCSE English and maths attainment and entry 2018 to 2019, independent alternative provision schools

| | % entered for GCSE | | | %9-1 Eng & | | |
|---|---|---|---|---|---|---|
| Year | English | Maths | Both | Mat | Pupils | Schools |
| 2017/2018 | 58% | 50% | 49% | 31% | 1172 | 104 |
| 2018/2019 | 57% | 53% | 51% | 36% | 1395 | 102 |

Of the 1395 who completed Key Stage 4 in 2019, 386 (24%) are known to have experienced a permanent exclusion in the state-funded school sector.

We also note in passing that there are 450 pupils of compulsory school age in the local authority alternative provision census who are attending colleges of further education.

## Pupils who attend state-funded alternative provision but who leave before the end of Key Stage 4

Some pupils spend a short time in alternative provision before either returning to their school, obtaining a place at another mainstream or special school or moving on to a placement elsewhere (e.g. in independent AP or colleges of further education).

Using School Census, we identify all individuals observed to have attended a state-funded alternative provision school during their secondary education (i.e. in the five years prior to reaching compulsory school age). For most analysis, we split pupils into two groups: 1) pupils who were either single-rolled or mainly attended an AP school[4] (main enrolments) and 2) pupils who attended AP schools with subsidiary or other registrations (those who spend some time each week in AP but primarily attend another school or setting).

In each of the three cohorts, we found that between 19 and 20 thousand pupils spent some time in state-funded alternative provision prior to reaching school leaving age, 2.5 times the number who reach the end of Key Stage 4 within the sector (Table 3). Between 10 and 11 thousand are observed to have had a main enrolment at an AP school during their secondary education[5].

[4] These are pupils with an enrolment status of C (current) or M (main) in School Census. Pupils with an enrolment status of S (subsidiary) or G (guest) are considered to be attending but not on roll for the purposes of this analysis. Pupils with an enrolment status of 'F' (further education college) and 'O' (attending other provider) are recorded against the alternative provision school which holds their registration

[5] A small proportion, between 5% and 7% each year, are included in end of KS4 data at an alternative provision school despite never having been on roll.

### Table 3: Number of pupils accessing state-funded alternative provision schools during their secondary education

| Year | At end of KS4 | Main enrolment | Ever attending |
|---|---|---|---|
| 2016/2017 | 7533 | 10207 | 19424 |
| 2017/2018 | 7699 | 10251 | 19178 |
| 2018/2019 | 7462 | 10675 | 19338 |

Using a combination of school census, the local authority alternative provision census and Key Stage 4 data, we can derive the final destination of pupils who accessed alternative provision schools. We give precedence to institutions where pupils were counted in the Key Stage 4 data of the year they turned 16. Otherwise, we revert to the type of establishment attended according to the local authority AP census where a record exists (i.e. local authorities were paying for provision).

### Table 4: Type of institution attended at end of Key Stage 4, pupils accessing state-funded alternative provision schools during their secondary education

| | | Cohort | | |
|---|---|---|---|---|
| | | 2016/2017 | 2017/2018 | 2018/2019 |
| State-funded schools | Mainstream | 6544 | 6466 | 6510 |
| | Alternative Provision | 7533 | 7699 | 7462 |
| | Special and hospital | 1073 | 1096 | 1061 |
| Independent | Alternative Provision | 367 | 273 | 341 |
| | Other schools | 643 | 827 | 848 |
| Other Provision | Further Education | 255 | 336 | 243 |
| | Secure Units | 27 | 37 | 44 |
| | Other local authority alternative provision[6] | 535 | 256 | 324 |
| No destination | | 2447 | 2188 | 2505 |
| Total | | 19424 | 19178 | 19338 |

Around a third of pupils complete Key Stage 4 at a state-funded mainstream school (Table 4). A further 44 to 46% do so at a state-funded special, hospital or AP school. Around 9% complete Key Stage 4 at some other type of provision, including independent schools and FE colleges. Finally, a destination cannot be found for 11% to 13%. Some of this group may have migrated (overseas or to other parts of the UK) or, sadly, died.

## Characteristics of pupils who attend alternative provision

In general, pupils tend to enter the state-funded alternative provision sector in the later years of their secondary education, with between 46% and 50% entering at academic age 14 (Year 10) or later in the three cohorts considered in this report (Table 5). A small proportion spent time in AP during the primary years (aged 10 or below).

[6] This includes GFE colleges and one-to-one tuition paid for by the local authority

### Table 5: Age at which pupils first attend a state-funded alternative provision school

| Age at start of year | Cohort 2016/2017 | 2017/2018 | 2018/2019 |
|---|---|---|---|
| <10 | 5% | 5% | 2% |
| 10 | 4% | 2% | 4% |
| 11 | 5% | 8% | 9% |
| 12 | 15% | 16% | 16% |
| 13 | 21% | 22% | 22% |
| 14 | 27% | 26% | 26% |
| 15 | 23% | 22% | 20% |
| Total | 19424 | 19178 | 19338 |

In Table 3, we showed that the majority of pupils who accessed state-funded alternative provision during their secondary education did not necessarily complete Key Stage 4 within the sector. To examine the characteristics of pupils who attend AP in further detail, we first divide pupils who ever attended alternative provision into three groups:

1. Those who completed Key Stage 4 at a state-funded alternative provision school according to Key Stage 4 statistics;
2. Pupils not included above, but who were observed to have a main enrolment (have a "current" or "main" registration) at an alternative provision school in School Census while aged 11 to 15[7];
3. All other pupils accessing state-funded alternative provision schools not included above.

Table 6 shows some key characteristics of young people from the 2018/19 cohort who accessed state-funded alternative provision schools.

Pupils who complete Key Stage 4 in a state-funded alternative provision school and those who have a current or main registration are far more likely than other pupils who spend time in the sector to have been permanently excluded. This is consistent with the idea of alternative provision being a short-term intervention for many pupils. Pupils in the first two groups are also more likely to be disadvantaged, to have ever been in need and to have been identified as having behavioural, emotional or social difficulties (BESD) or social, emotional and mental health (SEMH) needs. This would also indicate tending to have more complex needs.

[7] Note that enrolment status is observed from termly School Census returns. It may be the case that an individual is enrolled for a short time between censuses with an enrolment status of main or current. This cannot be observed in the data.

### Table 6: Characteristics of pupils attending state-funded alternative provision, 2019 cohort

| Characteristic | End KS4 in AP | Main enrolment but do not end KS4 in AP | All other pupils attending AP | All pupils attending AP |
|---|---|---|---|---|
| Permanently excluded prior to final AP enrolment | 38% | 44% | 6% | 25% |
| Managed move prior to final AP enrolment | 17% | 5% | 1% | 8% |
| Girls | 33% | 27% | 39% | 35% |
| Child in need prior to final AP enrolment | 63% | 65% | 53% | 59% |
| Black Caribbean/ Mixed White and Black Caribbean ethnic background | 7% | 9% | 4% | 6% |
| First language other than English | 14% | 17% | 12% | 14% |
| Ever eligible for free school meals | 74% | 75% | 61% | 69% |
| Long-term disadvantaged[8] | 24% | 25% | 18% | 22% |
| Statement or EHCP (ever) | 10% | 26% | 20% | 17% |
| BESD or SEMH (ever) | 75% | 65% | 52% | 63% |
| Total pupils | 7462 | 3552 | 8324 | 19338 |

For comparison purposes, data on all other young people who reached the end of Key Stage 4 in 2019 in state-funded schools is presented in Table 7.

### Table 7: Characteristics of young people in the 2019 Key Stage 4 cohort who had never accessed alternative provision

| | |
|---|---|
| Permanently excluded (ever) | <1% |
| Managed move (ever) | <1% |
| Girls | 49% |
| Child in need (since 2008) | 20% |
| Black Caribbean/ Mixed White and Black Caribbean | 3% |
| First language other than English | 20% |
| Ever eligible for free school meals | 33% |
| Long-term disadvantaged | 6% |
| Statement or EHCP (ever) | 4% |
| BESD or SEMH (ever) | 7% |
| Total pupils | 532076 |

Compared to the general population, pupils who access alternative provision are:

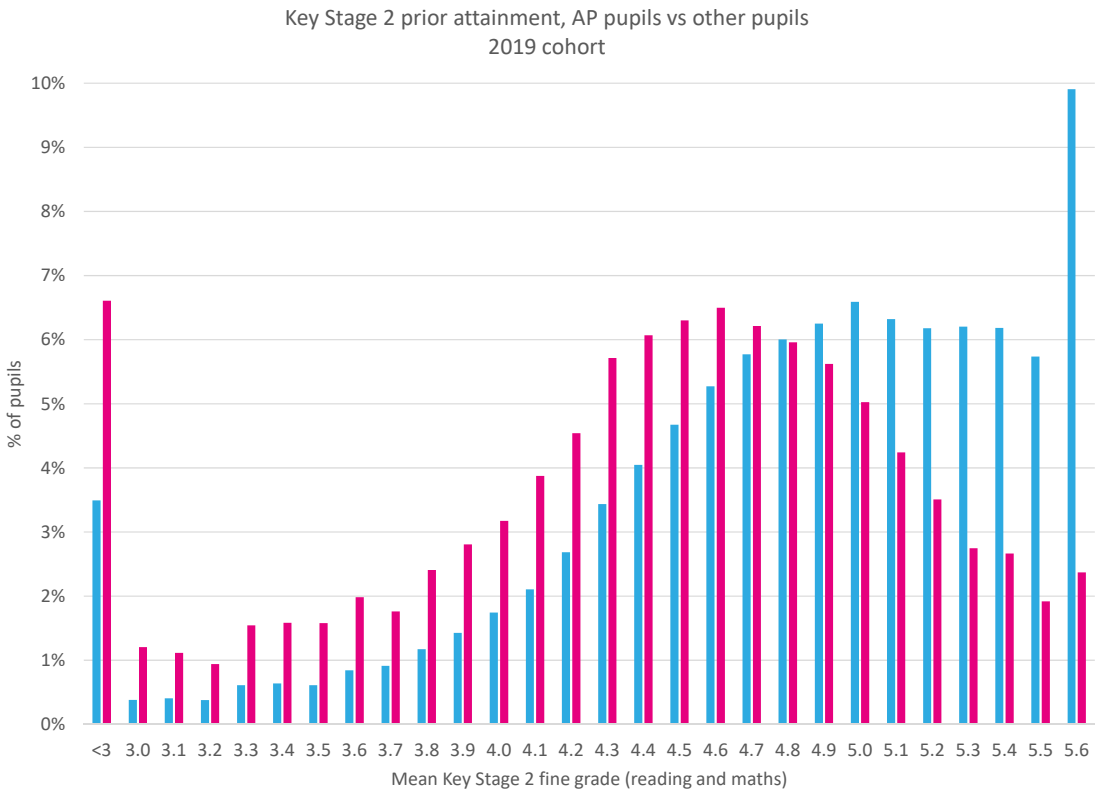
- Three times as likely to have been in need
- Over twice as likely to be black Caribbean or mixed white/ black Caribbean

[8] We calculate the percentage of terms pupils are observed to be eligible for free school meals using School Census. Those who are eligible for at least 80% of terms are considered long-term disadvantaged.

- Over twice as likely to have ever been eligible for free school meals
- Over three times as likely to be classified as long-term disadvantaged
- Almost nine times as likely to have ever had a statement of SEN or an EHC plan

Finally, Figure 1 compares the attainment of pupils who accessed state-funded alternative provision schools at the end of their primary education (Key Stage 2) compared to the general population.

Figure 1: Key Stage 2 attainment, AP pupils vs other pupils, 2019 cohort




On the whole, the attainment of pupils who accessed AP is substantially lower: just 19% were working at level 5 or higher (on average in reading and maths) compared to 47% of the general population. But it should be noted that 76% of those who accessed AP achieved level 4 or higher, the expected standard for an 11 year old.

## Variation between providers

There is considerable heterogeneity among state-funded alternative provision schools in terms of the pupils they serve.

To accompany this report, we have compiled an interim dataset of measures for each alternative provision school (Appendix 1).

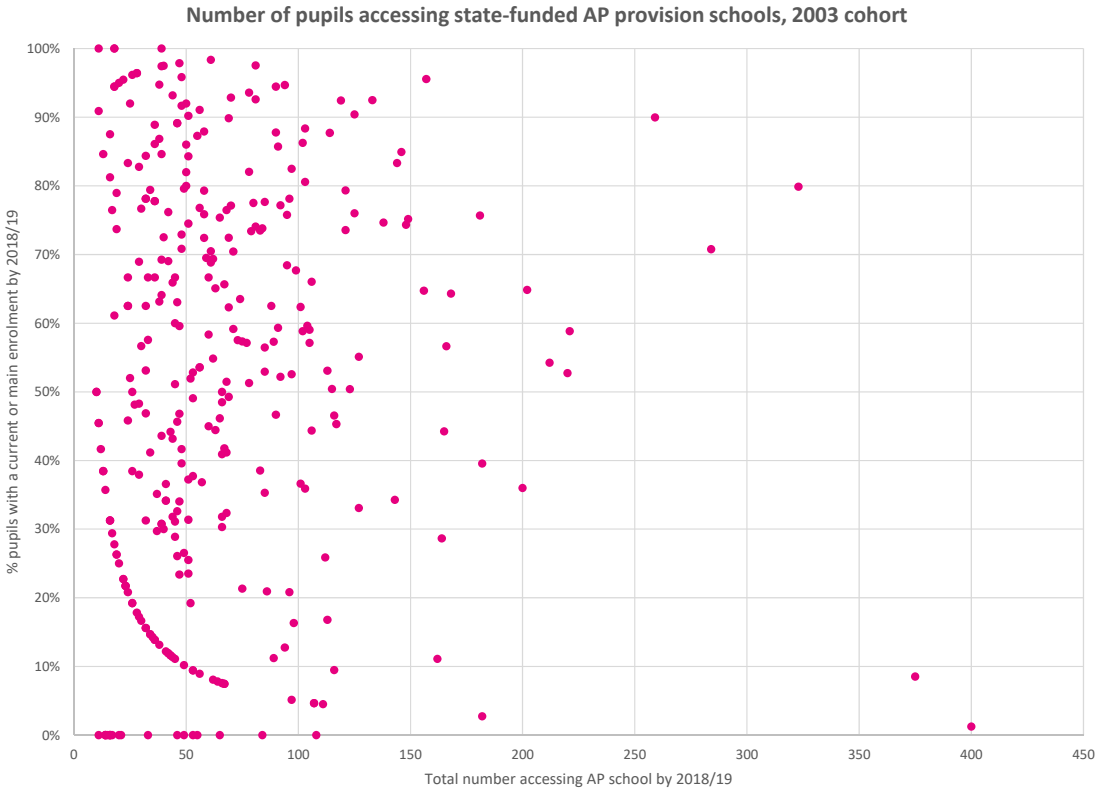
For each school we show:

- The number of pupils in the 2017 to 2019 cohorts who had ever attended the school while aged 11 to 15

- Of the above, the number to have ever had a "main" or "current" enrolment status in School Census
- The number included in end of Key Stage 4 statistics at the school
- Summary characteristics data (based on all pupils who had ever attended)
- Summary attainment data (for all pupils who had ever attended and separately for main enrolment and other (subsidiary registration) pupils)

State-funded alternative provision schools vary in terms of the number of pupils in a cohort that they serve. But they also vary in their admission arrangements. In Figure 2, we show the variability in the proportion of pupils they admit with an enrolment status of current or main. This includes 28 providers without any pupils enrolled with such an enrolment status.

Figure 2: Number of pupils attending AP schools by percentage with main or current enrolment status, 2019 cohort




## Attainment

Calculating attainment measures for AP schools first requires us to identify which set of pupils to include.

There are various options not limited to:

1. Those enrolled in Year 11
2. Those ever on roll up to and including Year 11
3. Those ever on roll with a 'current' or 'main' enrolment status up to the end of Year 11

Option 1 would exclude any individuals who left an AP school before the January of Year 11. Option 2 would include individuals who spent a short time at an AP school. Option 3 would exclude those who attend AP with a subsidiary registration.

In all cases, it may be the case that pupils take qualifications at a mainstream or special school rather than with a state-funded AP school. This is unavoidable given that AP tends to be a short-term intervention for many.

For this illustration, we calculate attainment measures for each AP provider for three different sets of pupils:

- All pupils attending the provider between ages 11 and 15
- Pupils attending the provider between ages 11 and 15 with a current or main enrolment status (main enrolment pupils)
- Pupils attending the provider between ages 11 and 15 with a subsidiary or other enrolment status (subsidiary registration pupils)

The second issue we run into is of which qualifications to count.

Since 2014, only a subset of qualifications approved for use by young people up to age 16 have been included in School Performance Tables. This means that a raft of qualifications have no value in NPD datasets, including popular qualifications such as Functional Skills. We would recommend that DfE continues to make available points scores and sizes (commonly referred to as qualification reference data) for these qualifications to enable stakeholders to create more comprehensive measures of attainment for young people in special schools and alternative provision schools.

For this report, we have used pre-2014 points scores and qualification sizes for qualifications that were available then, and imputed qualification points scores and sizes for newer qualifications. These put qualifications onto the same scale as reformed (9-1) GCSEs.

For example, a pass in level 2 functional skills qualification historically counted as 23 points and a size of 0.5 GCSEs. Accounting for size, this was equivalent to grade B at GCSE (46 points).

Nowadays, qualifications tend to be scored on the 9-1 basis. Maintaining the relationship with grade B in legacy GCSEs, we therefore assign 2.75 points to a level 2 functional skills pass. As before, it is considered to be the size of half a GCSE. 2.75 points in half a GCSE is equivalent to 5.5 points in a full GCSE (i.e. halfway between grade 6 and grade 5).

Similarly, pass in level 1 functional skills counts as 0.875 points and a size of 0.5 GCSEs. This is equivalent to 1.75 points. In other words, between grades 2 and 1 but closer to grade 2.

We calculate a number of attainment measures. These might include:

- Achievement of Level 2 (GCSE grade 9-4 or equivalent) in literacy and numeracy
- Achievement of Level 1 (GCSE grade 9-1 or equivalent) or higher in literacy and numeracy
- Achievement of Entry Level Qualifications (or higher) in literacy and numeracy
- Score in "best 5" qualifications (Attainment 5)

The "Attainment 5" measure is based on the highest scoring set of qualifications equivalent in size to 5 GCSEs. Two of the five "slots" are reserved for English and mathematics and so the measure is similar in nature to the Attainment 8 measure used for mainstream schools. As in Attainment 8, scores in English and maths are double-weighted.

In principle, these measures could also be calculated for pupils when they are aged 16 and above. These could be used in measures of post-16 progression.

Further information on the types of qualifications entered by pupils who complete Key Stage 4 in the AP sector can be found in Annex 1.

## Summary attainment statistics

We first show summary statistics for the sector as a whole, based on all pupils in the three cohorts we analyse who ever attend state-funded AP schools during their secondary education. Pupils are classified according to their enrolment status within the sector and the age at which they last attended a state-funded AP school. Any pupil to have ever had a current or main registration (main enrolment) is included in the "current or main" group. Data for the most recent cohort is shown separately.

### Table 8: Summary attainment statistics by enrolment status and age at which last attended, all pupils attending state-funded AP schools, 2017 to 2019 cohorts

| | | 2019 cohort | | | 2017 to 2019 cohorts | | |
|---|---|---|---|---|---|---|---|
| Enrolment status | Age at which last attended AP | L1 Basic Skills | A5 | pupils | L1 Basic Skills | A5 | Pupils |
| Current and Main | 15 | 52% | 9.8 | 8468 | 50% | 10.1 | 25362 |
| | 14 or below | 45% | 10.2 | 2207 | 43% | 10.5 | 5769 |
| Subsidiary or other | 15 | 61% | 14.1 | 3446 | 58% | 14.1 | 11174 |
| | 14 or below | 55% | 14.9 | 5217 | 55% | 15.8 | 15631 |
| All pupils accessing state-funded AP | | 54% | 12.0 | 19338 | 52% | 12.4 | 57936 |

Table 8 shows that just over half of pupils who attend state-funded schools go on to achieve level 1 basic skills. The average Attainment5 score for the 3 cohorts is 12.4. Given that there are 7 'slots' in the Attainment5 measure (English double-weighted, maths double-weighted and any 3 other subjects), this is equivalent to below grade 2 at GCSE on average[9]. Dual-rolled pupils, who only attend state-funded AP schools with a subsidiary or other registration, tend to achieve slightly higher results. This is likely to be the result of an increased propensity to return to mainstream schools. Pupils who remain in state-funded AP at age 15 tend to be slightly more likely to achieve level 1 basic skills than other pupils although their Attainment5 scores also tend to be slightly lower.

We can also examine differences in attainment between those who finish their compulsory schooling in state-funded AP schools with those who finish in mainstream schools. Based on pupils included in Performance Tables only, those completing Key Stage 4 in mainstream schools tend to be higher attaining than those attending state-funded AP schools who in turn tend to be higher attaining than those attending other forms of provision (Table 9).

[9] Grade 2 in English, maths and 3 other subjects would score 14 points under Attainment5.

Table 9: Summary attainment statistics by Key Stage 4 destination, all pupils attending state-funded AP schools and included in Performance Tables at age 1 , 2017 to 2019 cohorts

| | 2019 cohort | | | 2017 to 2019 cohorts | | |
|---|---|---|---|---|---|---|
| KS4 destination | L1 Basic Skills | A5 | Pupils | L1 Basic Skills | A5 | Pupils |
| State-funded AP schools | 54% | 10.2 | 7462 | 52% | 10.4 | 22692 |
| State-funded mainstream schools | 76% | 19.5 | 6498 | 75% | 20.3 | 19500 |
| Other known destination | 36% | 7.2 | 2826 | 34% | 7.5 | 8523 |

Differences in the extent to which pupils are re-integrated back into mainstream schools may therefore affect comparisons of attainment at state-funded AP schools.

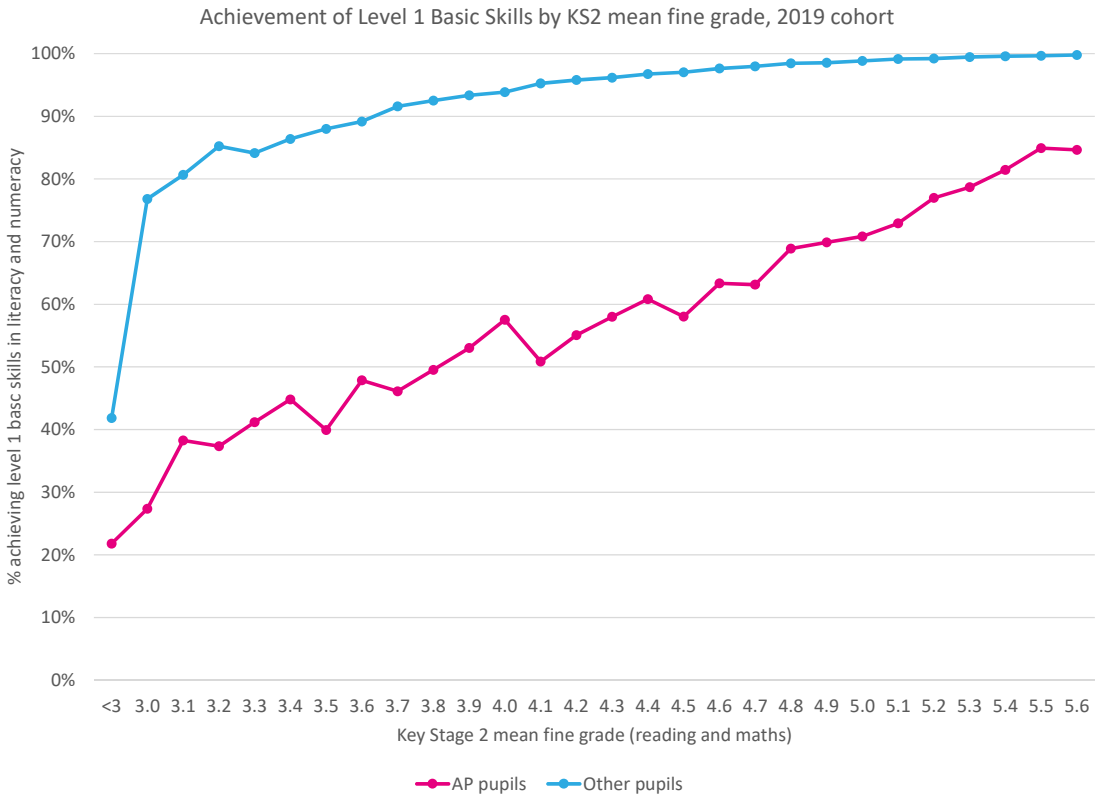
## Level 1 Basic Skills

Below we present some analysis of the Level 1 literacy and numeracy (basic skills) measure. This is based upon achieving Level 1 qualifications in both literacy and numeracy. We include GCSE grades 9-1 in English and maths, Level 2 functional skills in communication and numeracy and level 1 functional skills in communication and numeracy. These are all considered level 1 passes under this measure.

Table 8 showed that among the most recent cohort (those who turned 16 in 2018/19), 54% of pupils who attended state-funded AP schools with a current or main enrolment went on to achieve level 1 in literacy and numeracy. Some may have achieved this outside of the state-funded AP sector (e.g. in mainstream schools). By way of comparison, the national average for young people attending state-funded schools in 2019 was 95%.

In the chart below, we show how the probability of achieving level 1 or higher in basic skills increases in line with prior attainment at Key Stage 2. This is true for both pupils attending state-funded AP as well as pupils generally. However, the probability of achievement is somewhat lower in the AP sector across the prior attainment range.

Figure 3: Achievement of level 1 basic skills by KS2 mean fine grade, 2019 cohort




Similarly, as Table 10 shows, attainment in basic skills among state-funded AP pupils varies with respect to pupil characteristics. Pupils who enter the AP sector at a younger age tend to be lower attaining, as do those with a history of disadvantage, those to ever have had a EHC plan or statement of SEN and those classified as in need prior to entering AP.

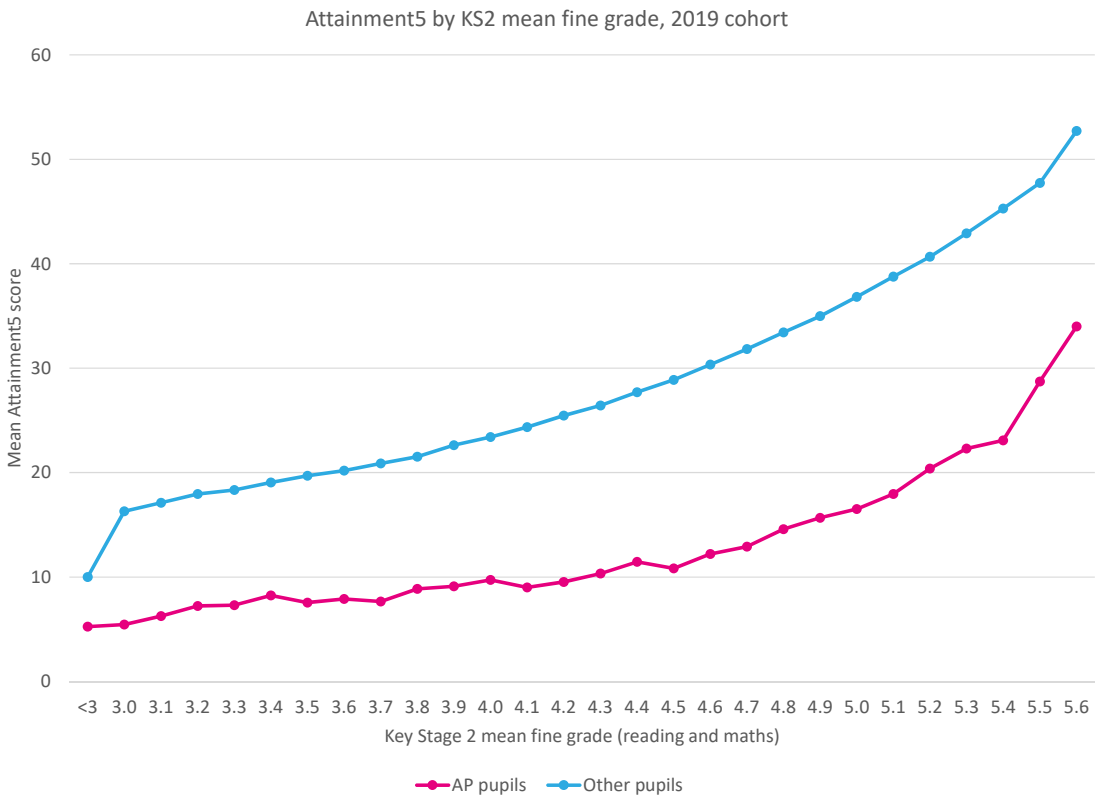
Table 10: Achievement of level 1 basic skills by characteristics, AP pupils, 2019 cohort

| Group | Category | L1 Basics | Pupils |
|---|---|---|---|
| Age first attending AP | <=9 | 35% | 418 |
| | 10 | 42% | 783 |
| | 11 | 40% | 1810 |
| | 12 | 39% | 3180 |
| | 13 | 45% | 4215 |
| | 14 | 53% | 5056 |
| | 15 | 57% | 3876 |
| Permanently excluded before entering A | No | 48% | 14544 |
| | Yes | 44% | 4794 |
| Managed move before entering AP | No | 47% | 17841 |
| | Yes | 51% | 1497 |
| Gender | Boys | 45% | 12643 |
| | Girls | 52% | 6695 |
| CIN before entering AP | No | 56% | 7908 |
| | Yes | 42% | 11430 |
| First language | English | 47% | 16709 |
| | Other | 48% | 2629 |
| FSM History | Never FSM | 57% | 6070 |
| | FSM <=25% | 51% | 2628 |
| | FSM 25 to 50% | 47% | 2714 |
| | FSM 50 to 80% | 40% | 3665 |
| | FSM>=80% | 40% | 4261 |
| EHCP or statement | Never | 50% | 16034 |
| | Ever | 34% | 3304 |
| SEMH/ BESD | Never | 56% | 7075 |
| | Ever | 43% | 12263 |
| All pupils ever attending AP | | 54% | 19338 |

## Attainment5

Analysis of the Attainment5 measure shows a similar pattern to the level 1 basic skills measure. Firstly, Figure 4 shows that Attainment5 scores for pupils who attend state-funded AP schools tend to be some way lower than those of pupils with similar Key Stage 2 attaining attending state-funded mainstream and special schools.

Figure 4: Attainment 5 by KS2 mean fine grade, 2019 cohort




As with the level 1 basic skills measure, pupils with EHCPs/ statements, the long-term disadvantaged, those previously in need and those with a previous permanent exclusion tend to be lower attaining (Table 11).

Table 11: Attainment5 by pupil characteristics, all pupils attending AP schools, 2019 cohort

| Group | Category | A5 | Pupils |
|---|---|---|---|
| Age first attending AP | <=9 | 8.1 | 418 |
| | 10 | 11.0 | 783 |
| | 11 | 9.6 | 1810 |
| | 12 | 9.0 | 3180 |
| | 13 | 9.9 | 4215 |
| | 14 | 11.6 | 5056 |
| | 15 | 12.3 | 3876 |
| Permanently excluded before entering AP | No | 11.3 | 14544 |
| | Yes | 8.4 | 4794 |
| Managed move before entering AP | No | 10.7 | 17841 |
| | Yes | 9.5 | 1497 |
| Gender | Boys | 9.5 | 12643 |
| | Girls | 12.7 | 6695 |
| CIN before entering AP | No | 14.1 | 7908 |
| | Yes | 8.3 | 11430 |
| First language | English | 10.3 | 16709 |
| | Other | 12.4 | 2629 |
| FSM History | Never FSM | 15.0 | 6070 |
| | FSM <=25% | 10.7 | 2628 |
| | FSM 25 to 50% | 9.6 | 2714 |
| | FSM 50 to 80% | 7.9 | 3665 |
| | FSM>=80% | 7.6 | 4261 |
| EHCP or statement | Never | 11.2 | 16034 |
| | Ever | 7.5 | 3304 |
| SEMH/ BESD | Never | 14.3 | 7075 |
| | Ever | 8.7 | 12263 |
| All pupils ever attending AP | | 12.1 | 19338 |

## To what extent does attainment vary between state-funded AP schools?

In this section, we examine how attainment varies between state-funded AP schools. We first calculate three-year averages for the level 1 basic skills and Attainment5 measures for all state-funded AP schools. This includes all those in the 2017 to 2019 cohorts. For the purposes of illustration we include all pupils but only include schools with at least 10 pupils. In the statistical appendices, we also produce school data separately for a) main enrolment (current and main registration) pupils and b) pupils with subsidiary and other registrations.

Figure 5 shows the percentage of pupils from each provider who subsequently achieved level 1 basic skills plotted against 3-year cohort size. The horizontal line denotes the 3-year national average for the sector (just below 50%). Smaller schools tend to have more variable results, hence the dashed lines serve to distinguish those whose results differ by more than chance variation. A similar plot is provided for Attainment5 (Figure 6). The Attainment5 and basic skills measures correlate reasonably strongly (r=0.72) at school level.

Figure 5: Percentage of AP pupils achieving level 1 basic skills at each state-funded AP school, all pupils ever on roll, 2017 to 2019 cohorts

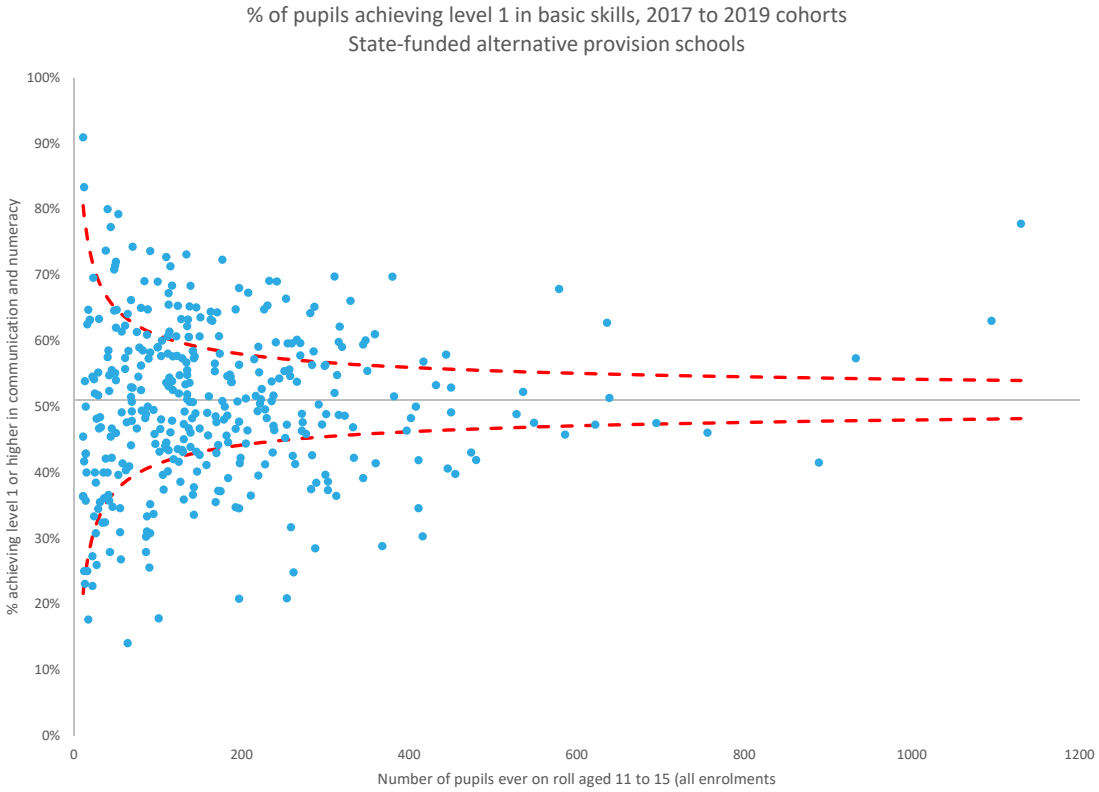
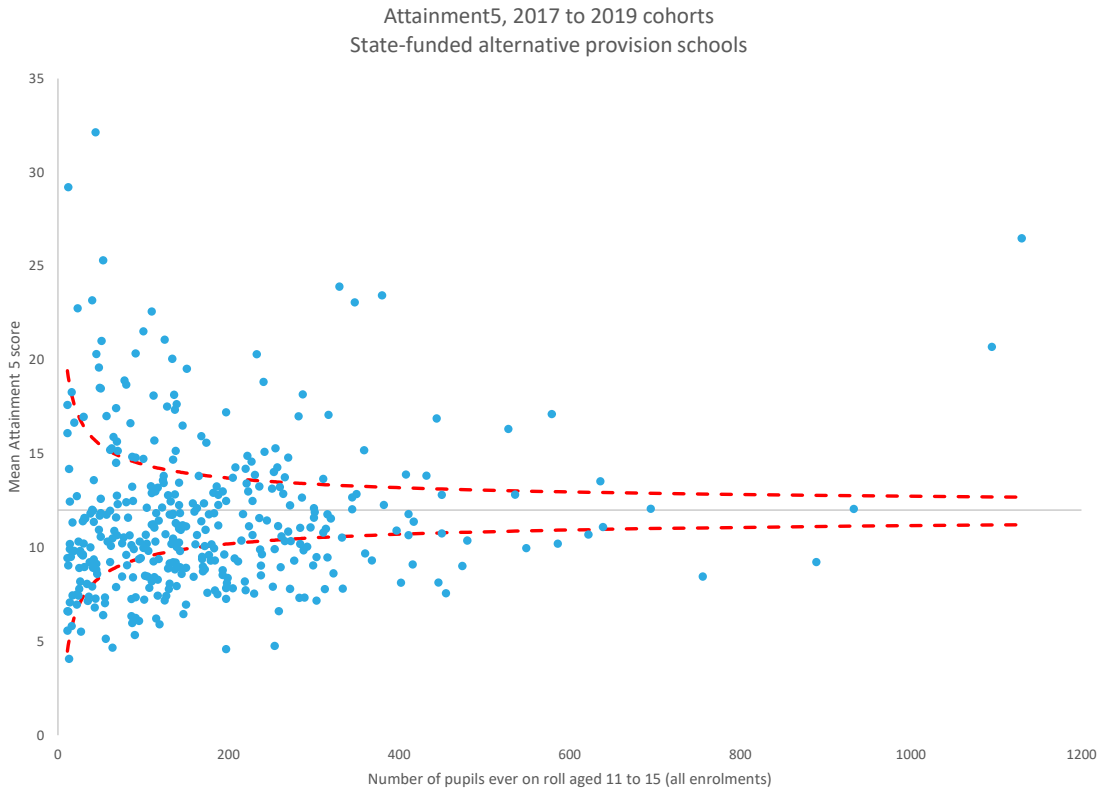



Figure 6: Mean Attainment5 scores at each state-funded AP school, all pupils ever on roll, 2017 to 2019 cohorts




Typically, analysis of the outcomes of pupils attending state-funded mainstream schools show that only around 10% to 15% of the variation in pupil attainment lies between schools, the remainder being within schools[10]. This means that efforts to improve schools would only have a modest impact on pupil attainment. Or put another way, differences in attainment between most schools are relatively modest.

Using the Attainment5 measure, we examine how much variation there is between state-funded AP schools using multilevel models. These models are estimated separately for a) all pupils, b) main enrolment pupils (current or main enrolment status), c) pupils with subsidiary or other registrations and d) those who complete KS4 in the state-funded sector.

### Table 12: Percentage of variance in Attainment5 between state-funded AP schools

| Enrolment Status | 2019 cohort | 2017 to 2019 cohorts |
|---|---|---|
| All pupils | 8% | 9% |
| Current or Main | 5% | 6% |
| Subsidiary or other | 9% | 8% |
| Pupils who completed KS4 at a state-funded AP school | 9% | 10% |

In general, Table 12 shows that there is very little variation between state-funded AP schools. As we shall see in the following section, this reduces further when controlling for differences in the characteristics of the pupils served by each school. Therefore, comparisons of

[10] https://www.nuffieldfoundation.org/sites/default/files/files/Better%20Schools%20for%20All%20-%20Final%20Report.pdf

attainment indicators for state-funded AP schools may not be particularly meaningful. However, it may be possible to identify schools which are particularly high or low attaining.

## Adjusting for differences in the pupil composition of state-funded AP schools

Given the preceding sections, we might expect attainment to vary between state-funded AP schools if they vary in the characteristics of the pupils they serve.

The two attainment measures can be contextualised by taking into account prior attainment and pupil characteristics. Further detail is provided in the Appendix. The measures used in the contextualisation process control for pupils' educational and social care histories prior to entering an AP school. These include variables typically used in contextual value added models for mainstream schools (LINK) plus further variables relevant to the AP sector such as exclusion history and type of registration.

The result of this is that we produce "estimated" achievement measures for each AP school. These represent notional "national averages" that take account of the specific characteristics of each provider. For example, an AP school with pupils with lower prior attainment and a higher incidence of disadvantage would have lower estimated achievement measures than the typical AP school.

Although Figure 4 and Table 11 showed that prior attainment and pupil characteristics were associated with Attainment5, they are not particularly predictive of it. The combination of factors used in the model explain around 30% of the variance in pupils' Attainment5 scores. By contrast, contextual models of school performance tend to account for around 65%[11]. In other words, other factors play a large part in the Attainment5 outcomes of pupils who attend state-funded AP schools. For many, these include the effects of the school to which they return following a spell at an AP school. But other unobserved factors, such as motivation, may also play a part.

Pupils who attend state-funded AP schools with an enrolment status of subsidiary or other tend to achieve higher Attainment5 scores than those with an enrolment status of current or main. The effect of contextualisation results in the latter group tending to achieve slightly higher scores (Table 13).

### Table 13: Attainment5 and Contextualised Attainment5 by enrolment status, 2019 cohort

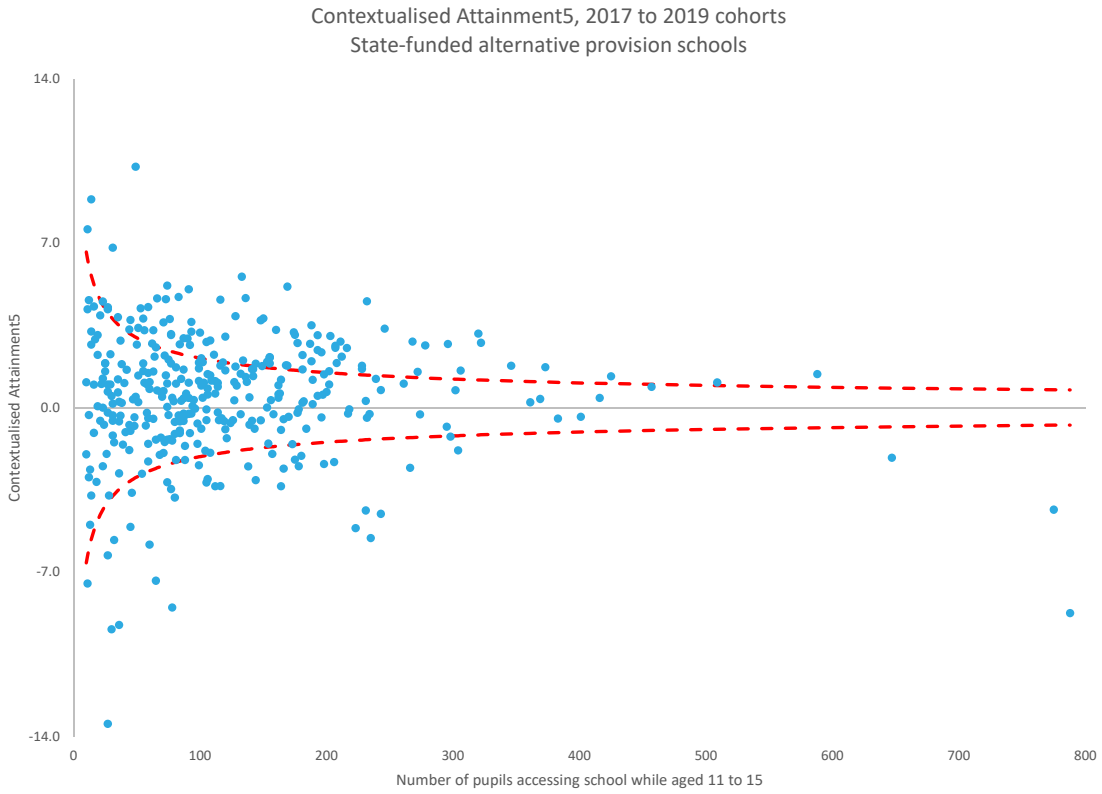
| Enrolment Status | A5 | Contextualised A5 | Pupils |
|---|---|---|---|
| Subsidiary or other | 14.2 | -0.7 | 9215 |
| Current or Main | 10.0 | 0.7 | 10123 |
| Difference | 4.2 | -1.4 | |
| All pupils | 12.0 | 0.0 | 19338 |

School-level contextualised Attainment5 measures for the three cohorts (2017 to 2019) combined are plotted in Figure 7. This time, attainment in line with expectation given the characteristics of pupils is denoted by the horizontal line at 0 and the points represent the

[11] https://ffteducationdatalab.org.uk/2021/03/report-all-models-are-wrong-some-of-these-might-be-useful/

extent to which mean Attainment 5 at each AP school exceeds or falls short of this benchmark. This chart still shows considerable variation between providers on this measure.

Figure 7: Contextualised Attainment 5, 2017 to 2019 cohorts




Calculating Attainment5 and Contextualised Attainment5 scores for each year gives an indication of how stable the scores are. If the correlation is low then this suggests that we are not measuring something that is consistent from year to year. Although we might expect some change over time in which schools might be identified as higher-performing, we would still expect some consistency from one year to the next. Correlations between years based on state-funded AP schools with at least 10 pupils in each cohort are shown in Table 14.

Table 14: Correlation between Attainment5 and Contextualised Attainment5 scores by year, state-funded AP schools

| Measure | | 2001 | 2002 |
|---|---|---|---|
| Attainment 5 | 2002 | 0.76 | |
| | 2003 | 0.74 | 0.84 |
| Contextualised Attainment5 | 2002 | 0.55 | |
| | 2003 | 0.53 | 0.67 |

As might be expected, measures for 2003 correlated more strongly with measures from the previous year than from two years earlier. Overall, the Attainment5 measure is more stable from year to year than the contextualised Attainment5 measure.

As the contextualisation model only accounts for a small proportion of the variance in Attainment5 scores, the unadjusted Attainment5 and contextualised Attainment5 scores correlate strongly with each other.

Table 15: Correlation between uncontextualised and contextualised Attainment5 scores, 2017 to 2019 cohorts

| Cohort | Correlation |
|---|---|
| 2017 | 0.87 |
| 2018 | 0.85 |
| 2019 | 0.86 |

The use of statistical models within the contextualisation models comes at the cost of transparency. An alternative might be to compare AP schools with similar pupil intakes. Examples of this approach are presented in Annex 2.

## Attendance

The National Pupil Database collects termly attendance/ absence data from all state-funded schools, including AP schools.

We have some concerns about the coverage of the absence data for AP schools. We estimate that absence data for the 2018 academic year is missing for approximately 10% of compulsory age pupils we observe attending state-funded AP in School Census. In a small number of cases, this occurs because a school closes. As absence data is collected a term in arrears, it cannot be supplied by schools which have closed. Among other schools, pupils with subsidiary or other registrations are more likely to have missing absence data (13% in 2018 compared to 6% among pupils with current or main registrations). Pupils who join an AP school in the second half of the summer term account for around 70% of the missing records. Absence data for Year 11 pupils is not recorded in the second half-term of Summer (due to study leave) but this only accounts for a small proportion (around 20%) of missing data.

With that caveat notwithstanding, absence rates for 2017 to 2019 can be calculated for AP schools. Unlike the attainment measures which were based solely on 15 year olds, here we include all pupils aged 11 to 15. We include all pupils regardless of their enrolment status.

Summary data for the whole sector is presented in Table 16 below. It can be seen that absence rates are high and have been increasing over the last three years. By way of comparison, 5.5% of sessions were missed in the state-funded secondary schools in 2019[12].

[12] https://www.gov.uk/government/statistics/pupil-absence-in-schools-in-england-2018-to-2019

Table 16: Absence in state-funded AP schools by pupil characteristics 2017 to 2019

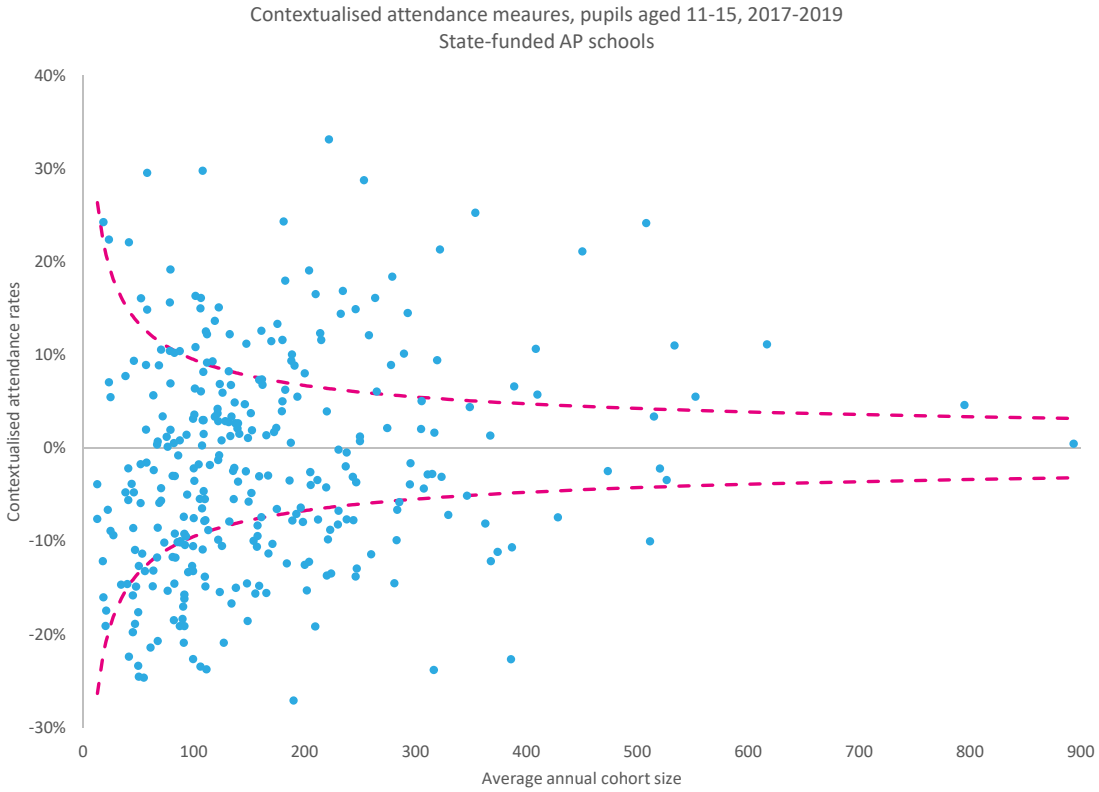
| Group | Category | Possible Sessions (thousands) | Absences (thousands) | Pupils | % absence |
|---|---|---|---|---|---|
| Age group | 12 | 682 | 202 | 4854 | 30% |
| | 13 | 2190 | 694 | 12052 | 32% |
| | 14 | 3944 | 1404 | 19265 | 36% |
| | 15 | 6214 | 2406 | 26654 | 39% |
| | 16 | 8004 | 3094 | 35844 | 39% |
| Ever permanently excluded | No | 13702 | 4948 | 50410 | 36% |
| | Yes | 7332 | 2852 | 20280 | 39% |
| Ever managed move | No | 19126 | 7098 | 66112 | 37% |
| | Yes | 1908 | 702 | 5682 | 37% |
| Gender | Boys | 14366 | 5242 | 45994 | 36% |
| | Girls | 6650 | 2552 | 24067 | 38% |
| CIN | Never | 6168 | 2024 | 24842 | 33% |
| | Ever | 14866 | 5776 | 46264 | 39% |
| First language | English | 18864 | 7151 | 61177 | 38% |
| | Other | 2170 | 649 | 9034 | 30% |
| FSM history | Never FSM | 5109 | 1733 | 21037 | 34% |
| | FSM <25% terms | 2593 | 935 | 8996 | 36% |
| | FSM>=25% terms | 2709 | 1014 | 9271 | 37% |
| | FSM>=50% terms | 4269 | 1630 | 13634 | 38% |
| | FSM>=80% terms | 6354 | 2489 | 19025 | 39% |
| Ever EHCP or statement | No | 18581 | 6959 | 63252 | 37% |
| | Yes | 2453 | 841 | 8845 | 34% |
| Ever SEMH/ BESD | No | 5698 | 2039 | 28975 | 36% |
| | Yes | 15336 | 5761 | 44922 | 38% |
| Enrolment status | Main/ Current | 7627 | 2737 | 38054 | 36% |
| | Subsidiary/ Other | 13407 | 5063 | 38856 | 38% |
| Academic year | 2016/17 | 6918 | 2488 | 32992 | 36% |
| | 2017/18 | 7010 | 2630 | 33142 | 38% |
| | 2018/19 | 7106 | 2682 | 32535 | 38% |
| | 3 years | 21034 | 7800 | 70147 | 37% |

Older pupils, the most disadvantaged and those ever to have been classified as in need in are more likely to be absent.

As with attainment, the mix of pupils attending state-funded AP schools affects the comparability of absence rates. Contextualised absence rates can be calculated for each AP school which takes account of the characteristics of pupils on roll.

For the purposes of illustration, we show contextualised attendance rates for each AP school for the last three years combined in Figure 8. We have switched from absence to attendance so that positive values indicate better performance. Each AP school's attendance rate is compared against a national rate that takes account a) the age of pupils and b) whether they have ever been permanently excluded. Other characteristics could be included.

Figure 8: Contextualised attendance measures, pupils aged 11-15, state-funded AP schools, 2017 to 2019

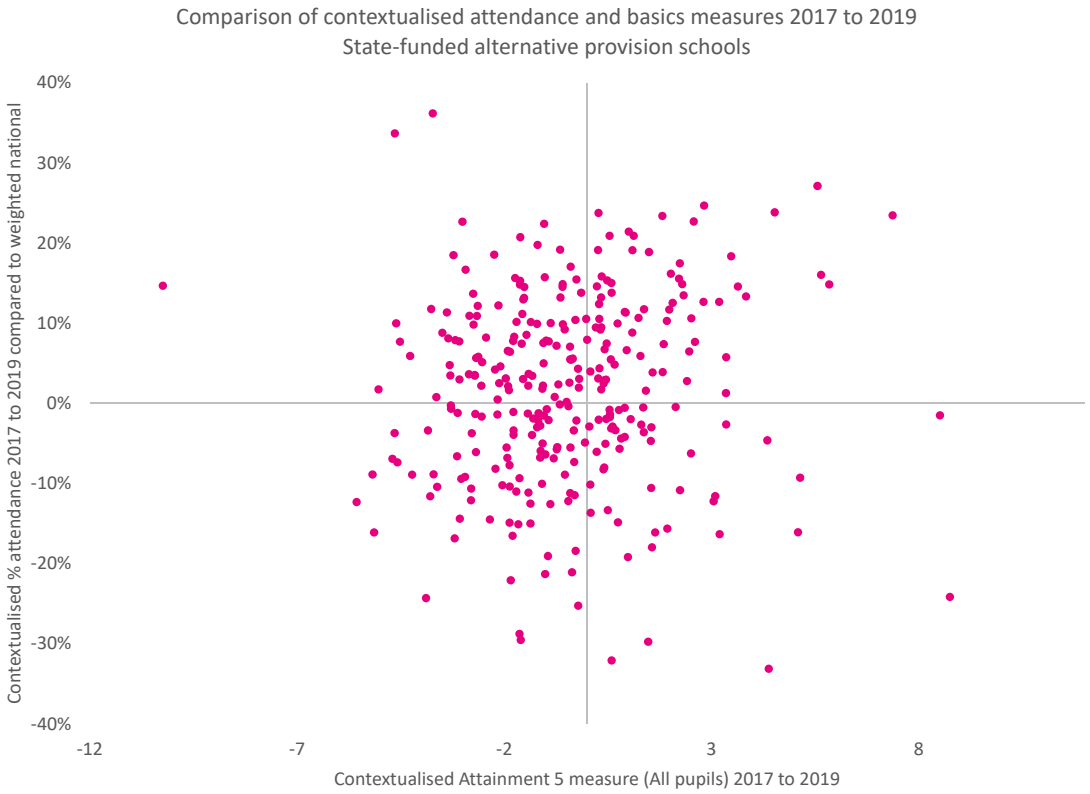



## Identifying high-performing state-funded AP schools

To what extent is there overlap between the AP schools with higher levels of contextualised attainment and higher levels of contextualised attendance?

In order to answer this, we plot the two measures against each other in Figure 9 below. Schools with at least 30 pupils in the three-year contextualised attainment measure are included (i.e. on average 10 pupils per cohort). There is hardly any correlation between the two measures (r=0.07). Those plotted in the upper-right quadrant are above average for both contextualised attainment and contextualised attendance.

Figure 9: Contextualised attainment and attendance measures, 2017 to 2019




Out of 296 state-funded AP schools for which we have both a) 2019 absence data and b) at least 30 pupils included in the 3-year contextualised Attainment 5 measure, we identify 35 above average on both measures.

An initial exploration of the characteristics of pupils who attend outlier schools compared to others shows that the outlier schools tend to have fewer pupils who had been permanently excluded prior to admission, fewer disadvantaged pupils and more girls (Table 17). Some further work may be needed to identify schools which are achieving stronger outcomes with more challenging intakes.

Table 17: Characteristics of pupils attending outlier schools and other AP schools, 2017 to 2019 cohort

| | Outlier AP schools | Other AP schools |
|---|---|---|
| Mean cohort size | 64.9 | 70.8 |
| % pupils with current or main enrolment size | 47% | 53% |
| % permanently excluded before admission | 17% | 25% |
| % managed move before admission | 5% | 8% |
| % CIN before admission | 56% | 59% |
| % CIN (ever) | 65% | 69% |
| % FSM (ever) | 66% | 71% |
| % long-term disadvantaged | 19% | 23% |
| % girls | 43% | 35% |
| % EHCP or statement (ever) | 15% | 16% |
| % SEMH/ BESD (ever) | 67% | 65% |
| Number of schools | 35 | 261 |
| Number of pupils | 6813 | 55433 |

## Appendix: Contextualised Attainment

The variables included in the contextualised attainment measure are:

- Key Stage 2 mean fine grade
- Age first entered state-funded AP sector
- Gender
- First language (English/ other)
- Ethnic background (20 categories)
- Ever had EHC plan or statement of SEN
- Ever recorded as having a primary SEND need of BESD or SEMH
- Free school meal history (5 categories)
- Permanently excluded prior to entering AP sector
- Managed move before entering AP sector
- Child in need before entering AP sector
- Interaction between EHC plan and BESD/SEMH
- Interaction of age and permanent exclusion
- Interaction of first language and free school meal history

A logistic regression model is fitted in STATA, regressing the above on the achievement of level 1 basic skills. This estimates the probability of a pupil achieving level 1 basic skills in terms of the above. For the Attainment5 measure, ordinary least squares regression is used.

Key Stage 2 mean fine grade is not available for some pupils. In these cases, Key Stage 2 mean fine grade is imputed in a pre-processing step.

Some pupils attend more than one state-funded AP school. Where this is the case, weighting is used. A pupil who attends 2 state-funded AP schools is weighted 1/2 at each school.

## Annex 1: Qualifications entered by Year 11 pupils at AP Schools

Establishing the qualifications offered by alternative provision (AP) schools[13] is made difficult by the short-term nature of many AP placements, with pupils returning to other schools to take GCSEs and equivalent qualifications.

However, we can observe the qualifications taken by a subset of the AP population, those who complete Key Stage 4 within the sector.

Just over 8 thousand pupils at AP schools were included in national end of Key Stage 4 statistics in 2019[14]. (LINK), this is less than half of all pupils who experienced AP during their secondary education.

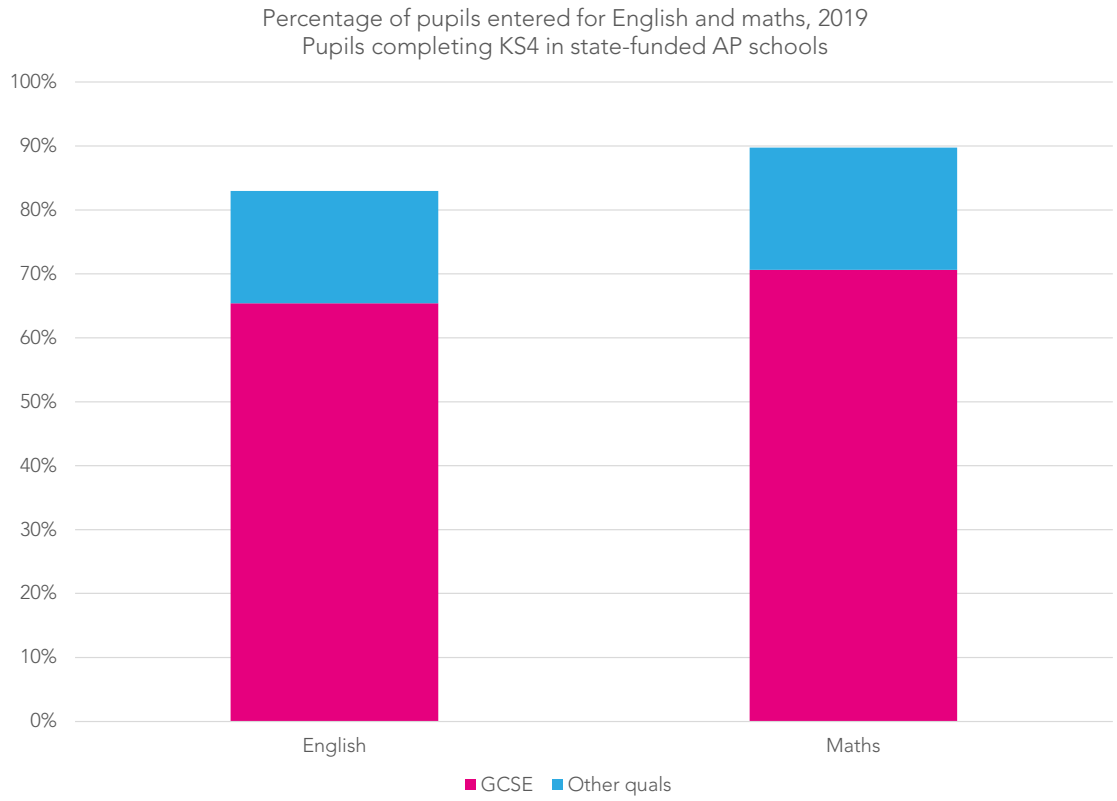
Published Key Stage 4 statistics for 2019 include qualifications taken in years up to and including 2019. For some pupils, this includes qualifications taken at other schools and settings. In the analysis that follows, we distinguish between qualifications taken at the AP school against which pupils are recorded at KS4 and qualifications taken in other schools and settings.

### English and maths

Firstly, we see that 83% of pupils entered a qualification in English and 90% in maths. The majority of pupils entered GCSEs, with the remainder entering other types of qualifications such as functional skills and entry level certificates.

[13] Pupil referral units, alternative provision free schools and academies

[14] Unlike in other parts of our analysis, we include pupils who might have been held back a year at some point in their school career and so complete Key Stage 4 at 17 rather than 16.




## Number of other qualifications entered

In terms of other qualifications, for each pupil we count the number of distinct subjects (other than English and maths) they entered using the discounting codes used by the Department for Education (DfE) in producing Key Stage 4 statistics. In the table below, we summarise the number of subjects entered broken down by a) the setting where subjects were entered and b) the years in which subjects were entered. This allows us to compare the number of subjects entered in 2019 at the AP school where Key Stage 4 was completed to the total number of subjects entered.

### Table 18: Number of subjects other than English and maths entered, 2019 end of KS4 cohort in AP schools

| Setting where subjects entered | Years when subject entered | Number of subjects entered | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Average | 1+ | 2+ | 3+ | 4+ | 5+ | Pupils |
| All schools | All years | 2.45 | 78% | 58% | 44% | 30% | 18% | 8056 |
| | 2019 only | 2.12 | 72% | 53% | 38% | 25% | 14% | 8056 |
| AP school | All years | 1.91 | 65% | 47% | 34% | 22% | 13% | 8056 |
| | 2019 only | 1.75 | 62% | 45% | 31% | 20% | 11% | 8056 |

Including all qualifications entered, pupils who completed Key Stage 4 in AP schools entered 2.45 subjects other than English and maths. This falls to 1.75 when limited to subjects entered at their AP school in 2019. Over half of pupils entered at least 2 other subjects although more than one in five (22%) entered none.

We also show in Table 2 the number of subjects entered by pupils in addition to English and maths, including functional skills. Overall, 41% of pupils entered 3 or more qualifications in addition to English and maths when including qualifications taken in all settings and in all years. However, this fell to 28% based on qualifications entered at AP schools in 2019.

### Table 19: Number of subjects entered in addition to English and maths, 2019 end of KS4 cohort in AP schools

| Setting where subjects entered | Years when subject entered | Number of subjects entered in addition to English and maths | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1+ | 2+ | 3+ | 4+ | 5+ | Pupils |
| All schools | All years | 68% | 54% | 41% | 28% | 17% | 68% |
| | 2019 only | 61% | 47% | 35% | 22% | 13% | 61% |
| AP school | All years | 57% | 43% | 31% | 21% | 12% | 57% |
| | 2019 only | 52% | 39% | 28% | 18% | 10% | 52% |

School-level data for larger AP schools[15] is included in the appendix. This is based on the first row in the table above, so includes all qualifications taken up to 2019 in all schools and settings. This shows a wide range of entry patterns, ranging from no pupils being entered for GCSE English and maths to all pupils being entered.

## Popular subjects

In total, the 8 thousand pupils who completed KS4 at AP schools entered 164 different subjects. However, these can be nested into a set of 16 groups. Table 3 summarises the number of pupils with at least one qualification entry in a subject group.

### Table 20: Number of pupils entering subjects by group, 2019 end of KS4 cohort in AP schools

| Subject Group | Entrants | Pupils | Percentage |
|---|---|---|---|
| Science | 3674 | 8056 | 46% |
| Preparation for life and work | 2415 | 8056 | 30% |
| Art and design | 1619 | 8056 | 20% |
| Humanities and social science | 1566 | 8056 | 19% |
| ICT and computing | 1243 | 8056 | 15% |
| Sport and leisure | 1057 | 8056 | 13% |
| Food and nutrition | 1023 | 8056 | 13% |
| Creative arts | 720 | 8056 | 9% |
| Construction | 476 | 8056 | 6% |
| Design, technology and engineering | 473 | 8056 | 6% |
| Personal services | 377 | 8056 | 5% |
| Business | 375 | 8056 | 5% |
| Health | 313 | 8056 | 4% |
| Languages | 233 | 8056 | 3% |
| Land studies | 79 | 8056 | 1% |
| Other | 45 | 8056 | 1% |

[15] 20 or more pupils at the end of Key Stage 4 in 2019

46% of pupils entered a qualification in science, primarily GCSE biology or GCSE double science. A third entered a preparation for work qualification. Smaller proportions of pupils entered qualifications in other subject groups.

### Table 21: Most popular qualifications (excluding English and maths), 2019 end of KS4 cohort at AP schools

| Subject Group | Qualification | Subject | Entries |
|---|---|---|---|
| Art & Design | GCSE | Art & Design | 842 |
| | GCSE | Art & Design (Fine Art) | 420 |
| Food, nutrition | BTEC Award Level 2 | Cookery- Domestic | 506 |
| | BTEC Award Level 1 | Cookery- Domestic | 332 |
| ICT and computing | Functional Skill ELQ | Computer Appreciation / Introduction | 387 |
| Preparation for life and work | VRQ Level 1 | Preparation for Work | 643 |
| | Level1/2 certificates | Preparation for Work | 463 |
| | VRQ Level 1 | Personal Finance | 303 |
| | VRQ Level 1 | Self Development | 330 |
| Science | GCSE | Biology | 1345 |
| | GCSE | Science: Double Award | 1497 |
| | ELQ Band C | Science SA | 1008 |
| Humanities and social science | GCSE | Social Science: Citizenship | 398 |
| | GCSE | Geography | 303 |
| | GCSE | History | 307 |
| | GCSE | Religious Studies | 324 |
| | GCSE (short) | Religious Studies | 304 |

## Annex 2: Creating groups of similar AP schools

One of the main disadvantages of the approach to contextualizing performance measures outlined in the main report is that it is somewhat opaque and difficult to explain clearly to users.

An alternative approach is to compare an AP school to those that are most similar in terms of the characteristics of the pupils it works with.

There are several options for achieving this. Firstly, a decision needs to be taken whether to:

1. Create a small set of "fixed" benchmark groups. Under this method, there would be a fixed number of groups of AP schools and all AP schools in the group would be considered "similar" to the others
2. Create a set of similar schools for each AP school. Under this method, each AP school would have its own set of similar schools

Under option 2, each AP school would be matched with the AP schools most similar to it. Under option 1, the most similar AP school for a particular school may not necessarily be in the same benchmark group.

We then have to consider whether to calculate similarity based on:

a. Past pupils. This may be the most appropriate option if benchmarking historic outcomes is the main purpose.
b. Current pupils. This may be the most appropriate option if encouraging collaboration is the main purpose.
c. Some combination of past and current pupils.

For the purposes of this illustration, we calculate 1 and 2 based on option b.

Both 1 and 2 are based on a set of indicators for each AP school with secondary-age pupils which we have derived. As a minimum, it includes data on the characteristics of the pupils served by each school. However, it could be extended to include other data on resources, staffing and past performance.

The indicators calculated summarise the pupil population of each AP school for each of the years 2017 to 2019:

- Number of pupils on roll at any point during the academic year
- % of pupils of year 11 age
- % of pupils enrolled with a current or main registration
- % of pupils to have been permanently excluded
- % of pupils with a statement/ EHCP
- % of pupils to have been identified as having behavioural, emotional and social difficulties or social and mental health issues
- % of pupils to have ever received free school meals
- % of pupils long-term disadvantaged
- % of pupils to have ever been in need

## Option one: Fixed groups

This method uses *cluster analysis* to divide AP schools into groups based on data from 2019. Cluster analysis is a type of unsupervised machine learning that allows us to create groups, or clusters, that are similar to one another on a set of variables of interest.

We excluded any schools with less than 30 pupils on roll during an academic year. K-means cluster analysis was then carried out on data to group the schools together.

### Determining the number of fixed groups

There are a number of ways to determine the optimal number of groups to use in cluster analysis. In this case, we applied three different methods, the elbow, silhouette and gap statistic methods, and ultimately created five clusters.

However, there is some subjectivity involved in determining the optimal number of clusters even when these methods are applied. It is also possible that if we apply the same analysis to data from another year, the optimal number of clusters may be more or less than five, which could be confusing for users and cause issues with consistency over time. For this reason, it might be more useful to use a consistent number of groups each time the analysis is applied rather than to try and determine the optimal number for each year's data.

### Group characteristics

The five groups that we created for this illustration had distinctive characteristics. These are shown in figure 1 overleaf.

The first group has a relatively high proportion of SEN pupils with an education, health and social care plan (EHCP) and / or behavioural, emotional and social difficulties (BESD); on average, schools in this group have 64% of pupils with an EHCP, compared to 10% in all AP schools, and 90% with BESD, compared to 67% overall. This group also has a higher proportion of pupils whose current or main registration is at the AP school rather than elsewhere (81% compared to 57% overall) and a lower proportion of pupils who have been permanently excluded (11% compared to 34% overall), and they tend to be smaller schools (54 pupils on average compared to 115 overall).

The second group includes schools with a relatively high proportion of pupils who have been permanently excluded, at 53% on average compared to 34% overall. It also has a particularly high proportion of both disadvantaged pupils, both those who have ever been eligible for free school meals (81% compared to 73% overall) and those who are long-term disadvantaged (29% compared to 23% overall).

Schools in the third group tend to have a relatively high number of pupils (249 on average compared to 115 overall) with a varied intake. The fourth group also included schools with a varied intake in terms of pupil characteristics and school history, but with a low to average number of pupils (93 compared to 115 overall) and a relatively low proportion of pupils who had been excluded (21% compared to 34% overall) or were in AP on a current or main registration (46% compared to 57% overall)

Finally, the fifth group includes schools in which relatively few pupils are attending on a current or main registration (23% compared to 57% overall) or have been permanently excluded (5% compared to 34% overall). Schools in this group tend to have fewer pupils who have BESD or have been refereed to social services; 47% of pupils have BESD compared to 67% overall and 56% have been referred for a CIN assessment compared to 69% overall). They have fewer disadvantaged pupils (53%

Figure 1: Mean values for each variable of interest by cluster, shown as z-scores[16]


[16] Z-scores are used to convert variables that are on different scales to a common scale. Z-scores follow a standard normal distribution; a z-score of zero is average and a z-score of one is one standard distribution above the mean.

were ever eligible for FSM compared to 73% overall) and more female pupils (58% compared to 34% overall).

### Stability over time

As mentioned above, the optimal number of fixed groups will not necessarily be consistent if cluster analysis is carried out on data from different years. But for the purposes of this illustration, we have chosen to apply cluster analysis to create five fixed groups based on data from 2017 and 2018, which we can then compare to the fixed groups based on 2019 data.

The characteristics of the five groups were fairly similar for each year. The majority of schools (53%) were in the 'same' group for each year from 2017-19, and 85% for at least two of the three years. This rises to 77% and 99% for schools in the second group, and 75% and 98% of schools in the fifth group. The second group tends to have a high proportion of pupils who have been excluded and who are on a current or main registration in the AP school, more disadvantaged pupils and fewer girls, and the fifth group is the opposite. This suggests that schools with these two patterns of intake tend to consistently work with similar pupils over time, but other schools may not.

Cluster analysis will ultimately be more successful for schools with an intake that is typical of one cluster, but may be less successful for borderline cases.

## Option two: Schools like yours

This method works in the same way as our *Schools Like Yours* website (LINK).

The indicators used in the process all have their own distributions and ranges. Some are on different scales. To get around these issues, we first standardise each school-level indicator for each year using the school-level mean and standard deviation.

We then calculate the average difference in standardised indicators between every pair of AP schools. This acts as a similarity index. Using the index, the most similar 30 AP schools for each AP school can be identified.

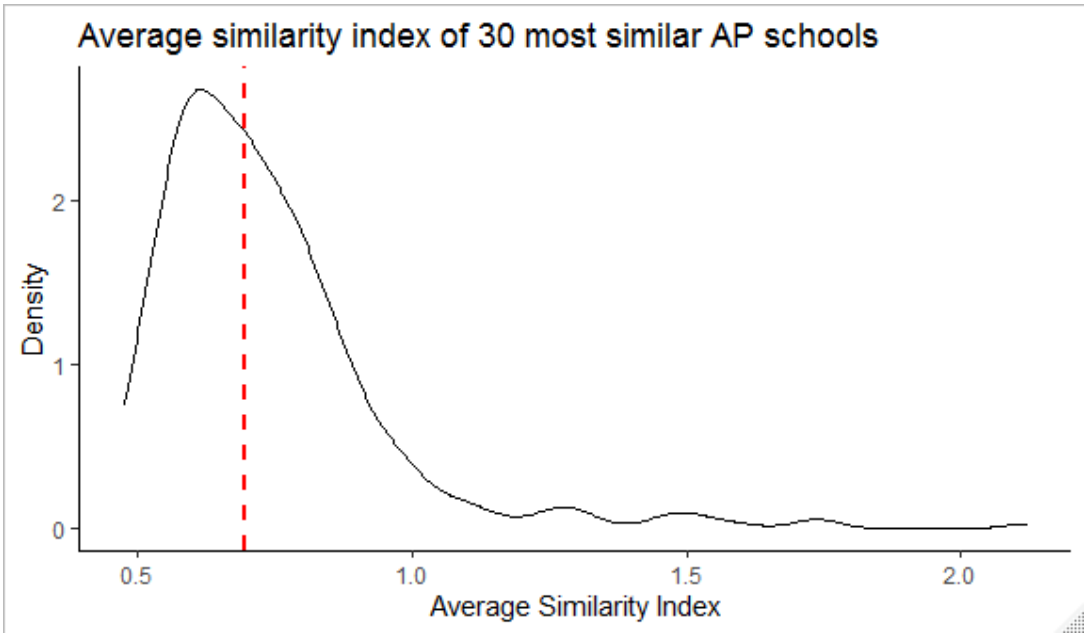
In practice, we would suggest giving users the facility to create their own sets of similar schools based on the indicators they consider most relevant to them. When using large sets of indicators in the similarity index, the results can be fairly "broad brush" and the resulting similar schools may not be especially similar on any single indicator.

### How similar are similar schools?

The average standardised difference acts as a similarity index. As a rough rule of thumb, we treat a similarity index of 0.5 or lower as indicating a close neighbour of a school. On average, each of the 325 AP schools we included in the measure for 2019 had 3.4 close neighbours with a range from 1 to 17. This would suggest that some of the AP schools are relatively dissimilar to all others.

In the density plot (a type of smoothed histogram) below, we plot the average similarity between each AP school and each of its 30 most similar schools. It shows that for the majority, the average similarity index is between 0.47 and 0.91 (277 out of 314 AP schools with at least 10 secondary-age pupils in 2019). The median average similarity index of 0.69 is shown by the dashed red line.  However, there is a tail of schools where the average similarity index is somewhat higher, exceeding 1 for 21 schools. These are AP schools which

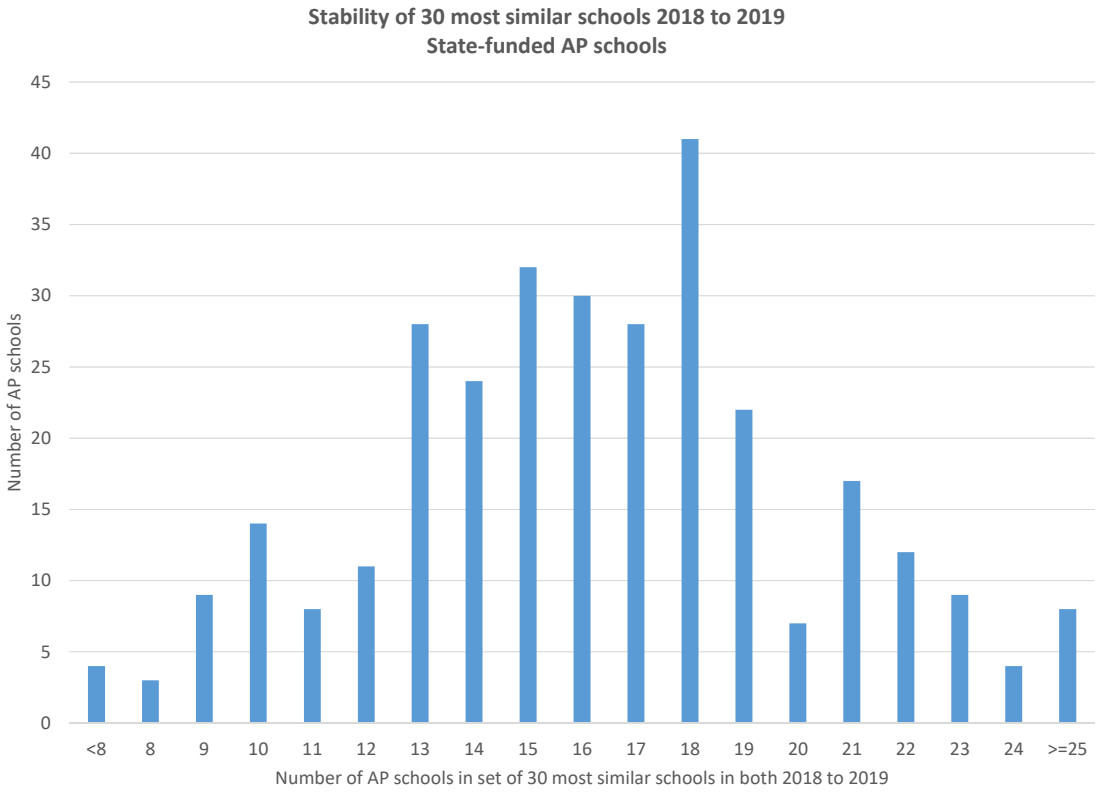
particularly differ in the characteristics of the pupils they serve compared to other AP schools.




## Stability of similar schools

If we were to calculate similar schools based on the characteristics of pupils on roll in a given year, how much change would there be if we updated each school's set of similar schools the following year?

To test this, we compared the set of the 30 most similar schools for each AP school in 2018 to the 30 most similar in 2019. The results are summarised in the chart below. Briefly, the modal number of similar schools in common to both years is 18. 95% of AP schools have at least 10 similar schools in common to both years, and 18% have at least 20. In other words, there is some stability, but there is also a degree of change.


Stability of 30 most similar schools 2018 to 2019
State-funded AP schools
Number of AP schools
45
40
35
30
25
20
15
10
5
0
<8
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
>=25
Number of AP schools in set of 30 most similar schools in both 2018 to 2019