

A narrowing path to success?

16-19 curriculum breadth and employment outcomes

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Executive summary

In general, students in England study a wide range of subjects during secondary school. However, unlike in many other countries, our upper-secondary (or 16-19) phase of education narrows this breadth of study to just a handful of subjects for most students. This narrowness has been effective in preparing students' transitions to higher education for continued study in the corresponding subjects. However, it is less clear whether this early narrowing is helpful or detrimental to young people's success in the labour market. In this research we consider trends in the diversity of level 3 (A levels or equivalent) qualifications taken by 16-19-year olds. Specifically, we count how many of the following subject groupings students have taken qualifications from:

- science, technology & engineering
- mathematics
- languages
- humanities, arts & social sciences
- vocational and professional.

Using new sources that link administrative data from schools, further education and higher education records with job records we then consider the relationship between young people's breadth of study and their subsequent employment outcomes.

Key Findings

The proportion of students with qualifications from three or more subject groups has halved since 2010

The majority of this decline took place between 2016 and 2019, with a 14-percentage-point fall over that period. Correspondingly, the proportion of students taking qualifications from only one or two subject groups has increased by 8 and 6 percentage points respectively. Since 2017 the average student has taken subjects from fewer than two subject groups. Only one in 100 students now takes qualifications from four or more subject groups, down from almost one in 10 in 2010.

This decline appears to be driven by the fall in the number of qualifications taken following reforms to A levels and AS levels

The decline in breadth very closely follows falls in the number of qualifications taken. The average number of qualifications taken fell by 43 per cent between 2016 and 2019, from five to three. This fall in turn is almost entirely due to a drop in the number of AS levels, following the decoupling of A levels and AS levels and a reduction in funding in recent years. This has resulted in total qualification provision decreasing by 8 per cent or around 71 teaching hours per student.

Breadth of study for students taking three qualifications has increased

For students taking three A levels (or other equivalent qualifications with the same teaching hours), there has been an increase in breadth in recent years. Since 2017 students from this group have become 50 per cent more likely to take a qualification from a different subject group.

Students with higher GCSE English and maths grades and lower levels of disadvantage are likely to study a broader range of subjects at A-level

On average, students achieving an average of a standard pass (grade 4) in GCSE English and maths take qualifications from one subject group, whilst students with a grade 7 or above take qualifications from two or more areas. Both disadvantaged students and students with special educational needs are less likely to study a broad range of subjects. Students from Chinese and Indian heritage study the broadest range of subjects on average, whilst Black Caribbean and Gypsy or Roma students study the narrowest range of subjects on average. These differences appear driven by the lower average prior attainment of these groups and persist even when comparing students taking the same number of qualifications.

Without controlling for other differences, students who studied subjects from more subject groups had higher earnings during their mid-twenties

Of 26 year olds who had achieved at least a bachelor's degree and were in employment, those who studied 16-19 qualifications from more subject groups had higher earnings on average. Women who had taken qualifications from all five subject groups averaged earnings of £26k (in 2016/17), compared with £19k for those who had taken qualifications from only one subject group. The corresponding figures for men were £28k and £21k. Even students taking qualifications from two subject groups had higher earnings than those taking qualifications from only one. Both women and men with qualifications from two subject groups earned £2.5k more than those with qualifications from only one subject group. However, those with qualifications from more subject groups also had other characteristics known to lead to higher earnings, such as higher educational attainment.

When comparing young people of similar backgrounds and educational attainment, some subject breadth is associated with marginally higher earnings by age 26.

Much of the difference in earnings associated with breadth can be explained by the higher attainment of those who had studied a wider variety of subjects during the 16-19 phase, as well as other differences in their background and education. Once these factors are considered, those taking qualifications from two or more subject groups earn around three to four per cent more than those taking qualifications from only one subject group. Whilst this difference is small, at age 26 it is comparable in size to factors such as the higher education institution attended or socio-economic status, the effects of which (on earnings) continue to grow during individuals' thirties and forties. There is no discernible difference between the earnings of those with qualifications from two subject groups and those with qualifications from more than two areas, once other factors are considered.

Breadth does not appear to have any association with the probability of being in employment or education at age 26 once attainment is considered

In general, greater breadth is associated with a higher probability of being in employment or education at age 26, though this is not the case for those with the very highest breadth scores. However, once we control for personal characteristics and educational attainment, apparent benefits to having studied a broader range of subjects disappears.

Conclusions and implications for policy

Our research indicates that young people who have at least some variety in the type of subjects they study during the 16-19 phase go on to have higher earnings. The difference is small during individual's mid-twenties but is in line with other factors that continue to grow in importance during a career. Using employment data only for individuals up to the age of 26 our research cannot definitively show that this is also the case for curriculum breadth. But as a broader set of skills is likely to help individuals' transition into a broader set of roles, for example opening up opportunities in different sectors or following unemployment, it certainly seems unlikely that its importance will diminish. We propose that our research should be updated when the LEO data has been established for long enough to consider employment outcomes in individual's mid-thirties.

Our research has also highlighted that an overall fall in the number of qualifications taken by young people is behind the reduction in the diversity of 16-19 study programmes. Reforms to A and AS levels have led to a substantial fall in the amount of teaching time that young people receive during this phase. Real term falls in 16-19 funding, alongside a funding formula that provides no incentive to offer an AS level in addition to three A levels (or equivalent applied or vocational qualifications), have most likely exacerbated the impact of these qualification reforms.

To reverse the recent fall in provision and breadth the government must undertake a wholesale review of 16-19 funding. We have previously provided evidence for an increase in funding levels, including greater funding for young people from lower income or disadvantaged backgrounds (Tuckett, Robinson, and Bunting 2021). These changes will help reduce overall funding pressures but must go together with a funding formula that no longer discourages breadth as provided by smaller additional qualifications such as AS levels.

When the government undertook their reforms of A and AS levels they were keen to preserve the additional breadth offered by AS levels (Rt Hon Michael Gove MP 2013). This clearly has not happened. The government must act to ensure that England's already uniquely narrow 16-19 provision is not squeezed further still.

1 - Introduction

England's secondary education curriculum has features in common with those of many other developed countries: students follow a broad curriculum before specialising during upper secondary education (at 16 in England). At that stage many opt for a vocational or technical education, whilst others follow an academic pathway, which for most students means A levels.

A levels date back to 1951. They were developed initially as university entrance exams and were not meant to be a stage of education in their own right. Our A level system has been broadly successful in increasing the number of students willing and able to complete three-year degree programmes, in contrast to many other countries which require a four-year course. However, few other education systems in comparable economies force learners to specialise so much at this point, or to drop native languages and maths after 16.

There have been various efforts to broaden 16-19 study since the introduction of A levels.

In 1959 the General Studies A level was introduced to cover a wide range of topics and disciplines. However, General Studies was often considered an 'add-on' to a student's other A levels and was not considered as equal to other A levels by many universities. Eventually, as part of a wider set of A level reforms, General Studies was discontinued in 2017.

In 1968 the International Baccalaureate, or IB, was established as an alternative to A levels. The IB is made up of six subject groups alongside three core elements. Whilst the IB is popular in independent schools and has achieved international recognition, it never succeeded in replacing the A level system, especially in state-funded schools and colleges.

In 2004, the Extended Project Qualification (EPQ) was introduced to ensure that all learners develop and demonstrate a range of generic skills (Tomlinson 2004). The EPQ is a standalone qualification equivalent to half an A level and is often taken by students in addition to their A level studies. The project takes the form of either a dissertation or an alternative form such as a musical or dramatical composition, report or artefact, backed up with paperwork.

Most notably, since 2000 and up until more recent years, A levels consisted of two equally weighted parts: an AS level, generally taken in the first year and a qualification in its own right, and an A2 assessed at the end of the second year. The primary purpose of AS levels was that students would take a broader range of AS level courses during the first year of study - up to four or five (Dearing 1996; FEFC 2000). They would then be able to narrow their studies in the second year by selecting the subjects which they would pursue to the full A level standard, whilst receiving a qualification for subjects they pursue no further.

However, since 2015 A levels and AS levels have been decoupled, so that the content of an AS level is distinct from the first year of an A level. This reform followed concerns from some universities that the modular nature, and content of AS levels and A2s, along with the opportunity to resit units, were contributing to students not developing the deep understanding and skills needed for higher education (Higton et al. 2012).

Whilst narrower academic study programmes are designed to prepare young people for higher education, one key question is the extent to which they also prepare young people for employment. Previous research from Dolton and Vignoles (2002) on the association between 16-19 curriculum breadth and employment outcomes concluded that "employers do not seem to reward individuals who take a broader curriculum at 16-19 more highly". Subsequent research from Johnes (2008) also

failed to find a link between breadth of curriculum and income, though it noted that some combinations of subjects are associated with better employment outcomes.

This issue has only become more pertinent in recent years, with predictions of further changes in the labour market resulting from technological change. Increased disruption to employment may increase the importance of a broader set of skills and knowledge, by enabling individuals to transition more easily to new roles. Moreover, in recent years a new data source that links education and employment records, the Longitudinal Education Outcomes data (LEO), has become available. As this new data source is derived from administrative, rather than survey, data sources it provides a quantity of data unavailable to earlier research efforts.

This research aims to use this new data to shed light on whether 16-19 curriculum breadth is associated with employment outcomes for individuals in their mid-twenties.

In Chapter 2 of this report, we describe our methodology, including coverage and data sources, our definition of 'breadth', the employment metrics used and our regression models.

In Chapter 3 we consider how 16-19 curriculum breadth has changed in recent years, and how curriculum breadth varies across different groups of students. We also consider uptake of qualifications designed to increase the diversity of students' 16-19 study programmes.

In Chapter 4 we consider the relationship between breadth and employment outcomes at age 26. We begin by looking at how outcomes vary with breadth. We then implement a regression model to control for other factors known to influence employment outcomes, helping to isolate the influence of breadth on outcomes. We also consider earnings for students taking the International Baccalaureate.

2 - Methodology

This section describes the methodologies used in this report. There are two distinct analyses within this report: in chapter 3, a descriptive analysis of curriculum breadth, considering trends over time and differences in breadth between groups in the most recent 16-19 cohort data available; and in chapter 4, an analysis investigating the association between breadth and employment outcomes. By its nature this second analysis considers a much earlier cohort of students, so that we can consider their subsequent labour market outcomes.

Coverage

Our analyses include students who have completed 16-19 education with at least one level 3 qualification equivalent to an AS level in size. We include only students within the state-maintained sector, including further education and sixth form colleges.

For our descriptive analysis in chapter 3, we have included students who completed their 16-19 study in 2019.

When considering employment outcomes in chapter 4, we have included students who completed their 16-19 study in the academic year 2008/09, and who then went on to complete a level 6 (bachelors) degree. At this stage AS levels were popular and could still be taken as the first part of a full A level. The typical education and employment pathway for this cohort are shown in table 1. This is for illustrative purposes only. Our analysis is not restricted to students following this trajectory.

Table 1: Illustrative pathway for student finishing 16-19 education in 2008/09

Academic year	Age	Typical route
2008/09	17/18	Year 13
2009/10	18/19	Year 1 of HE
2010/11	19/20	Year 2 of HE
2011/12	20/21	Year 3 of HE
2012/13	21/22	1 st year out of HE
2013/14	22/23	2 nd year out of HE
2014/15	23/24	3 rd year out of HE
2015/16	24/25	4 th year out of HE
2016/17	25/26	5 th year out of HE

Data

Analysis of trends in curriculum breadth in this report are derived from the National Pupil Database (NPD) student and exam files and the Ofqual qualification register. The NPD files are made available to EPI by the Department for Education via the Office for National Statistics Secure Research Service. The NPD dataset covering this phase of education is a combined dataset covering students in school sixth forms as recorded in the school census, and students at other further education institutions as recorded on the Individualised Learner Record (ILR). The datasets, including student level information and information on the qualifications they have taken, are compiled by the Department for Education. The NPD for students completing 16-19 education in 2019 was used in this research.

Analyses on the association between curriculum breadth and employment outcomes are derived from the Longitudinal Education Outcomes (LEO) data, which consists of information relating to four key areas:

- Student data - This contains the personal characteristics of the student (age, sex etc) and the educational institutions they are associated with.
- Exam data - This is information on the exams and qualifications taken by students, including the grades achieved, qualification type and subject area.
- University data - This data is collated by the Higher Education Statistics Agency (HESA) and describes the course type, subject area and grades achieved.
- Employment and benefits data - This data is collected by HMRC and DWP, and consists of information on income, employment spells and benefit use.

For this research we have used employment data from the 2016/17 tax year, as it is the most recent data available to us. The LEO data was made available to EPI by the Department for Education as part of a pilot programme for providing access to LEO to accredited researchers.

Defining breadth

Two elements are needed to measure how broad and balanced a student's curriculum is:

- How to group qualifications into groups of similar subjects; and
- A methodology that identifies students' diversity of study across these groups.

For this research we have primarily used the following five subject groups:

- Science, technology and computer science
- Mathematics
- Languages
- Humanities, arts and social sciences
- Vocational and professional

For each student we can then count the number of qualifications in each of these subject groups, to create a breadth score.

Table 3: Example of assignment of qualifications to subject groupings

	List of Level 3 Qualifications	Subject grouping score and overall breadth score
Student 1	A level Mathematics A level Physics A level Geography AS Further Mathematics	Science, technology and computer science: 1 Maths: 2 Languages: 0 Humanities, arts and social sciences: 1 Vocational and professional: 0 Breadth Score = 3 of 5
Student 2	A level History A level Psychology A level Sociology	Science, technology and computer science: 0 Maths: 0 Languages: 0 Humanities, arts and social sciences: 3 Vocational and professional: 0 Breadth Score = 1 of 5
Student 3	Level 3 Diploma in Business Administration A level English Language & Literature AS Maths	Science, technology and computer science: 0 Maths: 1 Languages: 1 Humanities, arts and social sciences: 0 Vocational and professional: 1 Breadth Score = 3 of 5

In this example, student 1 has a breadth score of 3 meaning that they have taken qualifications from three of the five subject groupings. The minimum possible score is 1, as only students taking at least one level 3 qualification are included. The maximum possible score will be 5, for those taking qualifications from all the subject groups.

It should be noted that there is no entirely objective methodology to allocate subject groupings, both in terms of the number of groups and which groups particular subjects are allocated to. For example, should architecture sit within the “Science, technology and engineering”, “Humanities, arts and social sciences” or “Vocational and Professional” grouping? Or should “Humanities, arts and social sciences” be considered as one group or three? For the purpose of this study we began with the subject area groupings used by the Department for Education and made some small adjustments in consultation with the Royal Society, who commissioned this research. In addition, in the absence of an objective methodology we have undertaken robustness checks using a grouping of seven categories and three categories. These groupings are shown in annex A, along with the subject areas within each category.

Measuring outcomes

Two outcome measures are used within this research: income and whether individuals were in sustained employment or education. Each gives different information on the relationship between curriculum breadth and desirable long-term outcomes for students.

- **Sustained employment or education** - We consider the proportion of students who are in sustained employment or education. Sustained employment means a student was employed for at least one day in five of the six months between October 2016 and March 2017. Sustained education means that they have a valid higher education study record that overlaps the relevant tax year. These are also the metrics as used by the Department for Education in their analysis of LEO data.¹
- **Income** - We use annualised income in the most recent year for which data is available – 2016/17. At this point the young people will typically be aged 26. For our descriptive analyses we use the median income for different groups. For our regression analysis we use the log of income. Only people in sustained employment and with income greater than zero are included, and we have removed the top and bottom five per cent of incomes due to data quality concerns.

Regression models

To provide a greater understanding of the association between curriculum breadth and young peoples' employment outcomes, we have produced several regression models. We have used log-linear models to consider income. These models provide coefficients in log points, which we have also converted to percentage change (in income). We have used a logistic regression model when considering sustained employment or education. These models provide coefficients in log odds. We have built up our models to allow us to examine how the coefficients for breadth and other variables change, as an increasing number of factors are included in the model. Specifically, we demonstrate the impact of three broad sets of controls, each of which includes the following variables:

Personal characteristics and KS4 results: FSM eligibility, SEN provision, ethnicity, GCSE English and maths attainment.

16-19 results, region & provider type: Total 16-19 point score, total number of 16-19 entries, take-up of specific 16-19 subjects, 16-19 institution type and region of 16-19 provider.

HE subjects and institution: Undergraduate subject and HE provider group based on selectivity²

As well as the five main subject grouping shown previously, we also used alternative grouping of three and seven, and produced comparable findings.

We also produced similar models to consider the association between achievement of the International Baccalaureate and employment outcomes. However, unlike our analysis using breadth scores we do not control for 16-19 results or entries. Our robustness check showed that our results are highly sensitive to assumptions regarding the size and grade equivalence between A levels and the IB. As such we use only controls for Key Stage 4 (GCSE) prior attainment.

¹ <https://explore-education-statistics.service.gov.uk/methodology/graduate-outcomes-leo-methodology>

² Russell Group, Other pre-1992 universities, Other (more selective) universities, and Other (less selective)

3 – Curriculum breadth

In this section we consider how curriculum breadth has changed in recent years and how breadth varies across different groups of students.

Changes in breadth over time

Figure 1 below shows that average curriculum breadth has fallen by 18 per cent since 2010. Most of this fall took place between 2016 and 2019, with a 13 per cent fall over that period. Since 2017 the average student has taken qualifications from fewer than two subject groups.

Figure 1 - Average breadth score: 2010-2019

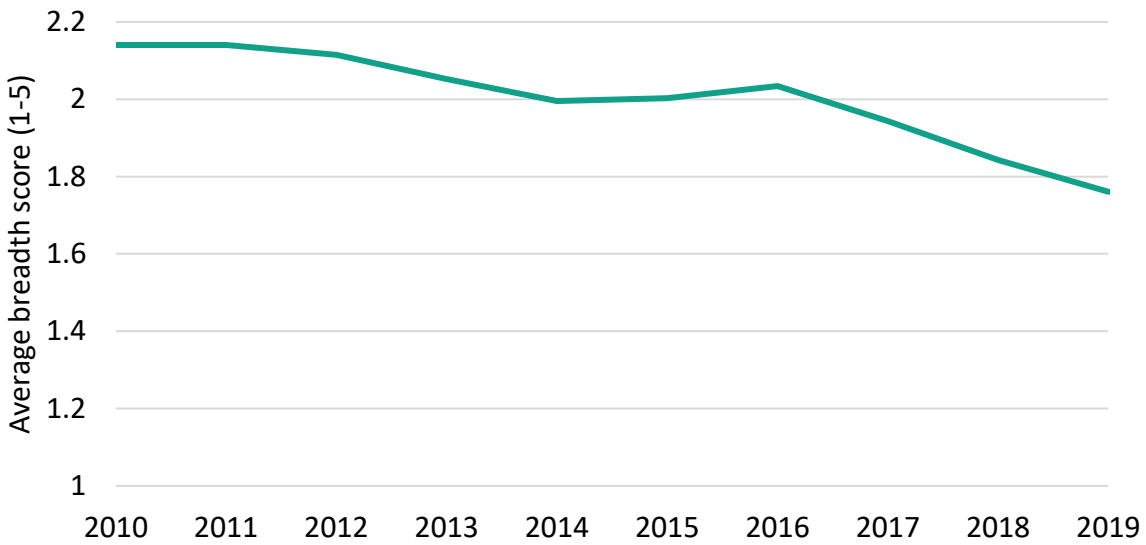


Figure 2 - Breadth scores - proportion of students

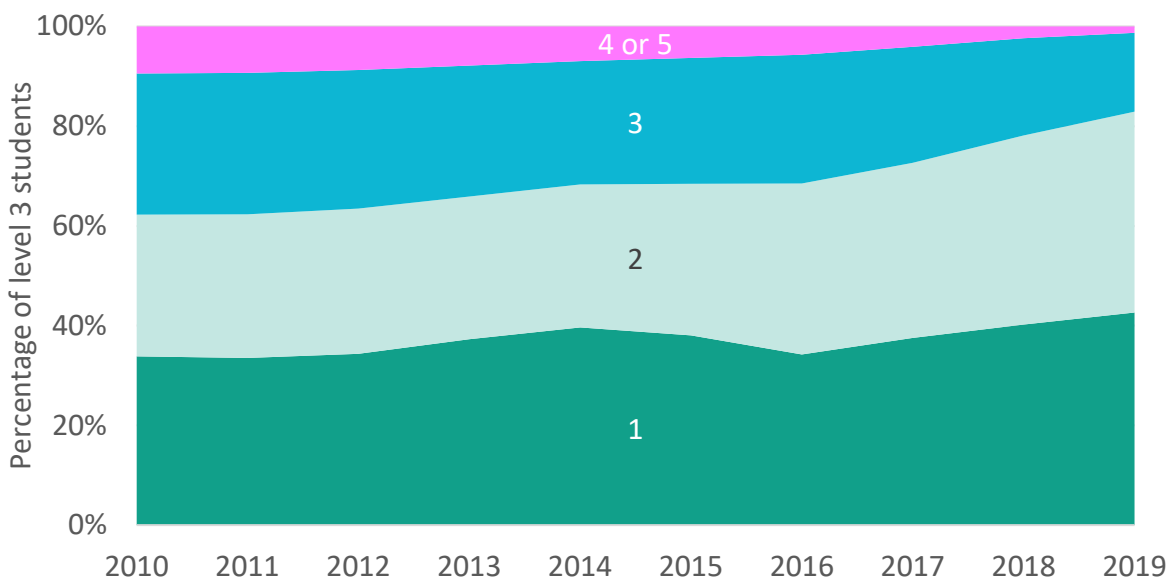


Figure 2 shows how this fall was largely driven by a decrease in the proportion of students taking qualifications from three or more subject groups, alongside a corresponding increase in the proportion taking qualifications from only one or two subject groups. In 2010, 38 per cent of

students took qualifications from three or more subject groups, but by 2019 this figure had more than halved, with only 17 per cent of students taking a very broad curriculum.

Figure 3 demonstrates that a key reason for the fall in breadth was a reduction in the average number of qualifications taken. The trend in average breadth scores very closely follows the trend in the number of qualifications taken. The average number of qualifications taken fell by 43 per cent between 2016 and 2019, from five to three.

Figure 3 - Average breadth score and number of qualifications

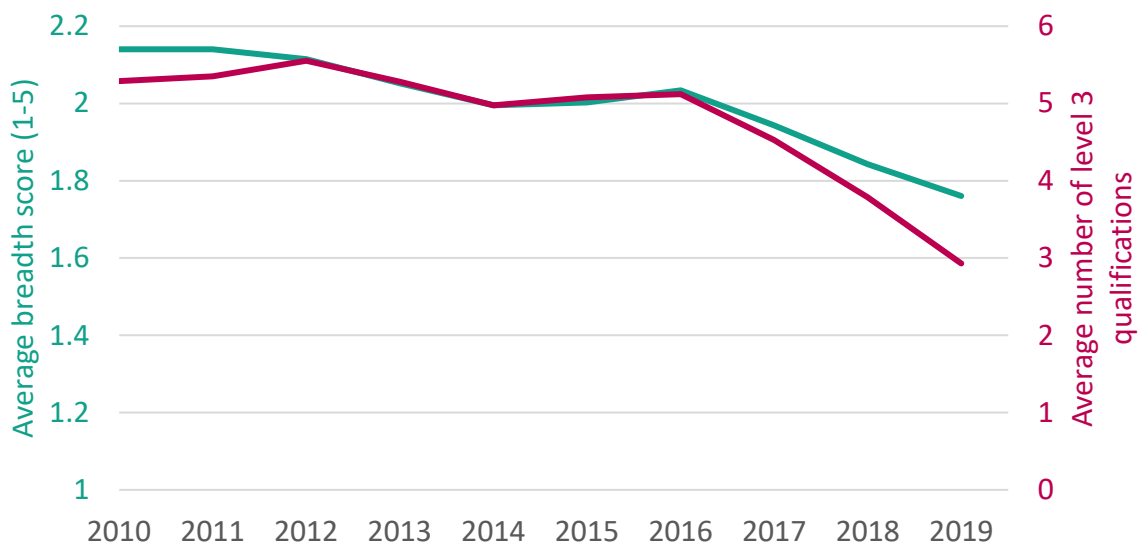
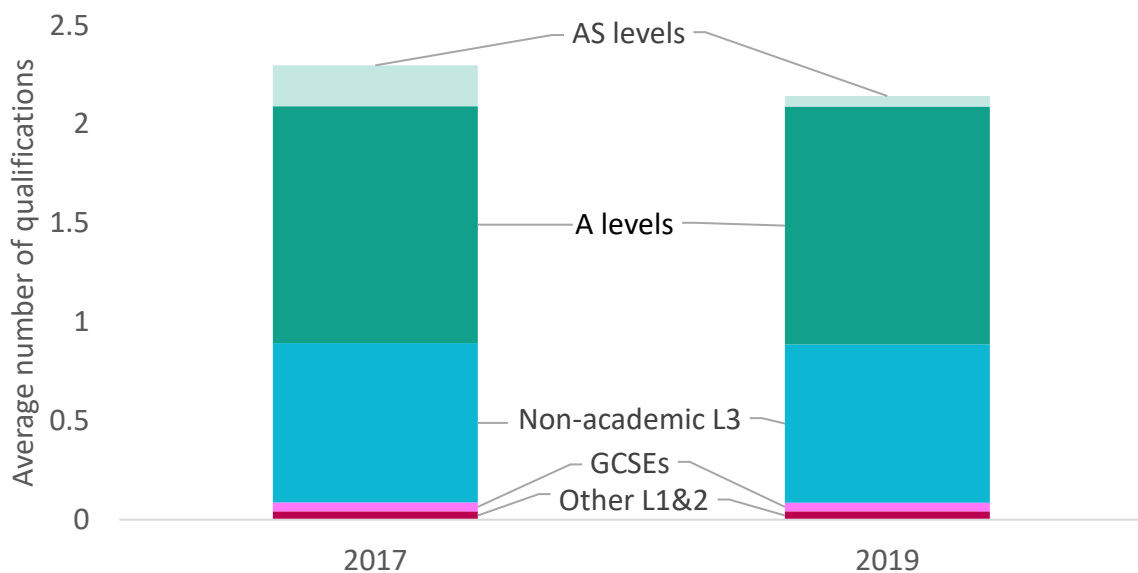


Figure 4 - Average number of entries into each qualification type (in A level equivalents)

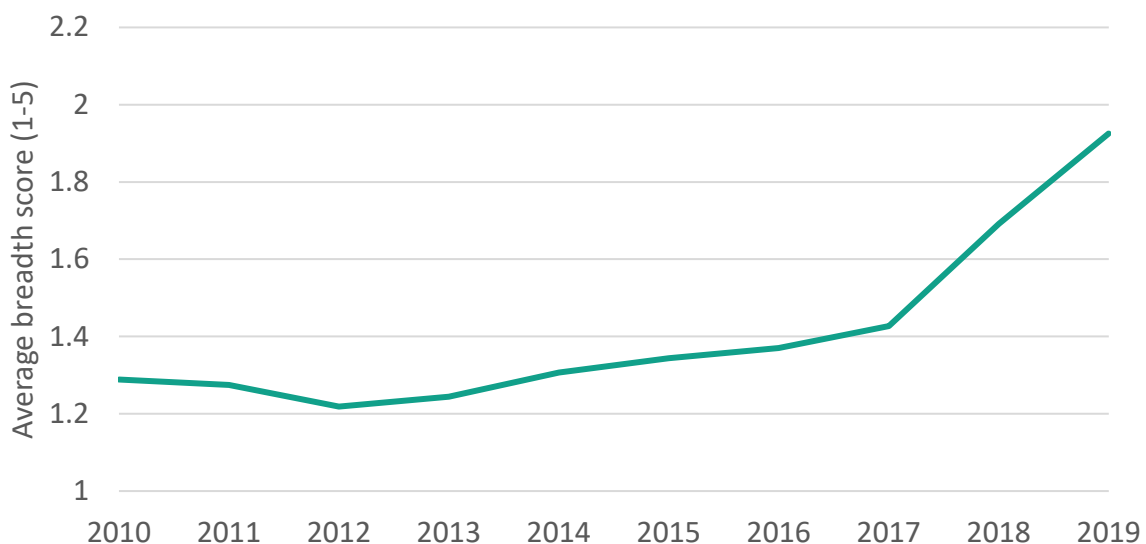


Previous EPI research, reproduced here in Figure 4, has shown that this fall is almost entirely due to a fall in the take-up of AS levels Figure 4 (Tuckett, Robinson, and Bunting 2021). In the last two years the average student has taken 0.2 fewer qualifications (in sizes equivalent to an A level), corresponding to a drop in provision of 8 per cent. This fall is almost entirely due to a fall in AS level entries, equivalent to the average student taking 0.4 fewer AS levels. Overall, the drop in the last two years is equivalent to 71 fewer guided learning hours for the average student.

This fall in AS level entries is likely to be due to a combination of two factors. Firstly, the introduction of the decoupling policy, whereby reformed AS levels no longer count towards a full A level. The first reformed AS levels were taught from 2015/16, meaning the first students to hold them were those finishing a two-year study programme in 2016/17. Further reformed AS levels have been introduced gradually in each year since then, replacing the legacy versions that counted towards full non-reformed A levels.

Secondly, the period 2012-2019 was one of reductions in real-term funding per student for the 16-19 phase. Between 2012 and 2019 funding per 16-18-year-old student fell by 16 per cent (Britton, Farquharson, and Sibieta 2019). Any impact of this fall will be exacerbated by the 16-19 funding formula, which offers no additional funding for an additional AS level for students already taking three A levels (or equivalently sized vocational qualifications). These funding pressures may also have played a part in the reduction of provision. Indeed, previous EPI research has shown a weak but discernible relationship between changes in funding and reductions in provision at an institution level (Dominguez-Reig and Robinson 2019).

Figure 5 - Average breadth score: students taking 3 A levels (or equivalent size)



As we have shown, the decline in breadth in recent years has been largely driven by falls in the number of subjects taken. However, we can also consider how breadth has changed for students taking a fixed number of qualifications. Figure 5 shows that, for students taking qualifications equivalent in size to three A levels, there has been an increase in breadth in recent years. We choose three as this is the median number of qualifications taken in 2019. Since 2017 the average breadth score increased by 0.5, equivalent to one in two students taking a qualification from an additional subject group.

Table 1 - Most common subject group combinations: 2019

Subject group combinations	Number of groups	Percentage of students
Vocational and professional	1	19%
Humanities and arts	1	15%
Humanities and arts & Vocational and professional	2	9%
Languages & Humanities and arts	2	9%
Science, technology and computer science	1	8%
Science, technology and computer science & Mathematics	2	8%
Science, technology and computer science & Humanities and arts	2	7%
Science, technology and computer science & Mathematics & Humanities and arts	3	4%
Science, technology and computer science & Humanities and arts & Vocational and professional	3	3%
Science, technology and computer science & Vocational and professional	2	3%

Table 1 shows the top ten most common subject group combinations in 2019. One-fifth of students take only qualifications from the vocational and professional group. This may be in part because many level 3 vocational qualifications have greater teaching hours than an A level, up to three times an A level in some cases. Students choosing these larger qualifications may therefore have less capacity to take qualifications from other subject groups. The most common combination of two subject groupings is humanities and arts, and vocational and professional, taken by just under one in ten students. The most common combination of three groups is science, technology and computer science; mathematics; and humanities and arts.

Breadth scores by student characteristics

In this section we consider how breadth scores vary by the characteristics of students, both for all students (taking level 3 qualifications) and students taking level 3 qualifications equivalent to 3 A levels in size.

Figure 6 - Average breadth score by prior attainment

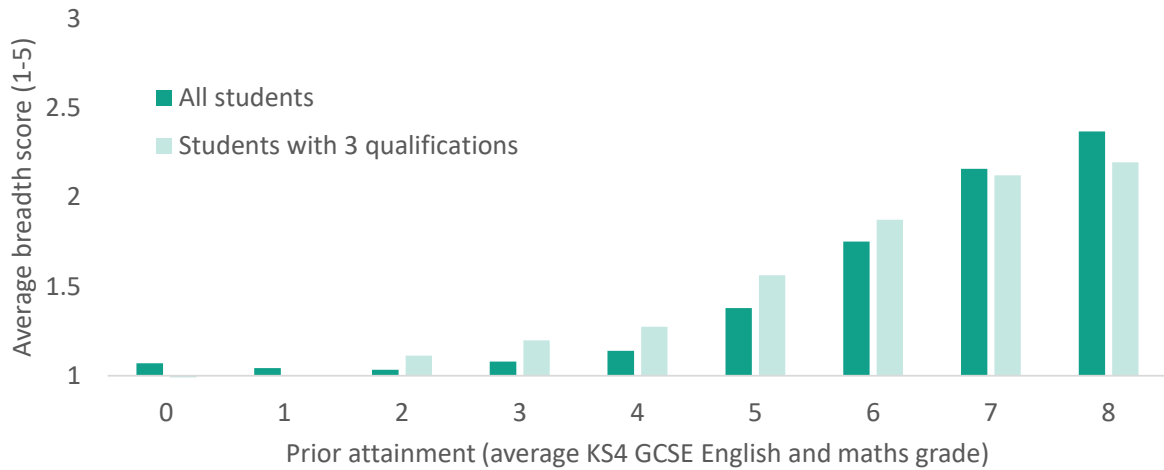


Figure 6 shows a clear association between prior attainment and breadth scores. Students achieving an average of a standard pass (grade 4) at the end of secondary school have an average breadth score of 1.1, whilst students with a grade 7 or 8 have average scores of 2.2 and 2.4 respectively, showing they take qualifications from at least twice as many subject groups. There is a similar disparity when considering only students with three qualifications.

Figure 7 - Average breadth score by student characteristics

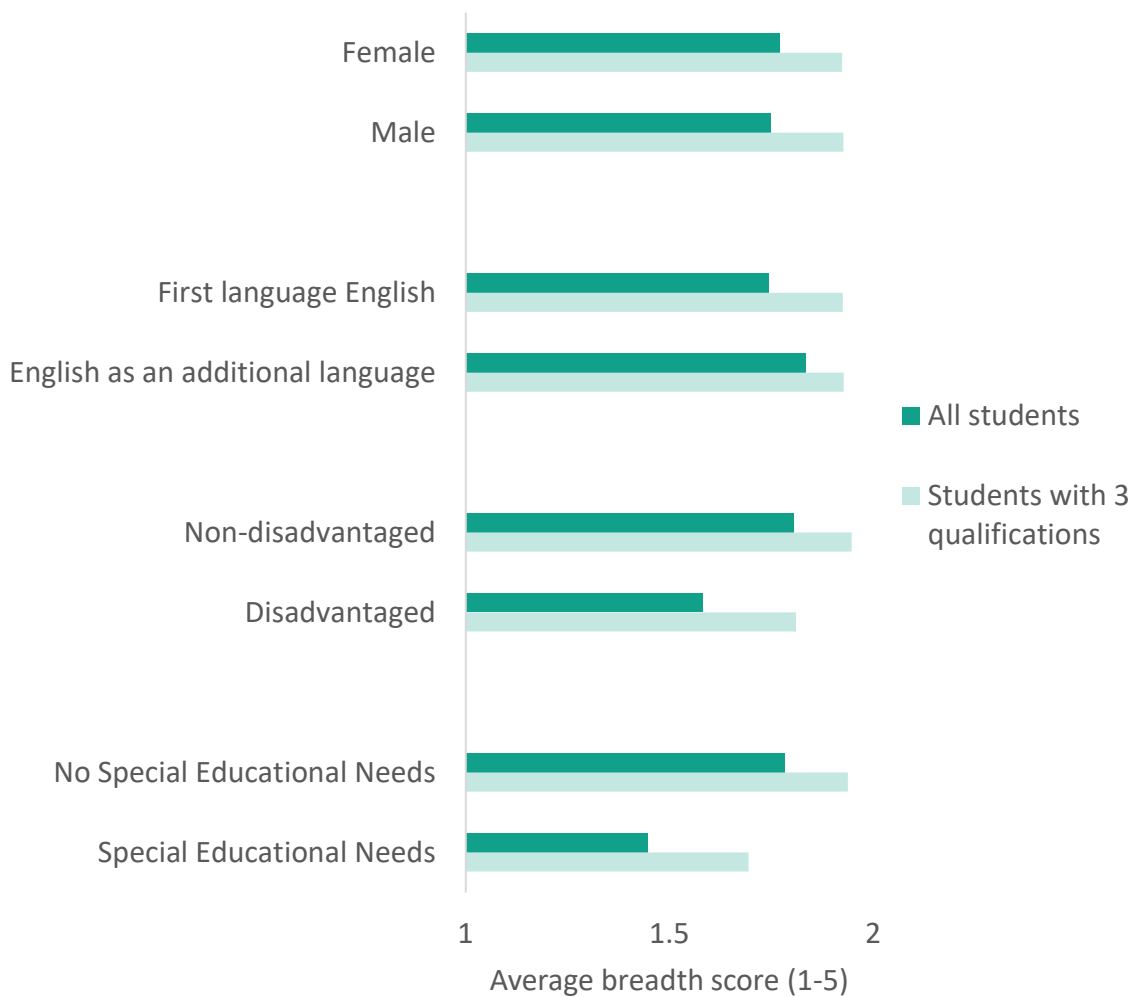


Figure 7 shows breadth scores by gender, first language, disadvantage and special educational needs. Female and male students have similar average breadth scores, including students taking three qualifications. Students with English as their first language typically have a slightly lower breadth score than students with English as an additional language (EAL). However, when considering only students taking three qualifications both groups have an almost identical breadth score, suggesting that EAL students take fewer qualifications on average, but that the qualifications they do take are typically more diverse. Indeed, they may be more likely to take language qualifications than non-EAL students. Disadvantaged students and students with special educational needs have lower average breadth scores than other students. This will be in part due to the lower average prior attainment of these groups, as observed in Figure 6.

Figure 8 - Average breadth score by ethnicity³

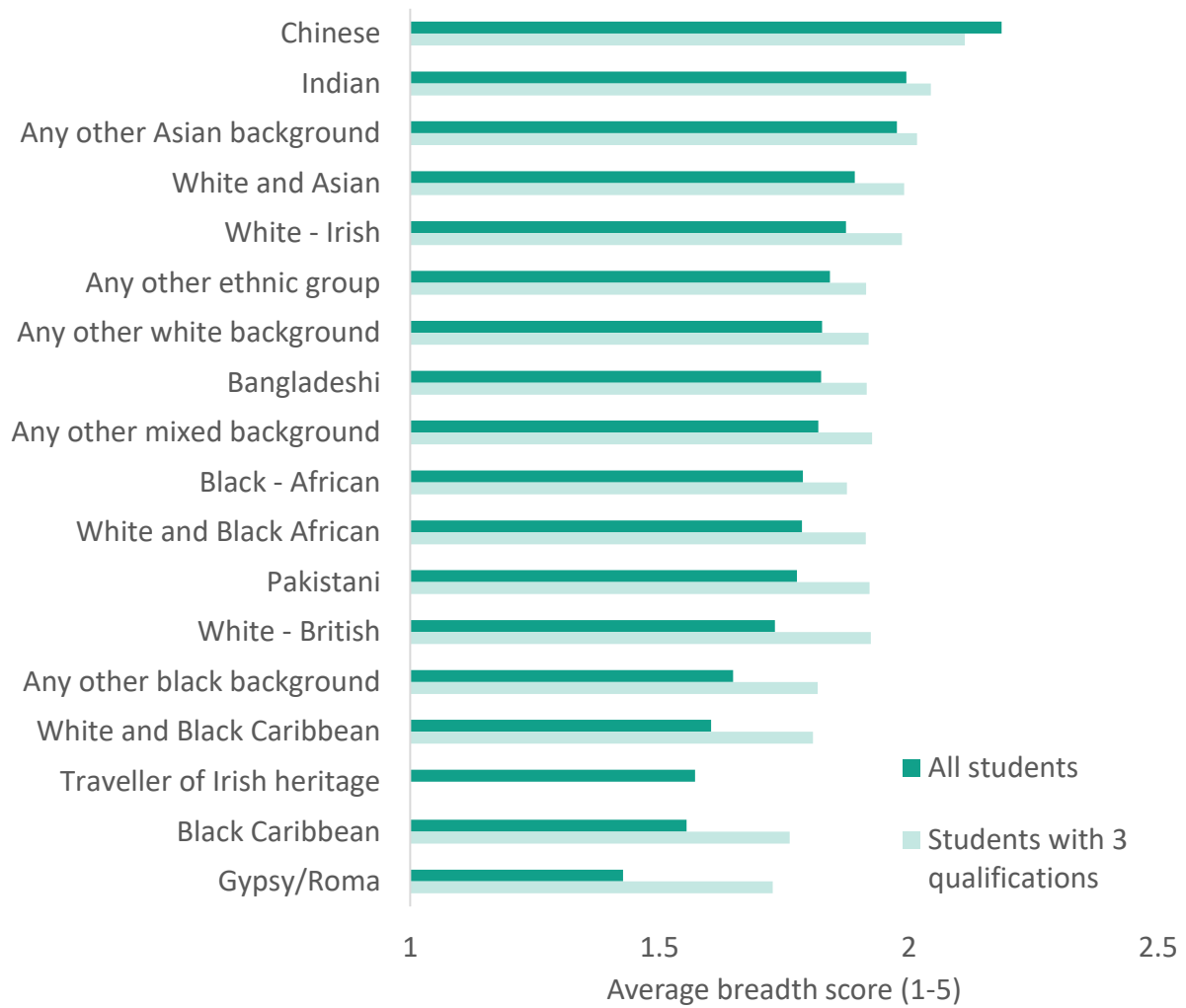


Figure 8 shows how average breadth scores vary by student ethnicity. Chinese students have the highest average breadth score, of 2.2. Similarly, when considering only those taking three qualifications, Chinese students have the highest average breadth score, of 2.1. Gypsy/Roma and Black Caribbean students have some of the lowest average breadth scores, of around 1.5. These groups also have the lowest breadth scores for students taking three qualifications.

³ Figures for traveller of Irish heritage students taking three qualifications are suppressed due to low numbers.

Figure 9 - Average breadth score by institution type

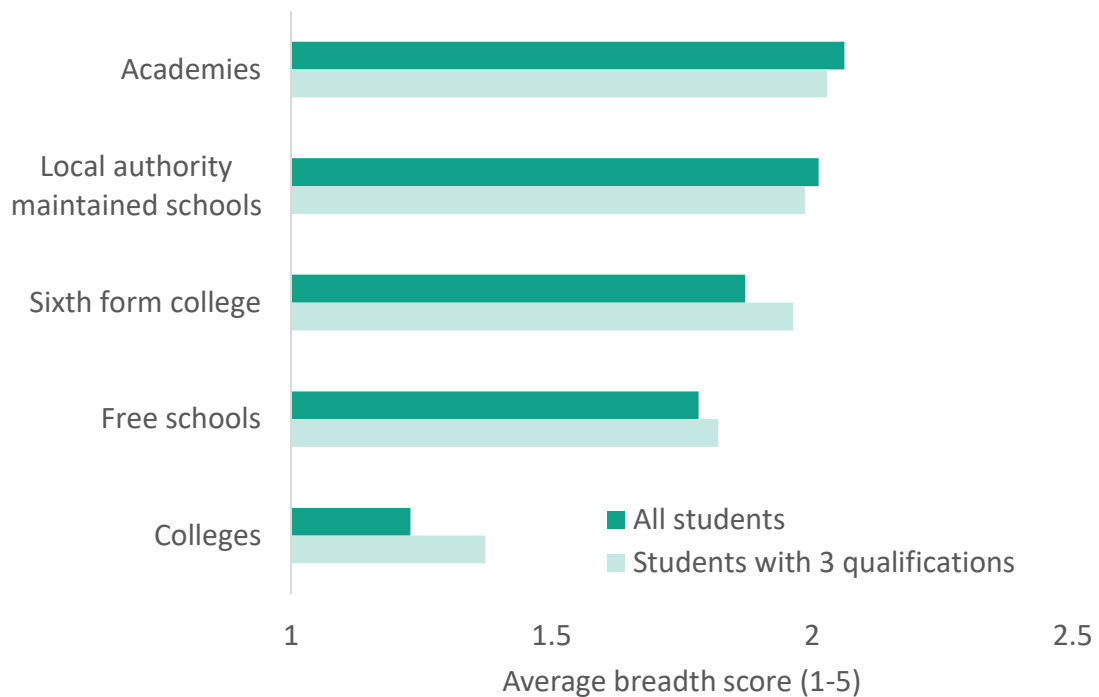


Figure 9 shows that students in academies and LA maintained school sixth forms tend to have the highest breadth scores, whilst students in colleges tend to have the lowest scores. On average students in these institutions also take more level 3 qualifications (3.4 and 3.3 respectively), which will contribute to these higher-than-average breadth scores. Students in colleges have the lowest average breadth score, of around 1.2. Correspondingly students in colleges take only 2.1 level 3 qualifications on average. As students in FE colleges have lower prior attainment on average, it is more likely that they will take lower-level qualifications, which are not included in our breadth measure. They may also be more likely to take vocational or technical qualifications, which as noted previously may be larger than an A level, reducing students' capacity to take qualifications from other subject groups.

Trends in broad qualifications

In addition to breadth of subjects from a range of subject groups, some post-16 students have the opportunity to pursue single qualifications which are designed to be intrinsically broad; most notably, the International Baccalaureate, Extended Project Qualifications and, until it was recently discontinued, General Studies A-level. In this section we consider trends in take-up and achievement of these qualifications in recent years.

Figure 10 - Take-up and achievement of the International Baccalaureate

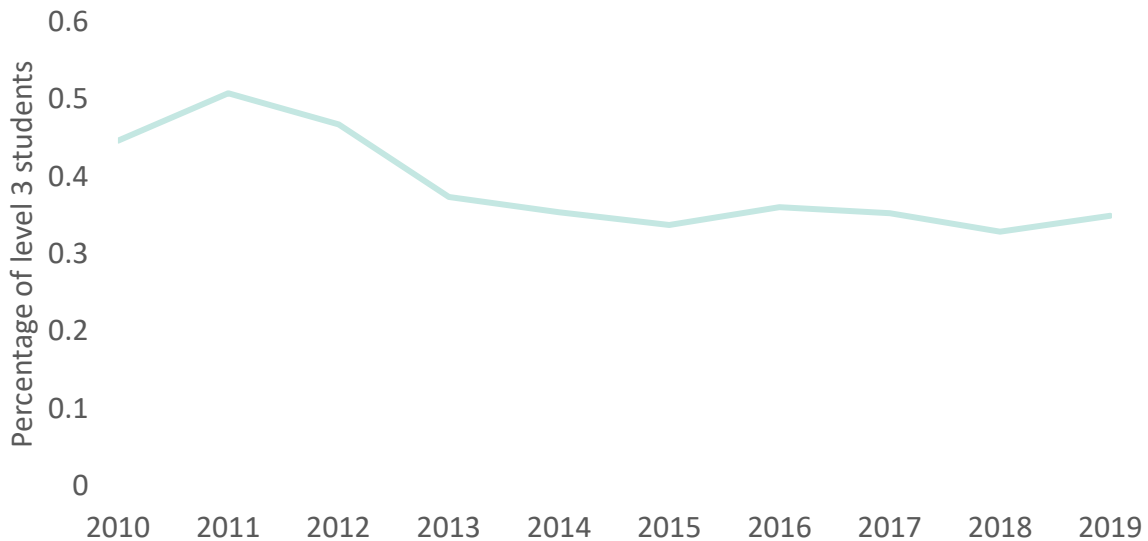
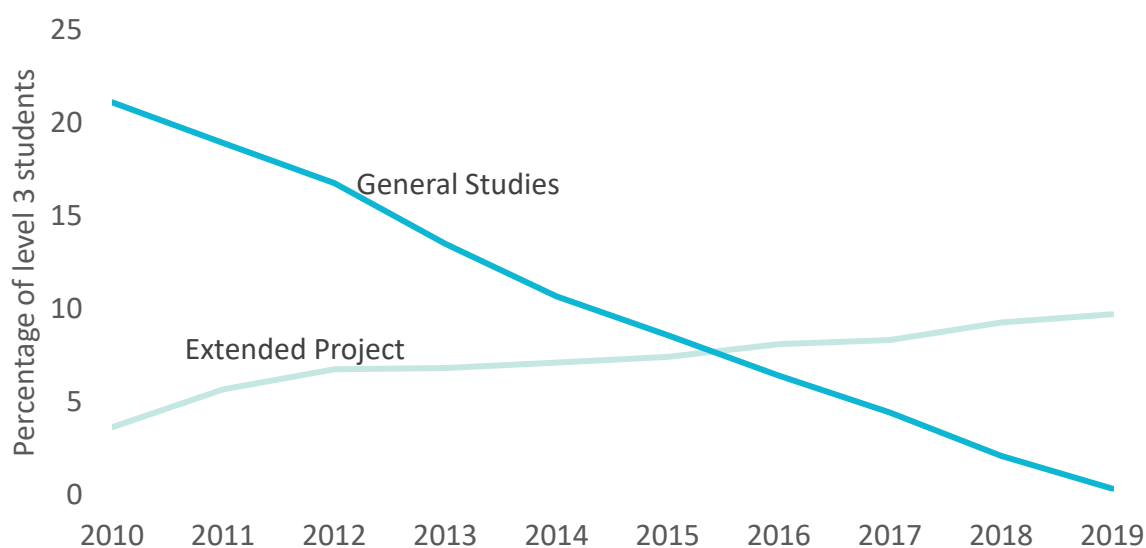


Figure 10 shows achievement of the International Baccalaureate diploma programme (the IB) in recent years. The IB is a qualification taken post-16 which alone is recognised as being equivalent to three to five A levels, and the majority of IB students continue to higher education. The IB curriculum is made up of three core elements (theory of knowledge, an extended essay and creativity/activity/service) and six subject groups (language & literature studies, language acquisition, individuals & societies, science, mathematics and arts). The IB is traditionally more popular in independent schools, though some state-funded institutions also offer the qualification to some students. In 2011 around 1 in 200 state-funded students taking level 3 qualifications achieved the IB. By 2019 this figure had reduced to around 1 in 300 students.

Figure 11 - Take-up and achievement of General Studies and Extended Project qualifications



General Studies A level was introduced in the 1950s and it aimed to encourage a broader sixth-form curriculum (Smithers and Robinson 1993). It covered culture, religion, philosophy, politics and the media and scientific research, technology and mathematics.

From 2015 all A levels were reformed by the government to improve standards. Following these reforms General Studies was withdrawn from new starters in 2017, as exam boards did not propose a replacement qualification to meet the standards of the reformed A levels.

Figure 11 shows that the decline in the popularity of General Studies was well underway before it was withdrawn, with a 50 per cent fall in the proportions of students taking it between 2010 and 2014. Final exams for General Studies were due to take place in 2020. By 2019 fewer than one per cent of students taking level 3 qualifications had taken General Studies.

While General Studies was declining, Figure 11 shows that Extended Project Qualifications (EPQs) were increasing in popularity. The EPQ was introduced in 2008 as a standalone qualification equivalent to half an A level and is often taken by students in addition to their A level studies. It was introduced to ensure that learners develop and demonstrate a range of generic skills, including research and analysis, problem solving, team-working, independent study, presentation and functional literacy and communication and critical thinking, and to encourage cross-boundary and/or in-depth learning and wider application of knowledge developed through main learning. The project takes the form of either a dissertation or an alternative form such as a musical or dramatical composition, report or artefact, backed up with paperwork. In 2010 only four per cent of students taking level 3 qualification took an EPQ, but by 2019 this had increased to almost 10 per cent.

4 – Relationship between breadth and employment outcomes

In this section we consider the relationship between breadth and employment outcomes at age 26, both the probability of being in employment or education and earnings. We begin by looking at how outcomes vary with breadth. We then implement a regression model to control for other factors known to influence employment outcomes, helping to isolate the influence of breadth. We also consider how outcomes for young people who took the international baccalaureate differ from the outcomes for other young people.

Figure 12 - Distribution of earnings by breadth score and gender: age 26

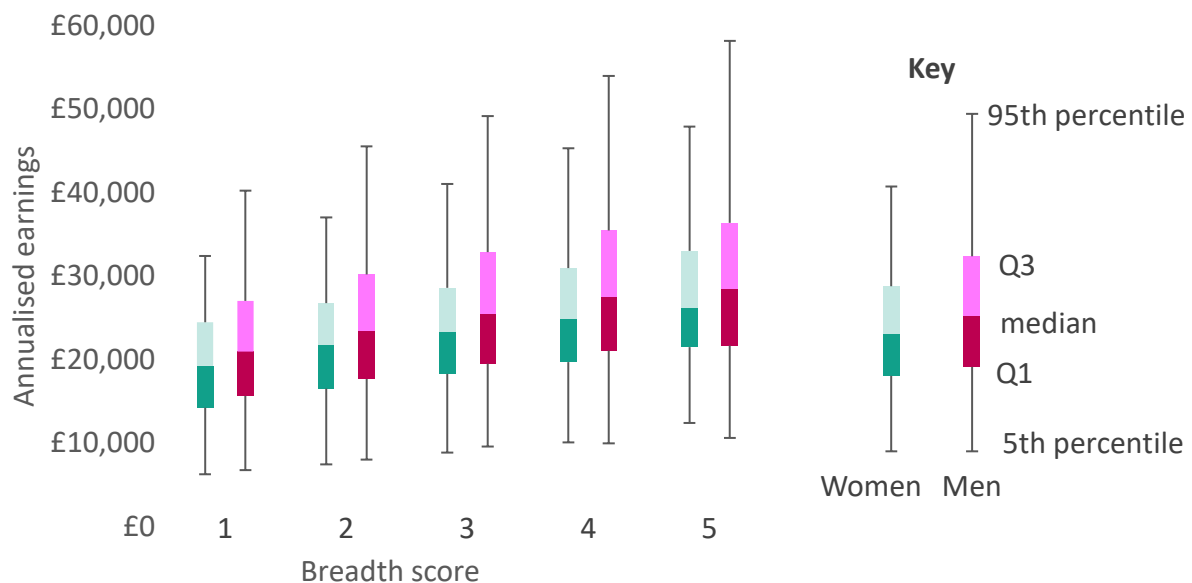


Figure 12 shows the distribution of earnings (for those in employment) at age 26 for both men and women, for each breadth score between 1 and 5. Taken in isolation there is a clear association between breadth and earnings. Both women and men with the highest breadth score earn around a third more than those with the lowest breadth score. However, as shown in Figure 6 higher breadth scores are associated with higher GCSE attainment, which is known to be predictive of higher salary returns. As such we cannot directly imply from this figure that it is 16-19 curriculum breadth itself that is leading to higher earnings.

It should also be noted that as well as higher average earnings greater breadth is also associated with greater variation in earnings, especially at the upper income end.

Figure 13 - Earnings by breadth score for ages 23 to 26: women

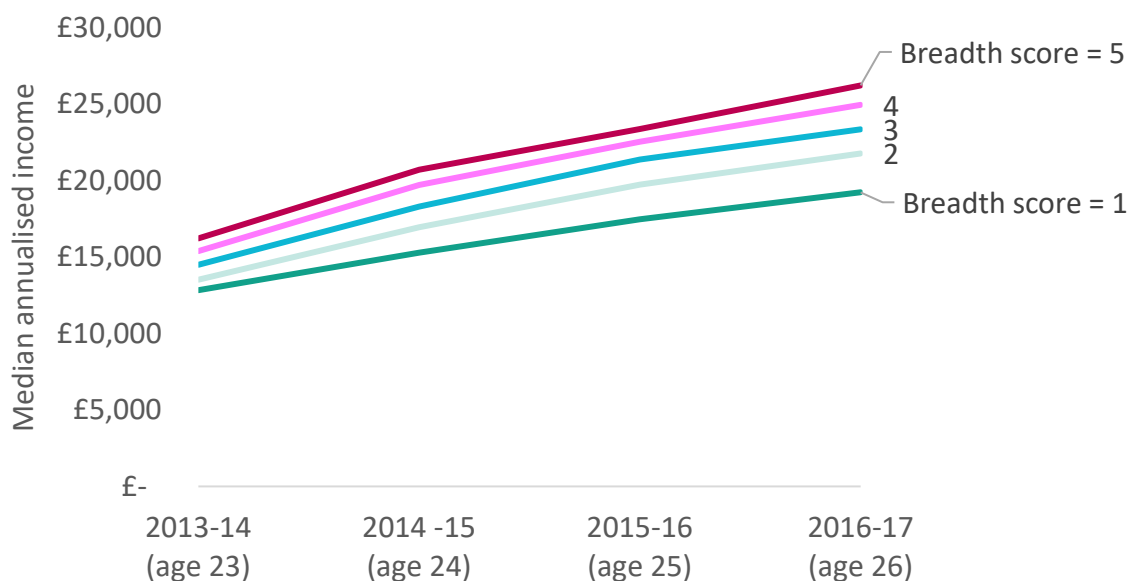


Figure 14 – Earnings by breadth score for ages 23 to 26: men

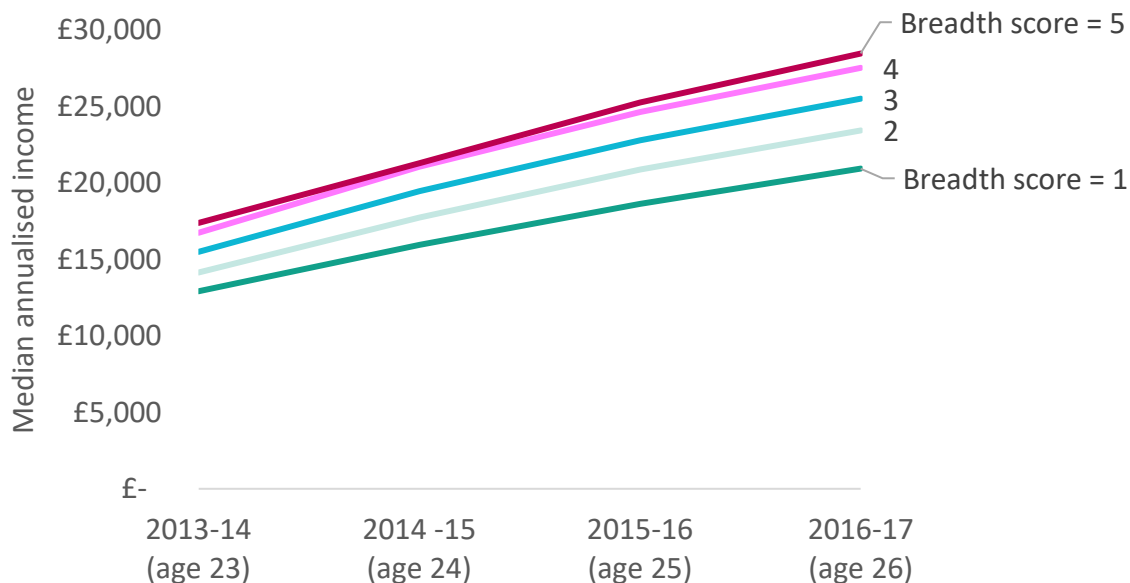


Figure 13 and Figure 14 show how average earnings for each breadth score change between the age of 23 and 26. For both women and men the difference between the earnings of individuals with low breadth scores and those with high breadth scores widens between the ages of 23 and 26. For women the gap increases from £3,400 to £7,000, and for men it increases from £4,500 to £7,500.

Table 2 - Age-26 returns by breadth score⁴

		Age-26 returns by breadth score (log points)							
Controls		Men				Women			
Personal characteristics and KS4 results	No	Yes	Yes	Yes	No	Yes	Yes	Yes	
16-19 results, region & provider type	No	No	Yes	Yes	No	No	Yes	Yes	
HE subjects and institution	No	No	No	Yes	No	No	No	Yes	
Breadth score (reference = 1)									
2	0.08 ***	0.05 ***	0.03 ***	0.03 ***	0.10 ***	0.06 ***	0.03 ***	0.03 ***	
3	0.15 ***	0.10 ***	0.04 ***	0.04 ***	0.16 ***	0.11 ***	0.04 ***	0.04 ***	
4	0.20 ***	0.14 ***	0.03 **	0.03 ***	0.21 ***	0.14 ***	0.03 ***	0.04 ***	
5	0.22 ***	0.16 ***	0.02	0.03	0.26 ***	0.18 ***	0.03	0.04 **	
Students	52,125	52,125	52,125	52,125	68,505	68,505	68,505	68,505	
Adjusted r^2	0.03	0.05	0.13	0.17	0.04	0.06	0.13	0.17	

Figure 15 - Age-26 returns by breadth score, full model

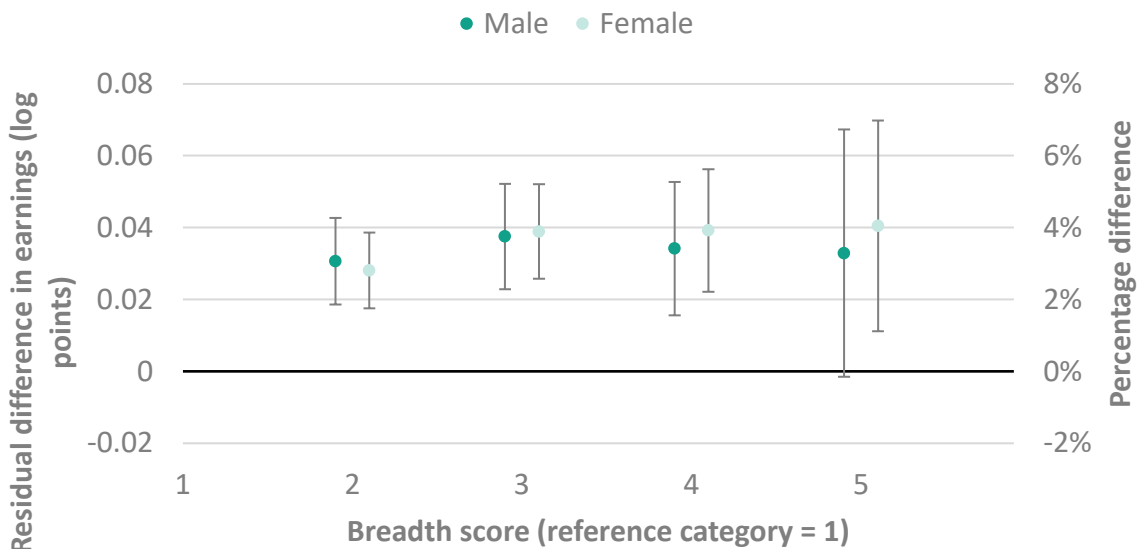


Table 2 shows our regression estimates for returns at age 26, for both men and women. Figure 15 show the corresponding estimates and their confidence intervals from the full model. In both cases the figures shown are relative to young people with the lowest breadth score of 1. Table 2 shows that much of the difference in earnings between those with high and low breadth scores is accounted for by young people’s background characteristics and GCSE (KS4) results. Additionally, controlling for the specific subjects studied and student results during the 16-19 phase, as well as the location and type of institution, reduces the differences in earnings further still. Interestingly, further conditioning on higher education institution and subject makes little difference. This is likely to be because 16-19 results and subject choice are highly predictive of which university and subject young people continue to.

⁴ * p<0.05, ** p<0.01, *** p<0.001

Our full model suggests that, while taking subjects from two subject groups (a breadth score of 2) is associated with higher returns than taking subjects from only one subject group, taking subjects from three or more subject groups offers little, if any, further benefits. In general, a breadth score of 2 or more is associated with three per cent higher earning than a breadth score of just one.

While three per cent appears to be a relatively small difference, interpretation of this figure requires some context. Significantly, our full models for both men and women account for only 17 per cent of the variation in earnings. On first inspection this low figure may be surprising, as it suggests that individual's socio-economic characteristics, and the entirety of their educational achievement only accounts for one-sixth of the variation in earnings. However, there are several factors that help explain this apparently low figure:

- Our analysis only includes students who completed a first degree. Given that completion of a first degree often leads to higher early career earnings, focusing only on this group will reduce the overall variation in earnings (Belfield et al. 2018).
- Our analysis does not account for the number of hours worked. The HMRC data that forms part of the LEO dataset do not include information on part-time work. Therefore, some of the variation in earnings will be due to an important factor that we cannot control for.
- There will be many other factors that influence earnings. For example, employers are known to value soft skills such as individual's ability to collaborate effectively. Factors such as access to social networks and labour market discrimination may also play a part.
- Perhaps most critically, our results are for graduates at age 26, which is relatively early in their working life. The relationship between earnings and some educational factors may increase the longer individuals spend in the labour market, and the overall variation in earnings for different career paths may increase with age.

It's also worth noting that in our research we consider all subject group combinations to be equal. Although we include subject controls to mitigate the effect of returns associated with particular subjects, some subject groups combinations may be associated with greater returns than others. Indeed, evidence from Johnes (2008) suggested that some combinations of subjects are associated with better employment outcomes. The returns we observe here may therefore be considered a (weighted) average of the returns associated with a range of different subject group combinations. Note also that our research does not allow us to attribute causality to the relationship between breadth and returns. Whilst we have included many controls there may be other unmeasured factors associated with both breadth and income that we are unable to take into account in our analysis.

To understand whether the benefits of breadth increase with age we can consider whether returns at a younger age are smaller, thereby suggesting an increasing trend.

Figure 16 - Ages 25 and 26 returns by breadth score, women

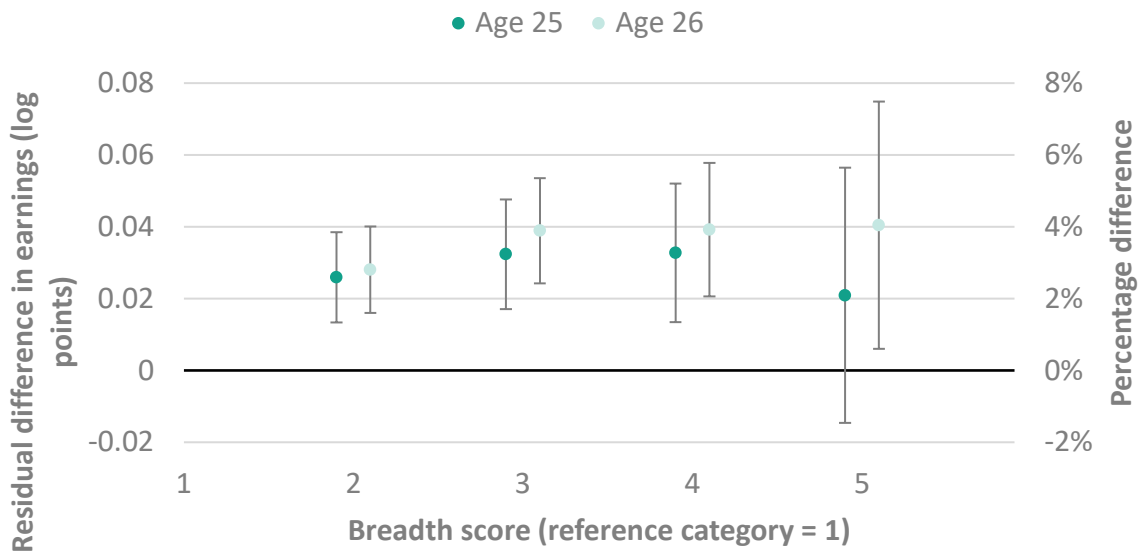


Figure 17 - Ages 25 and 26 returns by breadth score, men

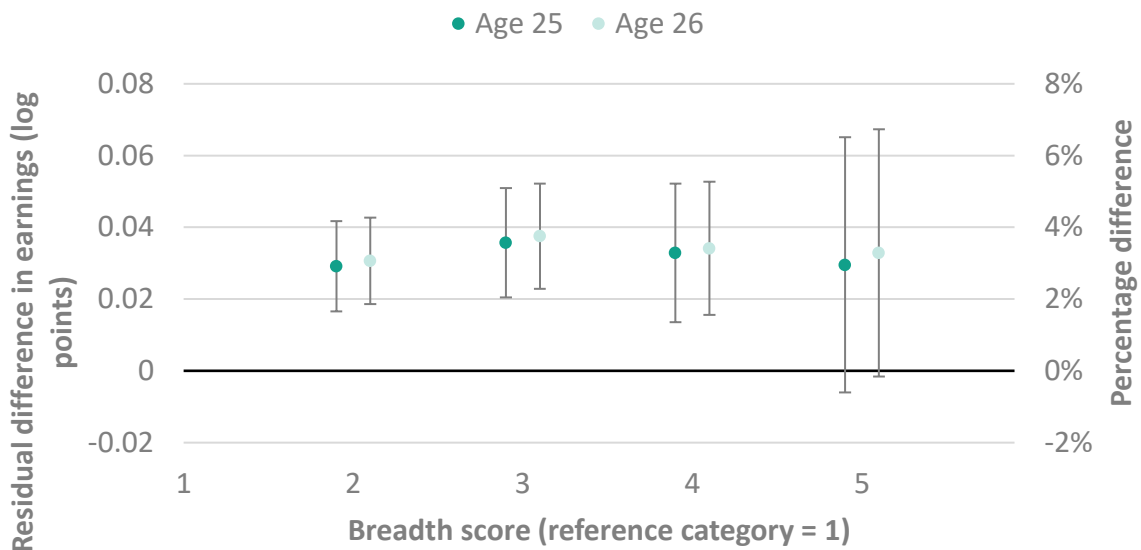
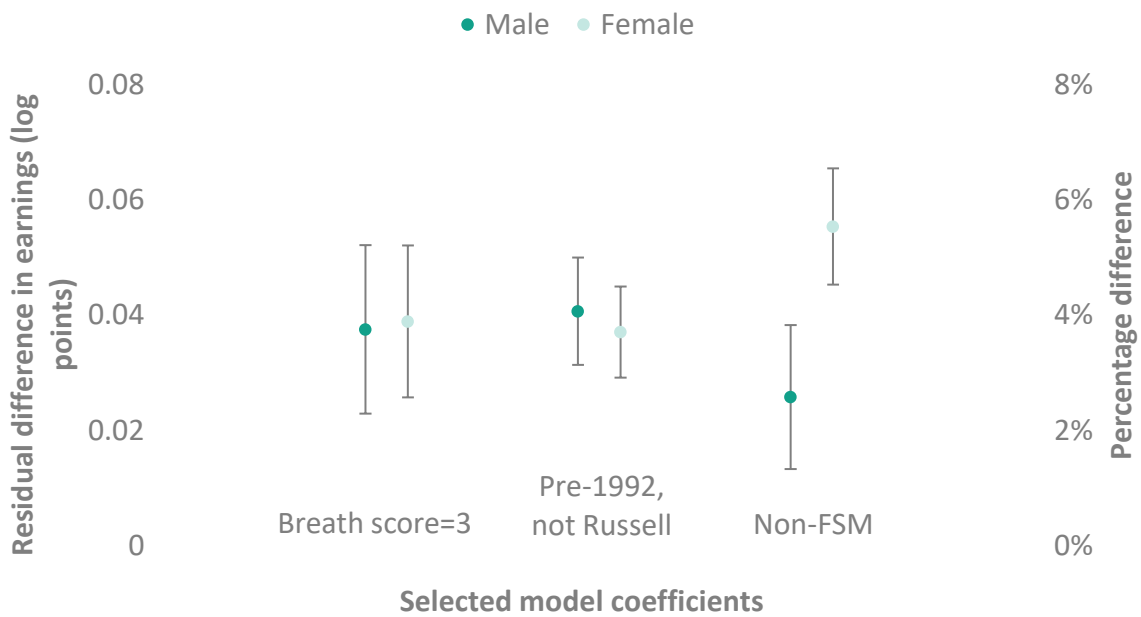


Figure 16 and Figure 17 show how our estimates for returns at age 26 compare with equivalent estimates for a year earlier, when individuals were 25. In general, the results at age 25 look similar to those at age 26. However, though far from statistically significant, there is a small increase in the returns associated with some breadth between the ages of 25 and 26 (about 0.2 per cent for men, and between 0.2 and 2 per cent for women).

Figure 18 - Age-26 returns by selected characteristics⁵



To give further context to our estimates for greater breadth we can also compare them with other estimates from our full model, shown in Figure 18. We observe that the conditional difference in returns between having a breadth score of three and a score of only one is similar in scale to the difference between being, or not being, in receipt of free school meals or between attending a pre-1992 university and attending a less selective post-1992 institution. Within these comparison groups the benefits of attending a pre-1992 university become most apparent from the age of 40, whilst the differences between the earnings of individuals from lower and higher income household appear to double between individuals’ mid-twenties and their early thirties (Britton et al. 2020; 2019).

Whilst none of this provides certainty that the returns associated with curriculum breadth continue to grow during a career, it certainly warrants further research to identify whether this may be the case. Speculatively, it seems likely that the benefits of curriculum breadth may become more apparent once individuals have spent more time in the labour market. For example, in easing the transition to a new role which requires a different or broader skill set.

⁵ Reference categories as follows: Breadth score=3 - breadth score=1, Pre-1992, not Russell – all less selective post 1992 higher education institutions, Non-FSM – FSM.

Figure 19 - Proportion in employment or education by breadth score for ages 23 to 26: women

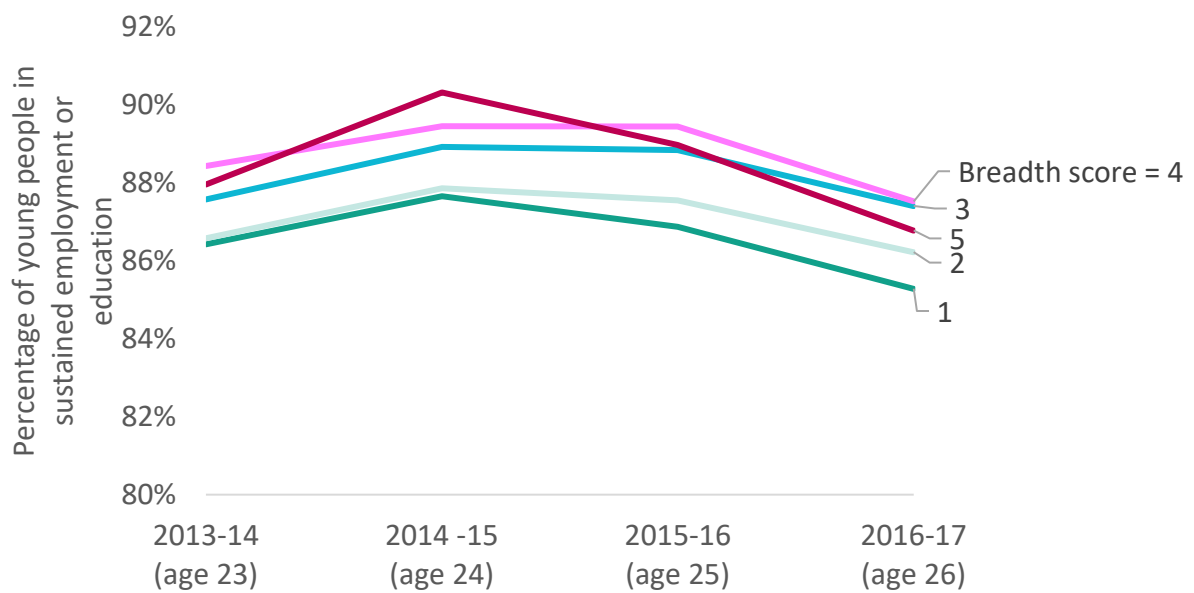


Figure 20 - Proportion in employment or education by breadth score for ages 23 to 26: men

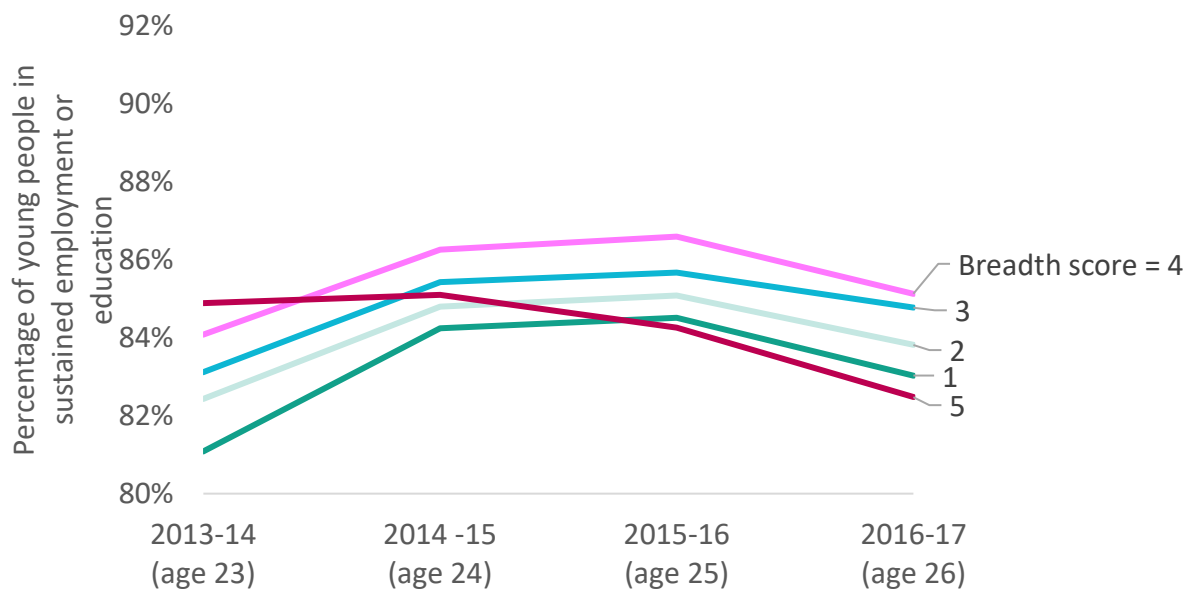


Figure 19 and Figure 20 show how the proportion of young people with different breadth scores in employment or education changes between the ages of 23 and 26. Although in general higher breadth scores are associated with a higher probability of being in employment or education, this is not the case for those with the very highest breadth scores. Indeed, by the age of 26 men with a breadth score of 5 are less likely to be in employment or education than men with a breadth score of 1.

Table 3 - Conditional probability of sustained employment at age-26 returns by breadth score⁶

Age-26 sustained employment or education by breadth score (log odds)									
Controls		Men				Women			
Personal characteristics and KS4 results		No	Yes	Yes	Yes	No	Yes	Yes	Yes
16-19 results, region & provider type		No	No	Yes	Yes	No	No	Yes	Yes
HE subjects and institution		No	No	No	Yes	No	No	No	Yes
Breadth score (reference = 1)									
	2	0.06 *	0.00	-0.03	-0.01	0.08 **	0.03	0.00	0.01
	3	0.13 ***	0.04	-0.02	-0.01	0.18 ***	0.09 **	0.02	0.04
	4	0.16 ***	0.04	-0.03	-0.01	0.19 ***	0.07 *	0.00	0.02
	5	-0.04	-0.15	-0.15	-0.15	0.12	0.00	-0.01	0.02
Students		82,600	82,600	82,600	82,600	101,975	101,975	101,975	101,975

Table 3 shows our regression estimates for the residual difference in the probability of being in employment or education at age 26, for both men and women. Once we control for personal characteristics and GCSE (KS4) attainment, any apparent benefits to greater breadth are considerably reduced. Including 16-19 results reduces the estimates further, such that the returns associated with breadth scores of two or above are no longer statistically significantly different from the returns for young people with a breadth score of one. That is, once other factors are controlled for, there is no evidence that breadth increases young people’s probability of employment.

Given that there does appear to be a small but positive association for earnings for those in employment, it is surprising that we do not detect a similar trend when considering the probability of being in employment or education. There are several factors to bear in mind when considering this finding. Firstly, the population under consideration is all graduates who had previously taken level 3 qualifications. In general employment levels are relatively high for this group (DfE 2021). Secondly, as mentioned in our earnings analysis, our results are for graduates at age 26, when most of our population will be in their first graduate job. Whilst breadth may well protect against unexpected bouts of unemployment, allowing individuals more flexibility to move into different sectors or roles, these benefits may not become apparent for some time. However, we are unable to test this theory with the data currently available to us.

⁶ * p<0.05, ** p<0.01, *** p<0.001

International Baccalaureate

In this section we consider the employment outcomes associated with young people who had previously taken the IB, to identify any potential benefits to the breadth of study that the IB provides. We present both descriptive differences in the earnings of these young people and the results from our regression analysis. It should be noted, however, that this is not a full evaluation of the IB, which would require a much deeper and broader analysis.

Figure 21 - Distribution of earnings for 26-year-olds who had taken the International Baccalaureate: men and women

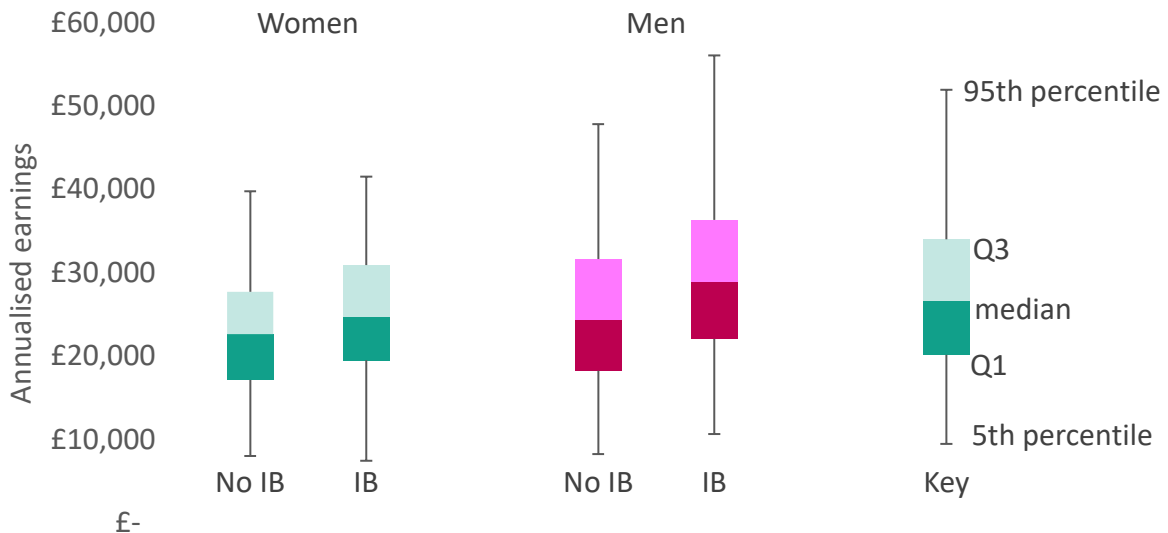


Figure 21 shows that both men and women who achieved the IB earned more than other students who had taken level 3 qualifications and had achieved at least a bachelor's degree. The median earning of women who achieved the IB was £2,100 higher than those who had not. For men it was £4,600 higher. However, the IB is designed as a challenging alternative to A levels, and as a result the average prior (GCSE) attainment of students taking the IB is significantly higher than that of students taking other level 3 qualifications.

Table 4 - Returns for 26 year olds who had taken the International Baccalaureate⁷

		Age-26 returns by breadth score							
<i>Controls</i>		Men				Women			
Personal characteristics and KS4 results		No	Yes	Yes	Yes	No	Yes	Yes	Yes
Region & provider type		No	No	Yes	Yes	No	No	Yes	Yes
HE subjects and institution		No	No	No	Yes	No	No	No	Yes
Achievement of the IB		0.12 ***	0.11 ***	0.05 *	0.03	0.09 ***	0.09 ***	0.04 *	0.01
<i>Students</i>		52,390	52,390	52,390	52,390	68,885	68,885	68,885	68,885
<i>IB students</i>		270	270	270	270	385	385	385	385
<i>Adjusted r²</i>		0.00	0.01	0.08	0.15	0.00	0.01	0.10	0.16

Table 4 shows our regression estimates for those who had achieved the IB, for both men and women. Once we control for personal characteristics, KS4 results and region and provider type the returns associated with the IB shrink to around five per cent of earnings. That is to say that IB students earn four or five per cent more than students who were otherwise similar at age 16. This result is statistically significant at the 95 per cent level.

Once we further control for the status of the university they attended, and the subject of their undergraduate degree, the effect size reduces further to between one and three per cent. Although the effect size for men is similar to that associated with higher breadth scores (Table 2), the relatively small number of IB students means this estimate is not statistically significant.

This suggest that the IB helps young people to access universities and subjects that secure them increased returns, but that it is currently unclear whether the breadth and other factors unique to the IB provide further benefits in the labour market. As with our previous breadth analysis, it would be worth looking again at the returns for these students when they are older and have had more time in the labour market.

It is also worth noting that, as a relatively niche qualification outside of the independent sector, students taking the IB may differ from other students in terms of unobserved characteristics such as motivation or parental engagement. As we are unable to control for these factors within our analysis they may affect our estimates for the returns associated with achieving the IB.

⁷ * p<0.05, ** p<0.01, *** p<0.001

5 – Conclusion

Our research indicates that 26-year-olds who had studied qualifications from at least two subject groups during the 16-19 phase went on to have earnings three to four per cent higher than those who studied qualifications from only one group, after controlling for student's characteristics and educational attainment. Whilst this effect appears small, we must consider that we are measuring earnings early in individual's careers. Also, the effect is similar in size to that of disadvantage or the type of university attended, both of which continue to grow in importance during a career. Using employment data only for individuals up to the age of 26, our research cannot definitively show that this is also the case for curriculum breadth. But as a broader set of skills is likely to help individuals' transition into a broader set of roles, for example opening up opportunities in different sectors or following unemployment, it certainly seems unlikely that its importance will diminish.

Our research should be updated when the LEO data has been established for long enough to consider employment outcomes in individual's mid-thirties. This research should also return to the question of whether breadth is beneficial to avoiding unemployment in the longer term, as our research showed no statistically significant relationship between breadth and sustained employment or education outcomes. Similarly, a deeper study on the returns to the IB, which considers individuals later in their careers, would be worthwhile. Our exploratory analysis suggested that the IB may help students secure places on to more selective higher education courses (leading to higher returns). However once higher education course had been controlled for, we observed no statistically significant returns to the IB.

Following the introduction of new A and AS levels in 2015, the average number of qualifications taken fell by 43 per cent between 2016 and 2019. Correspondingly the average breadth score fell by 13 per cent over the same period. However, qualifications and breadth were falling even prior to these reforms, quite likely driven by the falls in funding seen since 2010 (Dominguez-Reig and Robinson 2019) and by a funding formula that provides no extra funding for a student taking an AS level in addition to three A levels (or equivalent qualifications).

It is also concerning that disadvantaged students and Gypsy or Roma, Black Caribbean, White and Black Caribbean and students with any other black background study the narrowest range of subjects on average, even when we consider students taking similar numbers of qualifications. Whilst we have not considered how much of this lack of breadth may be due to the lower average prior attainment of these groups, it nonetheless requires further attention from policymakers.

To reverse the recent fall in provision and breadth the government must undertake a wholesale review of 16-19 funding. We've previously provided evidence for an increase in funding levels, including greater funding for young people from lower income or disadvantaged backgrounds. These changes will help reduce overall funding pressures but must go together with a funding formula that no longer discourages breadth as provided by smaller additional qualifications such as AS levels.

When the government undertook their reforms of A and AS levels they were keen to preserve the additional breadth offered by AS levels (Rt Hon Michael Gove MP 2013). This clearly has not happened. The government must act to ensure that England's already uniquely narrow 16-19 provision is not squeezed further still.

Annex A: Full subject groupings

Table 5 - Primary grouping (five groups) and additional groupings used for robustness checks.

Three groups	Five groups (primary grouping)	Seven groups
Science, technology, engineering and maths	Science, technology and engineering	Science, technology and engineering
	Mathematics	Mathematics
Arts, humanities, languages and social sciences	Languages	British languages
		Additional languages
	Humanities, arts and social sciences	Humanities and social sciences
		Arts
Vocational and professional	Vocational and professional	Vocational and professional

The following list shows which of our 5 groups subject areas are categorised into. The additional subgroups for the 7 groups are shown under bullet points.

Science, technology and computer science

Science, Engineering, Manufacturing technologies, Transportation operations and maintenance, Building and construction, Urban, rural and regional planning, Biology, Chemistry, Physics, Computer studies and science, ICT practitioners

Mathematics

Mathematics and statistics, Further maths

Languages

- **British languages** - Languages, literature and culture of the British Isles
- **Additional languages** - Other languages, literature and culture

Humanities, arts and social sciences

- **Humanities and social sciences** - History, Archaeology and archaeological sciences, Philosophy, Theology and religious studies, Geography, Sociology and social policy, Politics, Economics, Anthropology, Linguistics, Critical thinking, Psychology
- **Arts** - Performing arts, Crafts, creative arts and design, Media and communication

Vocational and professional

Medicine and dentistry, Nursing, and subjects and vocations allied to medicine, Health and social care, Public services, Child development and wellbeing, Agriculture, Horticulture and forestry, Animal care and veterinary science, Environmental conservation, ICT for users, Retailing and wholesaling, Warehousing and distribution, Service enterprises, Hospitality and catering, Sport, leisure and recreation, Travel and tourism, Publishing and information services, Teaching and lecturing, Direct learning support, Foundations for learning and life, Preparation for work, Accounting and finance, Administration, Business management, Marketing and sales, Law and legal services

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