Department for Education

Understanding costs of undergraduate provision in Higher Education

Costing study report

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GSR
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Social Science in Government

Important Notice

This report has been prepared in accordance with the terms of our engagement with the Department for Education (the 'DfE') dated 10th August 2018 (the 'Services Contract'). Accordingly, save as set out in the Services Contract, we have (i) not verified the reliability or accuracy of any information obtained in the course of our work, or (ii) not taken into account the interests, needs or circumstances of other parties (whom we may be aware might read this report).

This report is based on fieldwork carried out between 16 July 2018 and 15 February 2019.

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In particular, the report has not been prepared to address the individual requirements of any higher education institution nor those of people or organisations involved in the education sector who might have an interest in the matters discussed in this report.

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1 Executive Summary

1.1 Introduction

The purpose of this study is to help the Department for Education (DfE) to further understand the full economic cost[1] of undergraduate and foundation degree provision at a subject group level within Higher Education Institutions in England. This will form part of DfE's evidence base to support its higher education funding policy. This study is also part of a wider programme of evidence-gathering to inform the Post-18 education and funding review[2].

Building on information already collected as part of the Transparent Approach to Costing (TRAC)[3] exercise, this study contains an examination of what variation in full economic costs exists across the HE sector in England and between subject areas; what causes the differences in costs and how this influences institution decision-making. KPMG are independent consultants appointed to undertake the study in order to protect institutional anonymity and commercial confidentiality.

This study does not:

- Include funding decisions or recommendations. These are decisions for DfE to take;
- Make any assessment or judgements regarding teaching quality in respect of the reported costs; and
- Comment on the spending decisions taken by institutions.

In exploring the context of institutions' business models, we have collected institutions' views on the costs related to teaching. We noted that many factors, aside from cost, influenced institution's decisions around the teaching portfolio such as student demand, fulfilling quality requirements, and maintaining and enhancing reputation. We also noted that these decisions were often strategic in nature and not limited to the teaching of undergraduate provision.

1.2 Purpose of this study

This study addresses the following five key questions:

1. What is the total average full economic cost by subject groupings for full and part-time undergraduate-level provision?
2. What contribution do a range of cost categories make to the total average full economic cost?
3. What factors drive the total average full economic cost of different subjects for full- and part-time undergraduate provision?

[1] The TRAC process provides a full Economic Cost (fEC) of Teaching by taking the expenditure reported in the consolidated financial statements and adding a margin for sustainability and investment (the MSI). Further information on how fEC is determined in the sector is provided in 4.5.3.
[2] Further details on the Post-18 review terms of reference can be found here.
[3] For further information about TRAC, please refer to 4.5.3 or click here to access the TRAC website.

4. What factors help explain variations between institutions in the average full economic cost per student of a particular subject?

5. How do the costs of different subjects, in the context of institutions' business models and market pressures, influence an institution's decision-making?

To address these questions, we aimed to:

- Determine the average annual full economic cost per full-time equivalent student for the teaching costs of the subject groups in-scope on a Transparent Approach to Costing, ("TRAC") basis.

  Section 7.3 details the subject group unit costs for full-time and section 7.13 for part-time and foundation provision. Furthermore for full-time provision, section 7.4 details the subject group unit cost by TRAC Peer Group, section 7.6 by HESA cost centre and section 7.10 for the London based institutions.

- Understand the drivers of costs and cost variations.

  The description of the types of cost and their drivers collected in the costing methodology is provided in section 4.5 and supplemented by further detail in section 7.7, and Annex H and throughout the report we provide examples of the costs recorded.

  In addition to the variation presented in the charts of section 7.3 and 7.6, unit cost variations are reported in section 7.5 and sections 7.9 to 7.12 assess a range of factors which can influence cost.

- Provide the basis for a critical analysis of the strength of the evidence base for the costing analysis.

  Section 5 deals with the coverage provided by the data from participating institutions and highlights where representation was weaker. Section 6 describes the validation procedures and outcomes from assessing the evidence collected and used in the study.

We also sought to identify any issues that DfE might need to consider in using the costing data to inform its future funding decisions. We collected costs at course level, but then aggregated these up to a subject grouping level via existing Higher Education Statistics Agency (HESA)[4] cost centres. This is to reflect the current funding model which considers the cost of provision at the HESA cost centre level, which then informs a small number of price groups[5]. The mapping of HESA cost centres to subject grouping is provided in Annex C.

1.3 Scope

The scope of this study includes all undergraduate and foundation, part-time and full-time provision in England. It excludes the costs of postgraduate teaching provision, distance learners, short courses, franchised out provision and apprenticeships. It also excludes the cost of students' residential accommodation.

[4] For further information about HESA please click here.
[5] For further information about price groups please click here.

The study is based on the teaching costs reported in the academic year 2016-17. The methodology used to determine unit costs included all overseas students and relevant teaching costs, but excluded the discrete indirect costs associated with recruiting overseas students. This was done on the basis that institutions do not treat differently the delivery of teaching to these students. Indeed, isolating home and EU students could have created greater inconsistency and introduced further subjectivity into the costings. The students used for determining FTE and headcounts are therefore all Home, EU and Overseas students.

The costs collected also include all teaching costs whether or not the student completed their studies. Non-continuation rates[6] among institutions vary. For consistency with other exercises in the sector, we used a student FTE based on those that completed their course for the 2016-17 academic year.

1.4 Methodology

The study used the teaching costs reported in the Transparent Approach to Costing[7] (TRAC) data as its starting point for determining the costs of the in-scope provision. Where a resource supports teaching and another activity, for example research, the costs are apportioned between these activities in TRAC to reflect a reasonable cost for each activity.

TRAC is the standard method for costing in higher education in the UK and institutions use this methodology to report on their cost of teaching, research and other activities. TRAC provides a full economic cost of delivering these activities by incorporating a 'margin for sustainability and investment' (further details are provided in section 4.5.3). This is to provide the sustainable cost of teaching, research and other activities and is a concept that was accepted by HM Treasury in 2004 as a basis for funding research. We are also aware that the TRAC data has also been used in various other costing studies.

In summary, the approach used:

- TRAC based data as a robust and auditable source of data that agrees to the audited financial statements and captures the full economic costs;
- A Stage 1 pilot to develop the approach and consider the merits and disadvantages of alternative approaches;
- A Stage 2 pilot to test and refine the approach, prior to launching the full study;
- A consistent data collection return – developed during the pilot stages; and
- Close liaison with DfE and a range of stakeholders. These interactions also helped develop the approach, understand the variation in provision and debate the reasonableness of emerging findings.

To achieve a good understanding of subject group costs and their variation, we needed a representative sample of higher education institutions to participate in the study. To achieve this we engaged with a broad group of stakeholders to deliver a widespread communication

[6] Non-continuation rates used in the study were based on the percentage of students who did not continue or qualify at the same institution based on tracking students from the year they enter an institution to the following year (for full-time students). For further information on rates of non-continuation, please refer to HESA, or click here.
[7] For information about TRAC, please click here.

strategy across the sector to successfully achieve the coverage needed. We thank the groups for their valuable help and assistance.

The data collection included a number of contextual questions to contribute to addressing the broader questions posed by the study. Additionally, a series of face-to-face meetings were undertaken with 17 institutions to explore these questions and address any issues arising from the cost information submitted.

A key element of the study was to assess the reasonableness of the submitted data. We have not audited or verified the data provided by institutions. The methodology was designed to assess the reasonableness of the results, relative to data returned by other institutions. We have listed in section 6 the approach taken to assess the reasonableness of the data received.

The project was overseen by a Steering Group and further support was provided by an informal Technical Group. Annex A provides details of the Steering Group and the institutions involved in the Technical Group. Sections 3.5 and 4.5 contains further detail on the methodology for the study.

1.5 Coverage of the study

All institutions with in-scope provision in England were invited to participate and 41 submissions were received.

Following completion of the quality checking and a number of resubmissions, one institution was excluded from the analysis. As a result, over 9,000 courses from 40 institutions have been included in the analysis. Anonymised data at the aggregated subject group level of provision has been shared with DfE for use in informing their policy considerations.

The study has achieved the following levels of coverage:

- On a like-for-like student full-time equivalent (FTE) basis (based on HESA data provided by the Office for Students) for each subject group, the study reported an overall coverage of 38% coverage of all possible student FTEs, with a range of 36% to 52% by subject groups; and
- On a regional basis using the numbers of student FTEs contributing to each subject group, the coverage ranged from 35% to 52% for institutions outside London and for London institutions from 23% to 54%.

We have applied a threshold used in other studies for excluding results from detailed analysis that risk identifying individual institutions. Therefore where a level of analysis contains less than five institutions, the analysis has not been presented in the report.

Section 5 provides more detail on the coverage achieved.

1.6 Key findings and conclusions

The findings are based on the results provided by 40 institutions. The overwhelming majority of the analysis presented in this report related to full-time undergraduate provision as comparatively far less data on unit costs was collected for part-time and foundation degrees (further detailed in section 7.13).

All unit costs provided are based on one year (2016-17). Therefore this will need to be multiplied by the number of years of the programme to give an indicative cost for the entire programme.

The remainder of this section details findings and conclusions. Section 1.6.5 and Annexes J and K detail the findings for the part-time and foundation provision, but it is important to note that the costing information for part-time and foundation degree provision is less reliable and representative of all institutions delivering this provision.

It is also important to note that institutions had a variety of ways in which they organise, control and report their expenditure during the year. Therefore, whilst the study captured all the relevant teaching costs, any analysis using the detailed cost category levels needs careful understanding to avoid misrepresentation.

1.6.1 Unit costs by Subject Group for full-time provision

This section describes the unit cost results for each subject group. Section 1.6.2 describes the costs included, section 1.6.3 shows the variations in the results and 1.6.4 summarises what drives these costs.

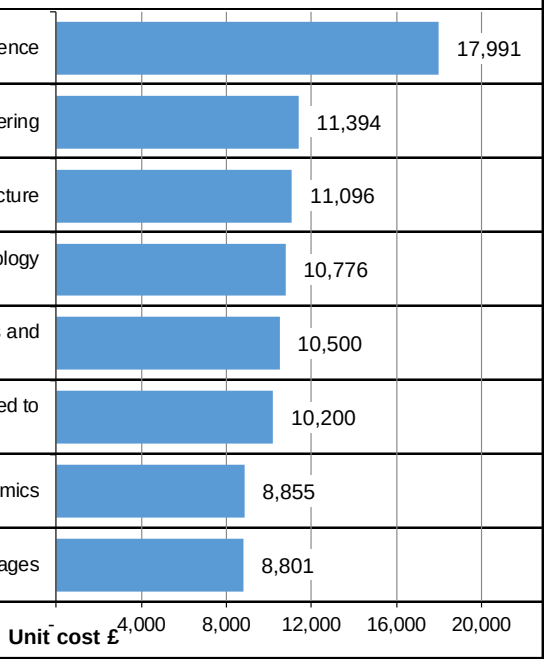
By aggregating the course costs and student numbers (FTEs) we calculated a total weighted average unit cost[8] for each subject group.

The following chart details the range of weighted average unit costs for each subject group, for full-time provision[9].

[8] This study determined unit costs that included both home and overseas students and relevant teaching costs on the basis that institutions do not treat differently the delivery of teaching to these students. See Annex O for the method to determine the total weighted average unit cost.
[9] For full-time provision, more than four institutions' submissions were received for each of the eight subject groups, as shown in the figures to the left in Chart 1.

Chart 1 – Weighted average unit cost for each subject group for full-time provision

Number of institutions in study	Number of student FTEs in study	Subject group and their weighted average unit cost £
14	20,591	Medical, dental and veterinary science
31	31,778	Engineering
37	64,974	Art and design and Architecture
26	16,991	Geology, environmental sciences, archaeology and ancient history
31	40,050	Maths, physics, chemistry, informatics and computing
32	97,258	Biological sciences and other subjects allied to health
34	109,727	Social sciences, history, economics
30	41,552	English, law and modern languages



Source: Analysis of data returns

Key observations from the chart are:

- Medical, dental and veterinary science is the subject group with the highest weighted average unit cost of £17,991 by a significant margin, over £6,400 above the next highest group;
- Five of the eight subject groups have a weighted average unit cost between £10,000 and £11,500; and
- The two lowest weighted average unit cost subject groups are within £100 of each other; Social sciences, history and economics at £8,855, and English, law and modern languages at £8,801.

For the Medical, dental and veterinary science subject group:

- Fewer institutions provided submissions but the coverage achieved across relevant providers was 52% by student FTEs. This is due to there being a smaller number of providers delivering this provision;
- Weighted average unit costs for course delivery staff, non-pay and departmental running costs were consistently higher than all other subject groups; and
- Placement activities were part of the professional training within this provision. Placement activities occur when a student is in a location where they receive supervision and undertake work associated with their professional studies. For medical (and some other provision within biological science and other subjects allied to health), they receive training in conjunction with a health provider, or trust. Health Education England funds this activity, but this can be paid directly to the placement provider or via the institution. Whilst the data return sought

further details on placement, the overall detail was insufficient to robustly extrapolate the cost impact for this study.

For the lower unit cost subject groups of English, law and modern languages, and Social sciences, history and economics, these had lower weighted average unit costs for staff, non-pay and departmental running costs, though not always the lowest among subject groups in proportionate terms. Both subject groups had the higher number of students in their staff to student ratio (of 24 to 25 respectively).

We also calculated an overall weighted average unit cost of £10,372 for all full-time provision. This figure should be used with caution as it reflects the mix of subject groups and student volumes from the participating institutions, their various locations and many further factors influencing how the provision is taught. It is therefore unlikely to represent any single institution's overall cost for one full-time student.

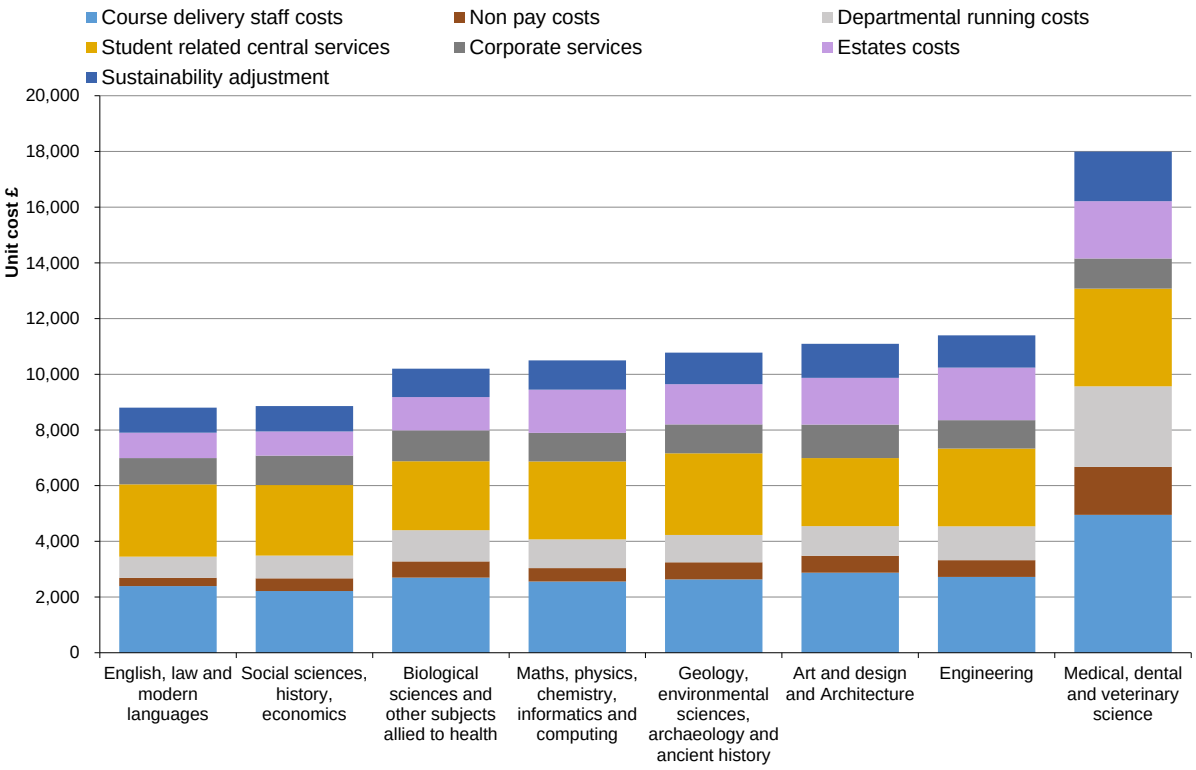
1.6.2 What costs are incurred?

We required institutions to provide their teaching costs using seven cost categories which we developed (comprising course delivery staff costs, non-pay, departmental running costs, student related central services, corporate services, estate and sustainability)[10]. Across the subject groups, we analysed the unit cost amounts and proportions by each cost category for the full-time provision[11] in Chart 2 and Chart 3.

[10] More detail on the cost categories used in this study and the type of cost items allocated to each category is set out I Annex H of this report.

[11] Charts for part-time and foundation courses are provided in Annex J and K. Charts for each subject group by institution and cost category are provided in Annex P, Q and R for full-time, part-time and foundation provision respectively.

Chart 2 – Weighted average unit cost for full-time undergraduate subject groups by cost category



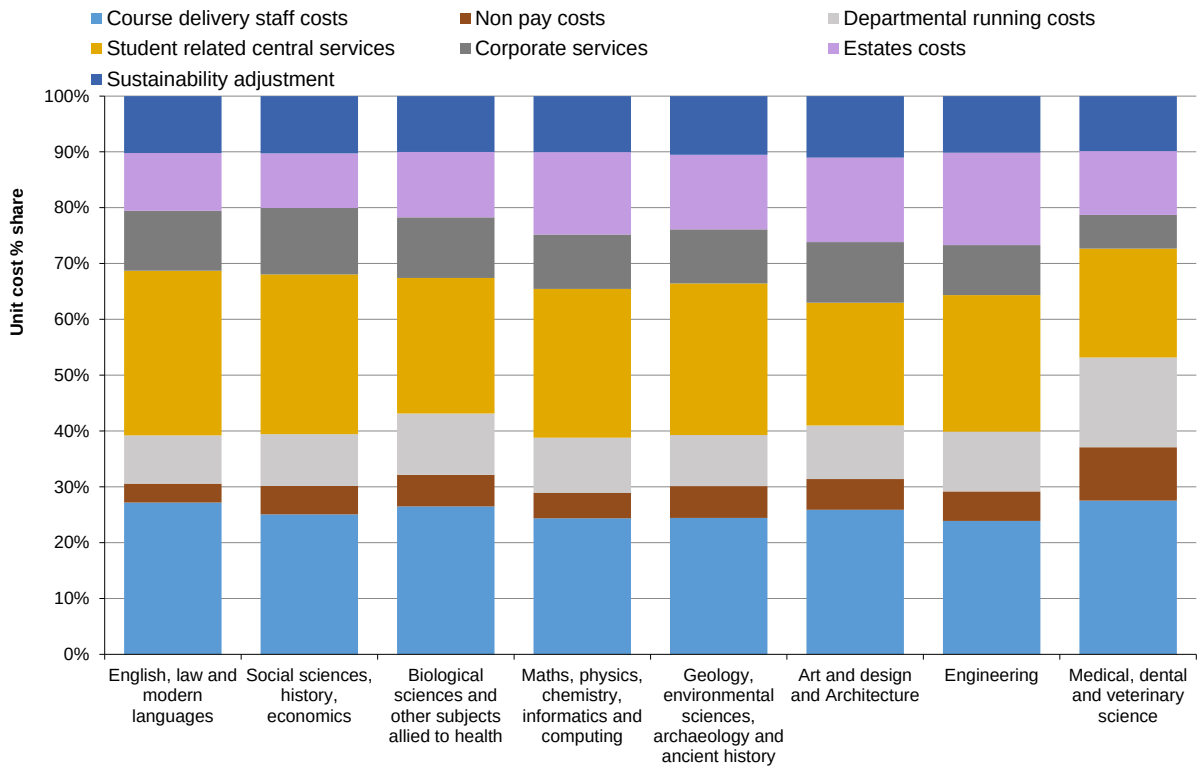
Source: Analysis of data returns

Among the data provided at this level, we found:

- Some consistency among the course delivery staff costs (with the exception of Medical, dental and veterinary science) and sustainability adjustment categories of cost; and
- A lesser amount of consistency, in terms of absolute values, among the subject groups' categories of non-pay, departmental running costs, centrally organised service costs and estate costs. Here the organisational structure of an institution appeared to influence, to some extent, the allocation of costs among these categories. Further narrative is provided in 7.7.

As the absolute values of cost will vary by subject groups, Chart 3 has been produced to show the proportions of cost by subject group:

Chart 3 – Weighted average unit cost proportions by cost category and full-time undergraduate subject groups



Source: Analysis of data returns

At this level, we noted that:

- Student related central services costs are a large cost category for most subject groups (between 22% and 30%), except for Medical, dental and veterinary science. For this subject group, course delivery staff costs are higher (at 28%);
- Course delivery staff costs are between 24% and 28% for each subject group;
- Departmental running and Estates costs have similar proportions and ranges, 9% to 16% and 10% to 17% respectively; and
- Sustainability adjustment costs are very close in range, between 10% and 11%. This compares to a separate study where the weighted mean MSI for the UK sector as a whole was 9.8% in 2016-17[12].

From our queries with and visits to institutions, we understood that there are a variety of ways in which institutions organise, control and report their expenditure during the year. As a result, there is some variability in where costs are coded in the financial ledgers in respect of centrally run services, estates and departmental running costs. More centralised institutions will tend to record a higher share of student related central costs, corporate services and estates costs, whereas some institutions allocate the costs of these activities through their financial ledgers to the academic departments, which in turn increases the reported departmental running cost and lowers the corporate services and estates costs reported.

[12] Figure based on the mean (weighted) on an income basis. Margin for Sustainability and Investment: analysis of 2016-17 data, Sustainability Metrics Steering Group, August 2018, please click here for link.

An institution's use of technology adds another dimension to the process of resource allocation and subsequent cost variation. For example, live lectures can be recorded and beamed to a much larger audience, and in doing so can shift costs into IT infrastructure, regulation and support costs. More personalised and small-group teaching is also being supported by technology. As other technologies, such as artificial intelligence are adopted this may lead to further cost variation.

Therefore, whilst the study captured all the relevant teaching costs, any analysis using the detailed cost category levels needs careful interpretation and we suggest reviewing categories in combination with each other to avoid misrepresentation. Further understanding on the nature of the costs were also obtained through the queries raised and discussions held with institutions. Details on the costs requested are provided in Annex H.

1.6.3 Cost variations

The HE sector is made up of a diverse range of institutions in terms of size, mission and location. Whilst undergraduate students accrue the same amount of credits towards their overall degrees, the resources required to deliver the teaching they receive can vary. Students studying different subject areas will naturally need different expertise, resources and levels of direct support; for example through the environments they learn in and the course materials needed to study (from class-rooms to laboratories to studio spaces and specialist equipment). Furthermore, students study for different lengths of time and across institutions can study a broad range of different areas within the same subject. Whilst this is less applicable in degrees leading to professional registration, the absence of a standard syllabus, or even length of study among many similar sounding degrees, means variation is pervasive across undergraduate provision.

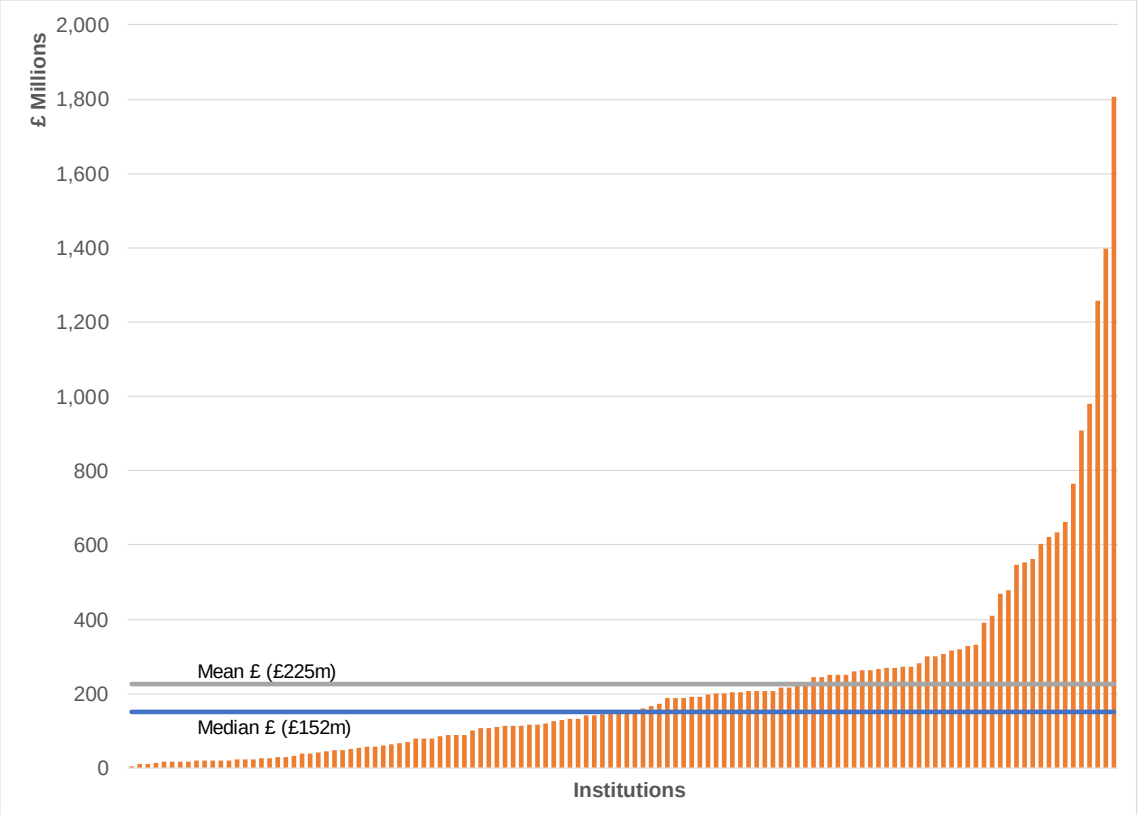
Student numbers can vary from year-to-year and also within an academic year. Students can switch courses, postpone, change institutions or leave higher education. This is on top of the life cycle of changes to courses, as new ones are introduced, existing ones revamped and other courses discontinued. This all has implications for how the course is taught, teaching contact time, and the number of students in a class, leading to variation in the resources required to deliver courses.

The courses themselves are made up of a number of modules. Individual students can select different combinations of modules within the same course. Where relevant, we were informed that this can lead to variation in the course cost reported.

In addition, the many varied student expectations, learning preferences and support, leads to differences in the approach to deliver the provision, which creates further cost variation. This variation is further impacted by institutional geography, scale, mission and history, and is influenced by the staff seniority, number and type to deliver the teaching. For example, Chart 4 shows the range of total expenditure across the 122 institutions that delivered provision that was in-scope for the study.

This chart shows wide variation in expenditure levels. In this population of institutions, the sector has five institutions contributing 20% of the total expenditure and a mean over £70m higher than the median of £152m. Almost seven in every ten institutions reported expenditure less than the average of £225m.

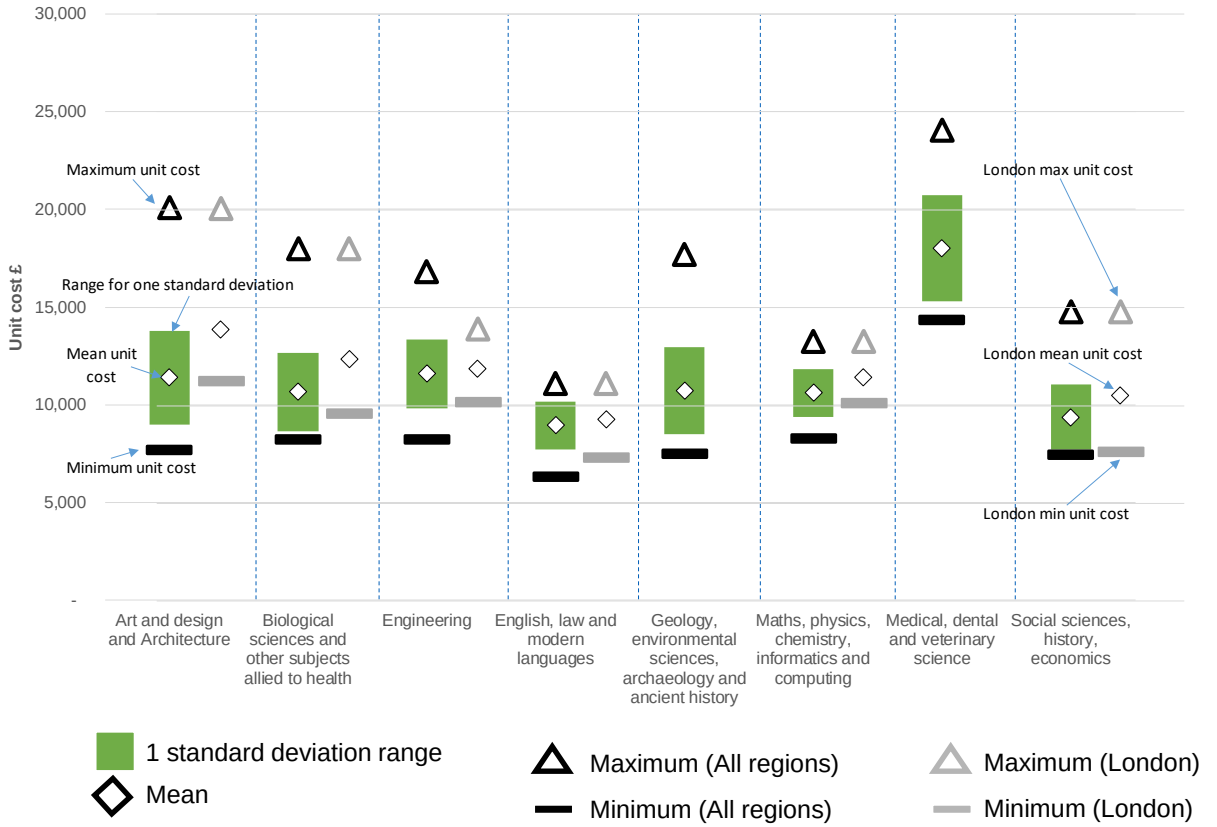
Chart 4 – Total expenditure for 2016-17 by institution



Source: Analysis of Finances of Higher Education Providers 2016-17, HESA Finance Record, released 28 April 2018, Table 1 and available here

We assessed the variation in the unit costs of teaching reported by institution, in line with the requirements for the study. The higher education sector has a wide range of institutions in terms of type, mission, location and scale and the weighted average unit costs report appear to reflect the diversity of the sector. To assess the variation we analysed the highest and lowest unit costs reported by institutions and the range for one standard deviation above and below the mean. This is shown in Chart 5 together with unit costs for London institutions only.

Chart 5 – Variation of weighted unit costs by subject group for full-time provision



Source: Analysis of data returns.

Fewer than five London institutions submitted data for Geology, environmental sciences, archaeology and ancient history, and Medical, dental and veterinary science, and therefore the results are not published.

The Medical, dental and veterinary science subject group has a broader range for its standard deviation (the unit costs up to one standard deviation either side of the mean). Part of the explanation for the Medical, dental and veterinary science subject group's broader range for the standard deviation, is the fewer number of contributions, (data returns were received from 14 institutions although out of a possible 36 which meant 39% coverage). It is also affected by the geographic spread of institutions and could be affected by the different arrangements for funding student placements. The variation in student placements arises due to some institutions paying placement providers and receiving the funding from Health Education England (HEE) for the placement costs, whereas in other regions HEE pay the placement provider directly.

Arts and design and architecture has the second highest standard deviation range. Part of the reason for this appears to be some institutions having more intensive teaching than others and others with higher student related central costs, estate costs or corporate service costs. This appears more exaggerated by the mix of institutions that provide this subject group provision, being a mix of specialist small institutions (some in London) and institutions with a broader portfolio and hence opportunity to spread overhead costs more widely.

The London institutions had generally higher unit costs for each subject group and a 'minimum' unit cost above non-London institutions. In six out of the eight subject groups with the highest unit cost, the institutions were all London based (five are shown in the chart). Not one institution dominated the subject groups. Half of the institutions with the highest unit costs

reported a low number of students in their ratio of staff to student[13]. Section 7.10 concludes that institutions located in London or specialist in nature had consistently higher subject group unit costs.

In considering the institutions reporting the lowest unit cost in each subject group we noted that five of the eight institutions are based in the North of the country. Four of the eight institutions have a high number of students in their staff to student ratios. None of the London institutions reported the lowest unit cost for the subject group.

Institutions exercise discretion over the level of resource used and costs of delivering provision, but this is influenced and limited by a number of factors. From our discussions with institutions, we were informed that these factors include: whether courses are accredited by professional oversight bodies; the resource intensity of the subject (i.e. the level of equipment and facilities required to deliver the course), access and participation plan obligations, widening participation plans and the demands and expectations of students in the context of operating in a more market driven environment. We outline in section 1.6.6 some other issues that limit the flexibility of the cost base.

Section 7.5 provides further insight into the amount of variation that exists across institutions for each subject group and section 7.9 provides insights into the factors behind some of the variation.

1.6.4 Understanding the cost drivers

We assessed whether different factors influenced the range of costs reported by institutions. To achieve a consistent and comparable analysis across different factors, we averaged the rank that each institution obtained by ordering their weighted average subject group unit costs (from 1 being the lowest in unit cost to 40 being the highest) and averaged the results against each of these factors. Annex X provides further detail on the methodology.

The following was analysed independently:

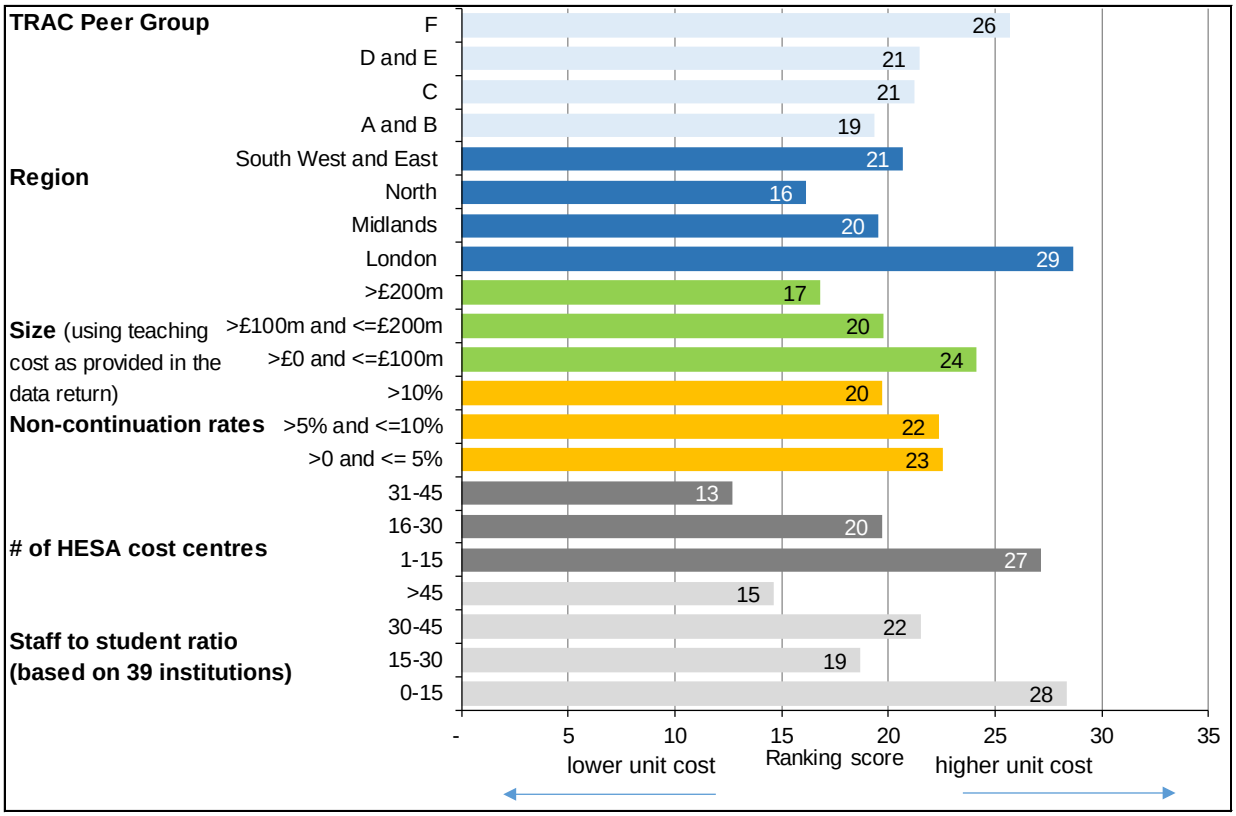
- TRAC peer group;
- Region;
- Financial scale of institution;
- Non-continuation rates;
- Number of HESA cost centres; and
- Staff to student ratio.

Using TRAC, each higher education institution is categorised into one of six Peer Groups depending on their size, as measured by income, the level of research income and whether they are specialist or have a medical school. Further details are provided in Annex B. This study uses Peer Groups to provide useful comparisons across similar institutions.

Some of the factors analysed are not independent of other, for example financial scale is also partly a function of the numbers of HESA cost centres in which institutions deliver provision. From the analysis we produced the following chart for the 40 participating institutions (except for the staff to student ratio analysis which was for 39 institutions).

[13] This was limited to three of six institutions, as two institutions did not provide SSR data.

Chart 6 – Average ranking results of subject group costs from each institution



Source: Analysis of data returns

From the analysis presented in Chart 6, it can be seen that:

- Specialist institutions (typically in TRAC Peer Group F) tend to have a higher unit cost, although size, the type of subject taught and less course variety are also likely to be factors in this group;
- Institutions in London tend to have a higher unit cost. Our further analysis indicates that the unit cost is 14.1% higher on average (see section 7.10);
- An institution with a smaller overall teaching cost is likely to be more costly on a unit cost basis though this factor is not independent of other factors such as the number of HESA cost centres;
- An institution with more HESA cost centres, a proxy measure of course variety, is likely to have a lower unit cost and conversely the institutions with fewer HESA cost centres had a higher unit cost (though this is also likely to be linked to scale and the specialist nature of those institutions). The mix of subjects offered will mean that this is not always the case however; and
- A higher number of students in the ratio of staff to students has a lower unit cost, and conversely the institutions with higher unit costs had a higher proportion of staff to students.

The ranking analysis also enables a comparison across factors. Institutions with a higher unit cost seem most associated with:

- Fewer HESA cost centres; and
- The ratio of staff to students (a lower number of students in the ratio has higher unit costs).

For both the factors of HESA cost centres and the ratio of staff to students, the converse appears true for:

- A higher number of students to one staff member exhibited lower unit costs; and
- Where institutions delivered provision in more HESA cost centres, institutions exhibited lower unit costs.

It also highlighted non-continuation rates do not appear to influence the costs.

In conclusion, our analysis suggests that no single factor helps explain a difference in cost because more than one factor may be applicable, with all potentially applying to a single institution. For a higher unit cost, the factors included being located in London, being smaller in size, having a more limited range of provision and a lower number of students in their staff to student ratio. Discussions with institutions also confirmed these factors as important, but further illustrated the multi-factorial nature of influences on cost.

Annex Y contains a summary of the ranking analysis by subject group. Section 7.9.1 discusses the factors in more detail.

This study also determined the subject group weighted average unit costs of part-time and foundation provision. In this study, part-time provision was defined as dedicated part-time courses, rather than students studying part-time on a full-time course. The scale of this provision provided by participating institutions was considerably lower than that for full-time, and as a result, less representative. For the part-time provision, 17 institutions provided data returns and only 7 for foundation provision. More extensive data is required therefore before reliable judgments can be made over the cost of part-time and foundation provision. Section 7.13 outlines the limited results from these submissions.

1.6.5 Other considerations affecting the cost of teaching in the future

From the data returns, the visits undertaken to institutions and the broader engagement with stakeholders, it was consistently reported that the cost base in 2016-17 will not be representative of that in future years. The following issues were outlined as having an impact on the cost base and/or financial stability in future years:

- Pension costs – there are well documented changes planned for employer contributions to the Teachers Pension Scheme (7% increase), the Universities Superannuation Scheme and the Superannuation Arrangements for the University of London. A review is also ongoing affecting Local Government pension schemes and NHS pension schemes that may result in changes to contributions. Institutions outlined that they have limited control to be able to mitigate these increased costs and therefore noted that these changes will lead to increases in the cost of teaching in future years.
- Inflation – Inflation will be a factor affecting costs each year following 2016-17 on which this study is based. The retail price index from August 2017 – December 2018 indicates inflation of 4.7%. The consumer price index from August 2017 – December 2018 indicates inflation of 3.8%.
- The impact of BREXIT on EU and Overseas student recruitment, and staff retention and recruitment.
- Increased regulatory costs. With the introduction of the OfS, institutions foresee some additional costs in fulfilling their regulatory requirements.

- The cost base supporting Nursing, Midwifery and Allied Healthcare provision was stated as being in transition for some institutions in 2016-17 following the changes in the funding arrangements for this provision. This could mean the cost of delivering this provision will be subject to change in future years.
- Although unable to be quantified, institutions stated that their research agendas provide knowledge benefits to teaching, but that the costs of acquiring these advantages are not included in the teaching costs reported in this study.

Institutions also noted that they had experienced course delivery staff vacancies in 2016-17. This may increase the level of cost included in the study where more expensive temporary staff provided teaching cover, or may decrease the cost in examples where existing staff provided the necessary cover.

The HEFCE report on the 'Financial Health of the higher education sector 2016-17 to 2019-20 financial forecasts' publication noted the increases in capital expenditure and how this has increasingly been funded by cash and borrowing. Institutions outlined that these are long term finance obligations that have to be fulfilled.

1.6.6 Reported benefits and challenges arising from this study

Several institutions reported a number of benefits from completing the data return and participating more broadly in the study. These benefits included:

- Undertaking more detailed internal reviews into areas where the results challenged the existing financial understanding in areas of provision;
- Complemented ongoing discussions and work with academics on costs and the institution's finances more generally; and
- In one case, it identified an error made in the institution's TRAC return. Whilst not significant to this study, or its TRAC return, the institution planned to correct its treatment of costs for its future TRAC returns.

In the main, institutions acknowledged the importance of the study to the Post-18 Review and reported to have prioritised resources accordingly. However, many institutions, both those participating and those that declined, commented that the timescale and timing of the study were challenging. For those completing the data return, these concerns sometimes meant limiting the input from staff from across the institution in both preparation and review of the data return. The study needed input from finance, student registration or management and academic leads. Where the information was not readily available, some institutions reported focussing more on providing sufficient financial and student data in order to complete the unit cost calculations. This was completed in the time available at the expense of providing some of the wider and more detailed contextual data needed to explain fully the allocation of teaching costs across the seven cost categories and on the comparatively higher or lower unit costs for certain courses or certain institutions.

1.7 Summary

Our key findings and conclusions are that:

- Forty institutions participated in the study and this provided good coverage across subject groups; 38% coverage of all possible student FTEs, with a range of 36% to 52% by subject groups;
- The institutions that participated were diverse in nature and reflected the sector as a whole.
- The key factors helping to explain higher unit costs included being located in London, being smaller in size, having a more limited range of provision and a lower number of students in the staff to student ratio. All these factors could apply to a single institution.
- Across institutions, variations exist in the unit costs at the subject group level and, HESA cost centre level. Institutions explained that costs can vary across financial years depending on number of student FTEs and the stage of development or closure of the course.
- Whilst no single factor analysed had a strong relationship to the reported unit cost, being in London led to higher unit costs by 14.1% overall. Of the largest cost categories, course delivery staff costs were 6.3% higher and student related central services by 5.5%. Six institutions with these higher cost factors were consistently more costly across all of their provision.
- Institutions that were less costly in some subject groups were not consistently less costly in all subject groups. In a number of cases, institutions stated that they had a diverse portfolio in support of their strategic aims, and aimed to maintain a balanced financial position over the longer term.
- Direct teaching costs varied between 24% and 28% by the subject group being taught.
- Staff and Student related central services costs make up the largest share of unit costs across the subject groups (between 47% and 57% for both in total across all subject groups). These Student related activities (25% of the total costs) include financial support to students, library costs, marketing and admissions services, outreach services and student facilities. They also include IT services which are relevant to students and staff alike.
- Cost influences decisions over teaching portfolio, but not at the expense of quality. The larger cost decisions tend to be strategic in nature and executive time is spent assessing options and impact, both financially and non-financially.
- The volume of data received for part-time and foundation degree provision limits the conclusions that can be reached on the differences in cost for this type of provision.

In summary, we found that institutions are diverse and complex which leads to a variation of costs of teaching within subject groups. Institutions reported increasing challenges to maintaining financial stability due to volatile student demand, balanced against a desire to invest in staff to lower the student figure in the staff to student ratio, IT, and infrastructure, which are seen as enabling increased quality and attractiveness of the institution to students.

1.8 Limitations of the study

We collected, assessed and analysed a significant amount of data, from 40 institutions, covering 38% of the student population in England studying these courses during 2016-17. There are however some inherent limitations in this study, as follows:

- Whilst a range of measures have been taken to assess the data, we have not verified, substantiated or audited the data provided by institutions.
- Trend analyses and relative comparisons have been used to provide an indication of whether institutions have reasonably allocated and apportioned costs to the in-scope courses, but this does not provide absolute certainty that the costs are fairly stated.
- In completing the cost returns, management judgement has been used in certain cases to determine the costs that have then been allocated to courses and the cost drivers used. Reliance has therefore been placed on the sign off of these judgements by the Director of Finance or equivalent as appropriate.
- A 10% materiality threshold has been permitted in the guidance accompanying this study. It required institutions to apply the materiality threshold used in TRAC of 10% to the course costs.
- Responses to queries provided by institutions have been accepted at face value, subject to validation checks detailed in this report, and not subjected to procedures to verify the source of the data to further corroborating evidence.
- The pace at which this work was completed by institutions meant that it was not possible to collect as much contextual information needed to explain fully the allocation of teaching costs and on the comparatively higher or lower unit costs for certain courses or certain institutions.

Costing can be subjective and inevitably requires a number of judgements and assumptions to be made. We draw your attention to the principles set out in section 4.5.3 regarding TRAC and the principles institutions should apply in using it. We assume these have been adhered to and that in addition:

- Costs determined at the department and cost item level are representative of the costs incurred;
- Methods used to allocate costs to courses are based on sound and representative judgements;
- Out-of-scope assumptions are reasonable and reflect institutional circumstances;
- The metrics determined in allocating costs to courses are reliable and robust;
- The volumes of student active on each year of the programmes in-scope in 2016-17 is typical and representative unless specified; and
- Institutions have undertaken the reasonableness checks specified in the guidance for this study and sign-off and submission of their return indicates that the results are robust for the courses operated at their institution.

2 Glossary

This section details the acronyms and terms used throughout this report.

Term	Description
BUFDG	British Universities Finance Directors Group
Corporate services costs	For the purpose of this study, these costs were typically, though not exclusively, costs outside of the direct control of the academic department. Corporate services costs were required to include corporate functions which institutions arranged in cost centres separate to academic departments within their own management account structure. They included Finance, HR and Legal functions.
Cost driver	Cost drivers are used for allocating costs that cannot be directly allocated to a course. They are based typically on staff or student measures.
CPI	Consumer Price Inflation is the rate at which the prices of goods and services bought by households rise and fall; it is estimated using consumer price indices. It differs from the RPI measure in the goods and services which it takes account of. It is a national measure published by the Office for National Statistics. Click here for further information.
Course delivery staff cost	For the purpose of this study, these pay costs were directly incurred and controlled by academic departments. These categories included academic teaching and technical staff.
Departmental running cost	For the purpose of this study, these costs (both pay and non-pay) were controlled by academic departments, but tended to be indirect in nature to the course provision, for example administrative support to the academic departments.
DfE	Department for Education
Direct cost	A cost that is only incurred as a result of undertaking a particular activity and can be wholly attributed to that activity.
Estates cost	The costs of the maintaining an institution's space e.g. lecture theatres, laboratories, meeting rooms, offices and corridors.
Student related central services	For the purpose of this study, these costs (both pay and non-pay) are typically controlled centrally but are primarily aimed at supporting student learning. They include IT, Marketing and Admissions, Financial support to students, Libraries and museums, Outreach activity and Student Facilities.
FTE	Full-time equivalent. A measure of time for one student on a full-time course, 1.00 describes one full–time student.
HE	Higher education.
HEFCE	The Higher Education Funding Council for England. It was dissolved in 2018 and replaced with the Office for Students under the Higher Education and Research Act 2017.
HESA	The Higher Education Statistics Agency. HESA collects a range of data every year UK-wide from universities, higher education colleges and other differently funded providers of higher education. These data are then provided to UK government and higher education funding bodies to support

Term	Description
	their work in regulating and funding higher education providers. Please refer to www.hesa.ac.uk for further details.
HESA cost centres	HESA uses cost centres as a way of coding higher education activities. Further information is available here.
HESPA	Higher Education Strategic Planners Association
In-scope	Term used to refer to the provision included in this study's terms of reference.
Non-pay cost	For the purpose of this study, these non-pay costs were directly incurred in delivering teaching and controlled by academic departments. These categories included course materials and stationery.
OfS / HEFCE-fundable	Activities that may be counted within funding calculations by the Higher Education Funding Council for England or definitions used by the Office for Students.
PG	Postgraduate.
PGT	Postgraduate taught student.
RPI	Retail Prices Index is a measure of inflation. It differs from the CPI measure in the goods and services which it takes account of. The UK Treasury uses the RPI measure of inflation and it is published monthly by the Office for National Statistics though they do not classify it as a national statistic. Click here for further information.
SSR	Staff FTE to student FTE ratio. Provision with a staff to student ratio of 1:20, or 20, has a higher number of students than 15, i.e. there are more student FTE for every 1.00 staff FTE. All things being equal, provision with a ratio of 1:20 would be expected to have a lower staff unit cost than provision with 1:15.
Student FTE	A full-time equivalent student, based on a student studying full-time for a full year.
Sustainability cost	The cost that reflects the margin for sustainability and investment (MSI) added to the costs reported in the consolidated financial statements to present a full economic cost. It is designed to account for the fact that the "real" cost of higher education activity was higher than the historic expenditure stated in most institutions' published financial accounts.
Time allocation survey	A survey completed by staff at an institution to determine the proportion of their time spent on various teaching, research and other activities, used to allocate staff costs to activities.
TRAC	The Transparent Approach to Costing.
TRAC(T)	The Transparent Approach to Costing for Teaching.
UG	Undergraduate.
UUK	Universities UK, a collective voice for 137 universities in England, Scotland, Wales and Northern Ireland.
Workload Planning Model (WLM)	A method, like the Time Allocation Survey, of establishing the staff time spent on teaching, research and other activities.

Term	Description
	The WLM plans staff time for the academic year and is based on the full year rather than the TAS ‘snapshot’ survey.

3 Introduction and background

3.1 Introduction

The Government announced its Review of Post 18 Education and Funding in February 2018. Understanding the cost of undergraduate and foundation courses (for both full and part-time students) being delivered by Higher Education institutions across England was an important piece of information for this review. The Department for Education (DfE) commissioned this study and wrote to all institutions, encouraging their participation.

DfE considers it crucial that future funding policy decisions are informed by evidence in the form of representative data and contextual information from institutions. This study has formed part of a programme of evidence-gathering to inform the Post-18 Review of Education and Funding and will form part of the wider evidence base to support is higher education funding policy.

3.2 Background

Building on information already collected as part of the Transparent Approach to Costing (TRAC)[14] exercise, we used the Teaching Costs from the annual TRAC return as the starting point for the unit cost calculations. This means that the opening costs used in the study have already been identified as those for Teaching. The study has not queried the opening costs as they have been formally approved and included in the institution's TRAC submission to HEFCE / the OfS.

We then examined what variation exists across the sector and between subject groups; what factors help explain the differences in costs and how this influences institutions' decisions around pricing. KPMG are independent consultants appointed to undertake the study in order to protect institutional autonomy and commercial confidentiality.

3.3 Aims and overview of this study

The objectives of this study were to provide a greater understanding of the cost of undergraduate and foundation provision (for both full and part-time students), and specifically to:

- Determine the average annual full economic cost per full-time equivalent student for the subject groups and types of provision in the scope of this study on a Transparent Approach to Costing (TRAC) basis;
- Understand the drivers of costs and cost variations; and
- Provide the basis for a critical analysis of the strength of the evidence base for the costing analysis.

[14] For further information about TRAC, please click here.

3.4 Scope detail

The study focused on higher education provision in England and was based on the 2016-17 academic year. The study included all undergraduate and foundation, and both part-time and full-time provision in England. It excluded the costs of postgraduate teaching provision; distance learners; franchised out provision; short courses and apprenticeships.

For the purposes of this study, participants assigned one category of either full-time, part-time, sandwich, foundation or other, for the mode of the course. For the avoidance of doubt for this study, and by way of an example, a course with a student re-sitting module/s on a part-time basis, or studying the same modules over a longer time period, was counted as a full-time (with the student FTE as less than 1.00 FTE).

Courses that had been introduced for the first time, or were being delivered for the final time in 2016-17, were included on the basis that the transition and evolution of courses are an integral feature of reviewing and refreshing the portfolio of courses and programmes offered. Whilst this produced some unusual unit costs at the course level, in aggregate for the subject group level, it was judged necessary to include these ongoing costs in the consideration of their full economic unit costs. Our later discussions with institutions confirmed that these unusual costs often reflected the stage of the institution's management of courses and their underlying modules. We heard evidence of portfolio reviews, or ongoing appraisal of courses, leading to their disinvestment or re-investment depending on a department or faculty or institution's view. We did not seek to adjust costs for these factors, rather to ensure that these differences did not indicate an error or misinterpretation in the specification of the study.

In the same way as reported for TRAC(T), this report also excludes results which risk identifying individual institutions. This report uses the same threshold for detailing aggregated data and only details those where five or more institutions have provided course costs.

Anonymised data at the aggregated subject group level of provision has been shared with the DfE for use in informing their evidence base and funding policy.

Section 8 discusses other costs that will affect the results in future periods.

3.5 Approach

DfE invited all English institutions to participate in the main study. To encourage participation, we engaged with UUK, BUFDG, Russell Group Finance Director Group and HESPA to promote the study. Stakeholders kindly engaged with their respective members to promote the study. We also provided a series of webinar briefing sessions to assist institutions in completing the required work. A help-line and dedicated email address were also established to provide further bespoke assistance to institutions as they were compiling their returns.

Throughout the study a governance structure was in place to oversee and guide the work undertaken. The DfE established a Steering Group, which was further supported by a Technical Group. Annex A details the membership of both groups.

To achieve a good understanding of subject group costs, their variation, and their unit costs, we needed a representative sample of higher education providers and their foundation and undergraduate courses within the scope of this study. To this end, a broad group of stakeholders were engaged to deliver a widespread communication strategy across the sector which enabled us to successfully achieve the coverage needed. We thank the groups for their valuable help and assistance.

To obtain reasonable unit costs for each subject group, we adopted a top-down costing approach based on TRAC data. This involved first calculating course costs before aggregating to subject groups using HESA cost centre classifications. In summary, the approach involved:

- TRAC based data as a robust and auditable source of data that agrees to the audited financial statements and captures the full economic costs;
- A Stage 1 pilot to develop the approach and consider the merits and disadvantages of alternative approaches. This phase included engagement with key stakeholders to build understanding of the courses, how they were delivered and the key features of the provision. We worked with eight pilot institutions to develop the costing methodology and associated data collection template;
- A Stage 2 pilot to test and refine the approach, prior to launching the full study. This phase took advantage of the initial wave of engagement and 48 institutions (including those from phase one) were invited to complete a draft data return. The completed returns provided invaluable insight which was used to further refine the data return and approach to the full study;
- A consistent data collection return – developed during the pilot stages; and
- Close liaison with the DfE and a range of stakeholders. These interactions also helped develop the approach, understand the variation in provision and debate the reasonableness of emerging findings.

The contextual questions contained in the data return also contributed to addressing the broader questions posed in the study. Annex G summarises the questions posed. Additionally, a series of face-to-face meetings were organised with 17 institutions to explore these questions and address any issues arising from the cost information submitted.

Details of the Steering Group and Technical Group membership is provided in Annex A. The key detailed interactions in the approach included:

- Steering Group meetings to oversee the delivery of the study;
- Two Technical Group meetings where the membership:
    - Advised on the methodology for the cost collection and detail of the contextual questions;
    - Provided insight and agreed the appropriate cost drivers and data sources to be used in the study;
    - Agreed the cost collection and contextual data return templates for use in stage two of the study and the subject groups;
    - Shared views and their understanding on aspects of course delivery, activities and management; and
    - Acted as sounding board to the KPMG team during the study.
- Engaging with the pilot participants to:
    - Discuss and develop the methodology;
    - Develop material to support sector-wide participation; and
    - Agree an appropriate and consistent methodology to capture the costs.

- Engaging with a range of stakeholders to understand course delivery issues, information availability, cost variations and the sector environment, gain support for further engagement with institutions and act as an agent to encourage institutions' participation.
- Producing a data collection template for the participants to capture their costs and contextual factors consistently;
- Sharing a secure data transfer site to support the distribution and collection of study materials;
- Publishing requests to institutions to participate in the main study and submit cost and contextual information;
- Presentation of webinars to outline the approach in development, the data collection tool in detail and respond to queries;
- Provision of a helpdesk to assist institutions as they collected the data and follow up with institutions;
- Assessing and analysing the data once submitted, to assess whether it complied with the methodology and was consistent across the participants;
- Producing cost analyses and assessing results in conjunction with the responses from the contextual questions; and
- Engaging with a range of participating institutions to:
    - Explore any challenge or benefits arising from producing the data submission;
    - Understand the budgeting process and how costs are managed;
    - Understand the financial planning approach and use of TRAC;
    - Discuss the approach to planning efficiencies and the use of full cost information in that process; and
    - Collect feedback on the study.

Having obtained and assessed the data, we calculated weighted average unit costs at the subject group and HESA cost centre level, identified key findings and conclusions based on the data and wider contextual information provided by participating institutions.

3.6 Acknowledgements

A key part of the study was to engage effectively with key stakeholders. This was achieved through a combination of one-to-one meetings, several online and in person presentations and discussions, and group meetings. We detail below the groups that we would like to thank for their contribution, co-operation and assistance with this study. Particular thanks goes to:

- All the pilot institutions involved in wave 1 and 2;
- Participating institutions in the sector wide data collection;
- British Universities Finance Directors Group (BUFDG);
- Higher Education Strategic Planners Association (HESPA);
- The Russell Group Finance Director group; and

- Universities UK (UUK).

3.7 Structure of this report

This report contains the following key sections:

- Scope and methodology;
- Coverage;
- Data validation;
- Findings and analysis;
- Other cost considerations; and
- Appendices.

4 Scope and Methodology

4.1 Introduction

The study focused on higher education provision in England and was based on the 2016-17 academic year. The study included all undergraduate and foundation, and both part-time and full-time provision in England. It excluded the costs of postgraduate teaching provision; distance learners; franchised out provision; short courses and apprenticeships.

In the same way as reported for TRAC(T), this report also excludes results which risk identifying individual institutions. This report uses the same threshold for detailing aggregated results and only details those where five or more institutions have provided course costs. As a further safeguard on the validity of unit costs, a threshold of 100 student FTEs has been applied to any aggregated results (applicable to part-time and foundation provision only).

Anonymised data at the aggregated subject group level of provision has been shared with the DfE for use in informing their evidence base and funding policy.

This section starts by detailing our approach to the pilot selection and the broader stakeholder engagement which was carried out in parallel. This section also sets out the cost methodology which was followed, the nature of the costs included and excluded and relevant student FTEs, and how we collected the costs and supporting contextual information.

4.2 Pilot selection

Our approach sought to establish a small pilot group of institutions to refine and test a proposed costing methodology and contextual data return. In response to the DfE's letter to institutions (dated 6 June 2018) notifying them of the study, over 70 expressions of interest in the study were received. From this number, 46 institutions indicated their willingness to engage in the pilot stage.

Given the number of institutions willing to participate in a pilot phase and the positive engagement received, we adopted a two phase pilot approach. In discussion with the DfE, it was agreed that a small pilot phase followed by a more expansive wave of participation would:

- Gain greater input to developing a robust methodology;
- Capitalise on the experience of a wider range of institutions;
- Use the available time to best effect; and
- Obtain some early data.

To determine the first wave of pilot institutions, we considered a range of factors, including the:

- Course / subject group coverage - determined using a proxy for coverage from the HESA cost centres from TRAC(T);
- Scale of institution – determined from TRAC(T) to help balance representation from both smaller and larger institutions;
- Location – particularly whether the institution was inner or outer London and across the regions; and

- Nature of institution – given by the classification provided by the TRAC peer group (see Annex B for further details). For example, whether the institution was a specialist provider or more general teaching or more research intensive institution.

These quantifiable factors were also balanced with considerations regarding:

- Managing a reasonable number of institutions through the process of testing the methodology; and
- Working with experienced institutions with demonstrable TRAC / costing experience that would help identify efficient and effective ways of determining accurate costs and contributing effectively to the pilot stage.

In discussion with the DfE, and based on the factors described and institutions' availability, eight institutions were selected to participate in the wave one pilot. They also became members of the Technical Group (see Annex A for details) tasked with providing technical support and guidance on the methodological approach as well as the collection and interpretation of the cost data.

A further 40 participants were invited to participate in the second wave of pilot work (making a total of 48 institutions in total).

We received updates on participation from institutions throughout the study. Some institutions reported their reluctant withdrawal due to key staff sickness and turnover, as well as other priorities, retirements, internal restructuring and a lack of time or resource required to fully participate. Despite these withdrawals, institutions remained supportive and positive on the purpose of the study and wished to be kept abreast of its findings.

4.3 Pilot work

The first pilot group of eight institutions helped develop the approach. We held discussions with the pilot participants to discuss features of their courses' delivery and the proposed costing approach to collecting the costs and contextual information. As part of the process, we shared a draft data return, which the institutions partially completed and provided comments based on their experience.

The pilot institutions provided invaluable feedback which confirmed that:

- The format and flow of the returns was reasonably easy to follow (particularly to the TRAC managers) and that the Teaching Costs reported from the annual TRAC provided a reasonable starting point for the costing process; and
- The amount of time required to collect the detail requested was a concern, particularly given the other routine tasks overlapping with this study's timetable, namely the year-end financial accounts and the audit work and the HESA and TRAC submissions for 2017-18, coupled with summer holidays when access to academics would be more difficult. The time constraint was also raised and shared subsequently with the DfE. This concern, which was also conveyed to the DfE, was a recurring theme raised by institutions participating in the second pilot wave.

Importantly the pilot institutions provided feedback which enabled us to improve and refine the approach for the next pilot phase of work. This included the data that we collected, the allocation methods used and the content of further training materials.

The second group of pilot institutions also received all the draft materials at the same time as the first pilot group. This aimed to compensate for the challenging timescale and help the second wave of institutions become familiar with the likely information requirements and approach being developed. Using the feedback from the first pilot group, a second draft data return was issued to institutions participating in the second wave to complete, even if partially, by the deadline. Many institutions involved in the second pilot wave were able to meet the deadline, although a few submitted returns after the deadline had passed. A series of webinars was also conducted to introduce the materials. It was agreed that a more comprehensive completion exercise by the pilot institutions would strengthen the main study's approach and completion rate.

The analysis of results and feedback from the second phase of pilot work resulted in further improvements to the approach and data collection templates.

The highly provisional and incomplete unit cost results and pilot feedback was shared with the DfE during September 2018 in preparation for the main study exercise. The preliminary results were shared on the understanding that they were not yet reliable and thus should not be used at that stage.

4.4 Stakeholder engagement

In parallel with the pilot stages, a range of engagement exercises were carried out to raise awareness and participation in the costing study. In discussion with the DfE, a range of stakeholders were identified. Further individual meetings or group meetings were held with representatives from:

- British Universities Finance Directors Group (BUFDG);
- Higher Education Strategic Planners Association (HESPA);
- The Russell Group Finance Director group; and
- Universities UK (UUK).

These interactions served several purposes. First, to communicate the purpose and importance of the study and accordingly gather the support and involvement of institutions. Second, to gather collective views and insights that would help our understanding and interpretation of the data and our findings. Third, it was also an opportunity to explain our methodological approach and test its suitability among the experts from those professions.

Institutions interested in participating in the study were invited to register, with a total of 83 choosing to do so. This also helped raise awareness in the sector, assess and secure coverage and prioritise further work to gather as many returns as possible and address coverage issues.

During the study we conducted a number of webinars with pilot institutions and with the wider registered participants. In early September 2018 the two webinars, used to introduce the requirements of the main study, attracted 82 participants. Both webinars provided an opportunity for participants to ask questions and understand the process and requirements.

The main study was launched on 18 September 2018 and two webinars were held to support institutions complete the returns. These attracted over 80 participants. Training materials and detailed guidance were also produced and issued alongside the webinars and with the collection templates. Institutions also had access to a dedicated helpline and via the secure

data sharing platform participating institutions accessed a series of Frequently Asked Questions.

Details of the number of institutions responding to the main study is detailed in Section 5.

4.5 Costing methodology

4.5.1 Overview

The approach we have used in this study has been founded on a TRAC based cost methodology and involved the use of the following data collection and validation methods and processes:

- Standard templates developed with pilot institutions;
- Provision of guidance to promote consistent treatment of costs and accurate allocation to courses;
- Institutions reviewing and validating their own data prior to submission;
- Institution Directors of Finance confirming that in their submission:
    - The costs declared were representative of those incurred in delivering the courses that were in the scope of this review;
    - The basis for allocating costs to the headings specified at the academic department level were not unreasonable and materially correct; and
    - The responses declared were accurate and complete for the courses that are in-scope.
- A desk-top review of each institution's data submission, which considered the consistency and completeness of the data submitted:
    - Within the institution's submission;
    - With the other participants' submissions; and
    - With data provided by the OfS for 2016-17 TRAC costs and student numbers.
- Follow up communications with each institution to assess where source data differed to the OfS's TRAC data, where submissions were incomplete or contained unexpected data and to explore the factors behind out-of-scope unit costs that were, in absolute or comparative terms, particularly high or low;
- Follow up queries with the institutions based on unit costs at a HESA cost centre level that were outside three standard deviations for the subject grouping; and
- A more detailed and systematic review of the submissions from a range of institutions focusing on those submissions where we considered additional validation was needed. This focused on more detailed course level submissions with outliers in absolute or comparative terms and covered a range of institutions (see detailed analysis later in Section 6).

4.5.2 The benefits of applying TRAC principles in the approach

TRAC[15] is a principles based costing method that is underpinned by detailed requirements and guidance. Since this methodology is already familiar to the HE sector, we adopted a similar method, meaning that:

- Institutions should take a transparent and materially robust approach;
- Institutions were instructed to ensure they analysed costs and used allocation methods that could be justified;
- The process provided a consistent and fair basis for institutions to cost activities. For example, institutions were guided as to the preferred methods of allocating different types of costs;
- The process provided comparability; and
- Institutions established an audit trail to promote accountability. For example, institutions were instructed to keep track of its key judgements, in order to explain cost variations where required.

We required institutions to apply the materiality threshold used in TRAC of 10% to the course costs. Therefore the methods used by institutions to apportion and allocate costs and FTEs needed to be accurate to within a tolerance of 10%.

This TRAC based costing model provides the following benefits:

- It provides a 'top-down' model so that costs are reconcilable to the audited financial statements for the year, thus eliminating institutions' ability to include erroneous costs;
- It is a sector wide approach that is well embedded and has been used in other higher education sector costing studies. It therefore provides a consistent and common starting point for the costing study;
- TRAC is governed, both at a sector level, by the TRAC Development Group and within institutions, via a committee of the governing body. All TRAC returns have to be approved by the Vice Chancellor and also a committee of the governing body each year;
- It is a pre-existing process governed and controlled within institutions and across the sector, so it reduces the risk of bias in the costs allocated to teaching for the purpose of this study;
- A formal standard TRAC Guidance manual with detailed requirement have to be followed by all institutions and it is subject to periodic internal audit review and review by UKRI;
- It is used for multiple purposes and provided to multiple stakeholders. This therefore limits the ability for institutions to change costs for this study; and
- It provides a basis for illustrating the full economic cost of activities and for ensuring that all overheads are captured in the costing.

[15] For further details on TRAC please refer to the TRAC website.

4.5.3 The Full Economic Cost (fEC) and the Margin for Sustainability (MSI)

Introduction of TRAC

TRAC was introduced in HEIs progressively from 1999-2000, to satisfy the Government's requirements for increased transparency and accountability for the use of public funds. TRAC is an Activity-Based Costing system and is a UK sector-wide approach that identifies the full cost of key activities in institutions. The activities covered by TRAC are "Teaching" (broken down into publicly and non-publicly funded), "Research" (split between the main research sponsor types), "Other" (the other primary income-generating activities such as commercial activities, residences and conferences), and "Support" (activities such as preparation, proposal-writing and administration, which are costed separately but are attributed, as appropriate, to the three core activities – Teaching, Research and Other).

Introduction of full economic costing

The TRAC process evolved in 2004 with the introduction of full economic costing (fEC), following the Office of Science and Technology's review and reform of the "Dual Support System" for research through which funding was received both from the funding councils and the Research Councils. The reforms to the Dual Support system resulted in over £1 billion per annum in additional funding for research.

The basis for introducing full Economic Cost (or fEC) is that the expenditure reported in the audited financial statements do not reflect the cost of sustaining provision over the longer term. The TRAC Guidance states that 'all businesses need to cover the cost of financing and to generate a minimum level of retained surplus for investment, whether that be in capital, innovation or human resources. In economic theory, these surpluses are part of the costs of financing the business. These are legitimate costs of running a business, and are accepted under the Government Accounting Conventions for this reason.

About the sustainability adjustment (the Margin for Sustainability and Investment)

To take account of these factors, a margin for sustainability and investment (MSI)[16] is added to the costs reported in the consolidated financial statements to present a full economic cost. The fEC is "designed to account for the fact that the "real" cost of higher education activity was higher than the historic expenditure stated in most institutions' published financial accounts. This difference is due to a combination of understatement of current asset values in some institutions (depending on valuation practices); less than required levels of investment in physical assets (shown by backlogs of maintenance for example); and in services and support for students; and the need to allow a surplus or mark up for risk, financing and development. The cost adjustments are used as a proxy to reflect these additional economic costs of the activity." These adjustments were accepted by Government as part of designing the TRAC process and in 2004 HM Treasury set out in a letter to Government Departments its commitment to fund research on a full economic cost basis.

[16] The margin for sustainability (MSI) replaced two cost adjustments (the Infrastructure and Return for Financing and Investment adjustments) that were built into the TRAC methodology previously.

Prior to the introduction of the MSI the previous cost adjustments had not been updated since 2006. The Financial Sustainability Strategy Group (FSSG) led the development of the MSI and identified that when the Return for Financing and Investment adjustment was updated for current Ministry of Defence guidance, on which it was based, and aggregated with the Infrastructure Adjustment, the level of the MSI was comparable[17].

The MSI adjustment calculation uses data from the audited financial statements and from the institution's financial forecast that has been approved by its Governing Body. This reflects each institution's own financial strategy and is based on an agreed definition of the 'Earnings Before Interest, Taxation, Depreciation and Amortisation' (EBITDA)'[18].

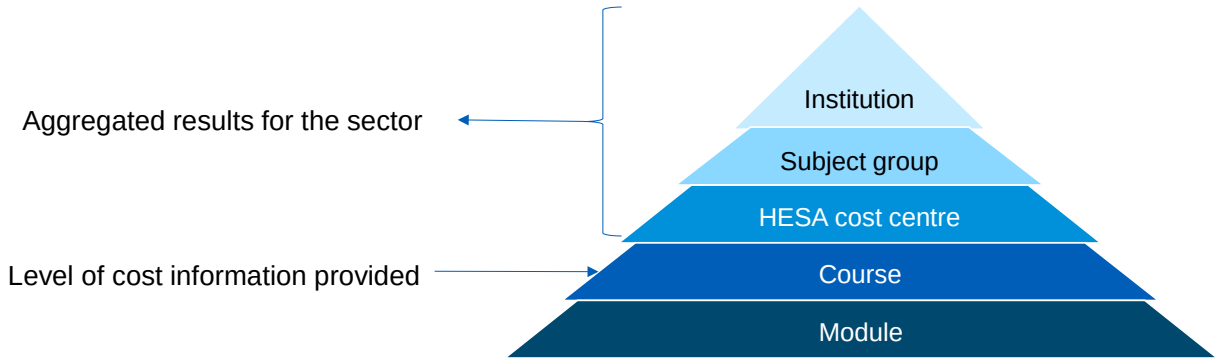
4.5.4 The costing model

The costing approach for this study used an amended version of TRAC. In summary, institutions provided their total Teaching cost from the 2016-17 submission of Annual TRAC. Institutions then deducted discrete, indirect costs associated with overseas recruitment from their own Teaching cost from TRAC. Costs associated with supporting overseas students were removed as these are resources not associated with teaching but are included within the Teaching cost in TRAC.

This institution-level cost was then split into academic departments before allocating costs to individual courses based on a range of cost driver information. The term academic department could also be faculty or school depending on their structure and chosen level of detail to apply in the data return.

The course level cost information was then aggregated into HESA cost centres and then subject groupings to arrive at a set of unit costs. Throughout the study, the unit cost was calculated by aggregating the costs and dividing by the total associated FTEs, thereby determining a weighted average unit cost. The following figure shows the different tiers at which costs were collected and calculated for the study.

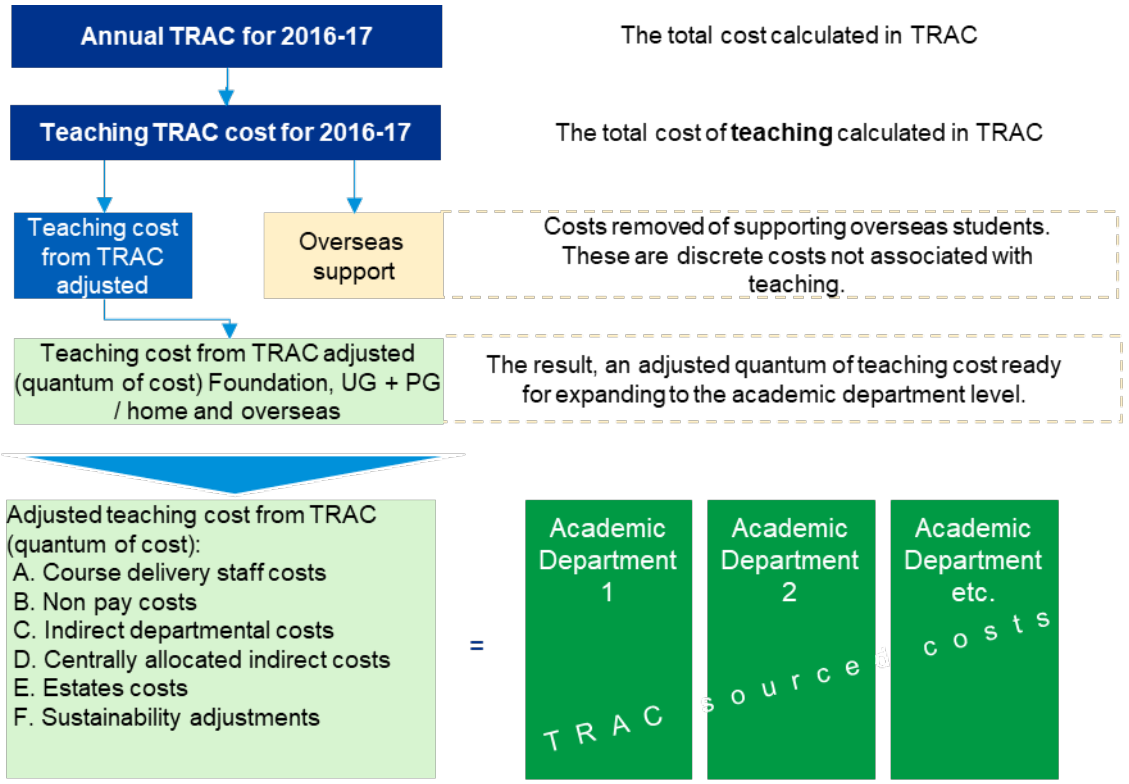
Figure 1 – Illustration of the hierarchy of costs collected and aggregated



We have set out three further schematics to show the various steps and adjustments made in the approach arrive at to the Teaching cost by academic department (Figure 2), the course costs (Figure 3) and finally the subject group costs (Figure 4).

[17] FSSG, *Report on the implementation of the Margin for Sustainability and Investment* (November 2017). Please click here to access.
[18] FSSG, *Report on the implementation of the Margin for Sustainability and Investment* (November 2017). Please click here to access.

Figure 2 – The costing approach from Teaching TRAC cost to academic department



Source: Adapted from the Costing study guidance

The guidance issued to study participants contained further details on the types of costs A to F in Figure 2. Table 23 in Annex H provides further detail on the level of costs collected and the types of cost item included in each category. For each academic department, costs were provided against six cost categories initially with further detail available, see Table 1.

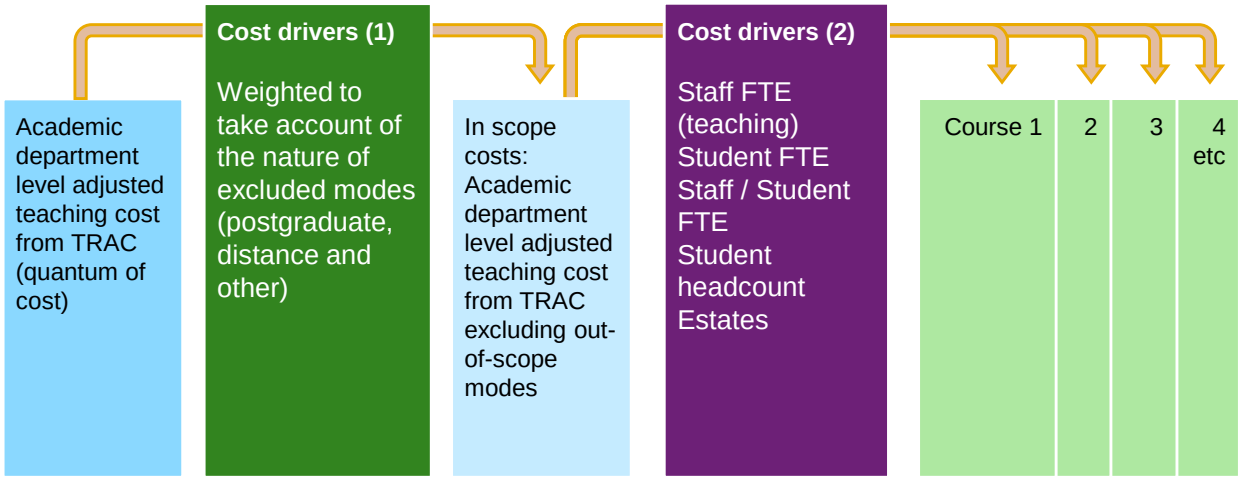
Table 1 – Cost categories and items collected

Cost category	Cost item
A – Course delivery staff costs	Course delivery
	Pay placement management
	Other - staff costs
B – Non-pay costs	Direct running costs - directly allocated
	Direct running costs - other
	Non-pay placement
	Other - non pay costs
C - Indirect departmental costs (later described as departmental running costs)	Staff costs
	Non staff costs
	Other - indirect cost
D - Centrally allocated indirect costs (later divided in the study analysis into Student related central service costs and Corporate services costs, see Annex CC)	Financial support to students
	Outreach activity
	Libraries and museums
	Student facilities
	Corporate services - HR
	Corporate services - Finance
	Corporate services - Legal

Cost category	Cost item
	Corporate services - IT
	Corporate services - other
	Other central running costs
E - Estates costs	Maintaining estate and teaching campuses
	Other - estate costs
F - Sustainability adjustment	Sustainability adjustment

Each academic department may have out-of-scope teaching provision. The first application of cost drivers (under 1 in Figure 3) removes these, for postgraduate students, franchised provision, apprenticeships, short courses or distance learners. At the academic department level in the data return, this was applied to all categories of cost in the same proportion.

Figure 3 – The costing model from Academic department to courses

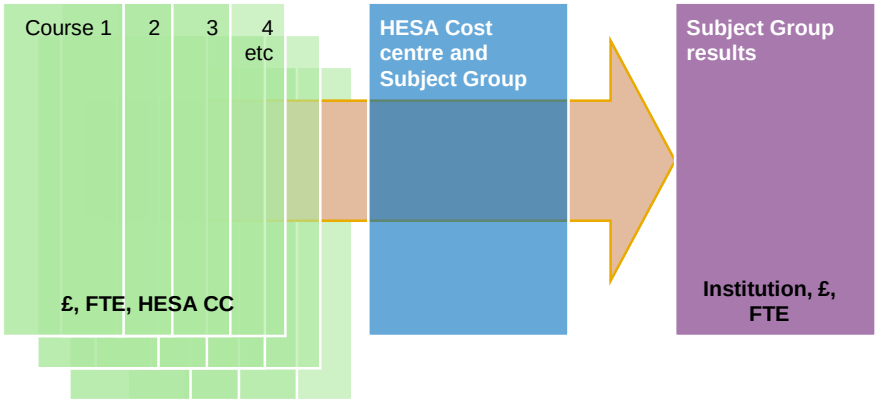


Source: Adapted from the Costing study guidance

The allocation of academic department costs to individual courses used the cost drivers available (detailed at 2 in Figure 3). Information was collected for each course that enabled the methodology to determine unit costs for full-time, part-time and foundation courses. In meeting the DfE's requirements, institutions were asked to identify part-time courses (rather than part-time students on full-time courses) which comprised only of part-time students.

Once the course costs were determined the results were aggregated into subject groups. The HESA cost centres attached to each course ID provide the link to support the mapping. Figure 4 provides an illustration of the mapping from aggregated course costs to subject groups via a table containing each HESA cost centre linked to a subject group.

Figure 4 – The costing model from course costs to subject groups



Source: Adapted from the Costing study guidance

4.5.5 Costing assumptions

The approach required a number of assumptions to be made. These were established in conjunction with the pilot institutions and provided in the guidance for this study. A key assumption was that institutions do not treat home, EU and overseas students differently in the delivery of their courses. The student numbers used for FTE and headcounts are therefore all Home, EU and overseas students.

Institutions manage the changing nature of teaching provision over time, both during a 12 month period and longer as they work towards their strategic objectives. A single year 'snapshot' of the cost (albeit across different year groups of students) would therefore reflect various factors and stages of an institution's development for that period. The underlining assumptions for each institution's return were:

- The volume of students on each year of the programmes in scope in 2016-17 is typical and representative.
- Course costs can change year-by-year by virtue of changes to the underlying modules that students may choose, or that the institution may offer, as part of the course available. Whilst cost data produced in this study should be representative and typical of that year's choices and subject groups, it is assumed that the differences in the preceding or following year are not materially different in aggregate.
- Costs associated with developing courses and not yet started in 2016-17 are absorbed by the academic department developing the course. Within TRAC, the costs of preparing materials for an agreed new course are recorded in Teaching and any initial course development costs in Support for Teaching, which is then allocated to Teaching. It is therefore assumed that development is a continuous activity and therefore reasonable to include these costs in this study.
- An institution may have courses with student FTEs in some but not all year groups, because either students started in the current or earlier period, or because the courses are in a process of closure from an earlier period. The approach assumed that whilst the lower student FTEs (than if the course had 'full' year groups) would be reflected in the unit cost calculation denominator,

the costs may not have reduced in line with the FTE change. In aggregate, we assume this is not material and is a cost legitimate to include in this study.

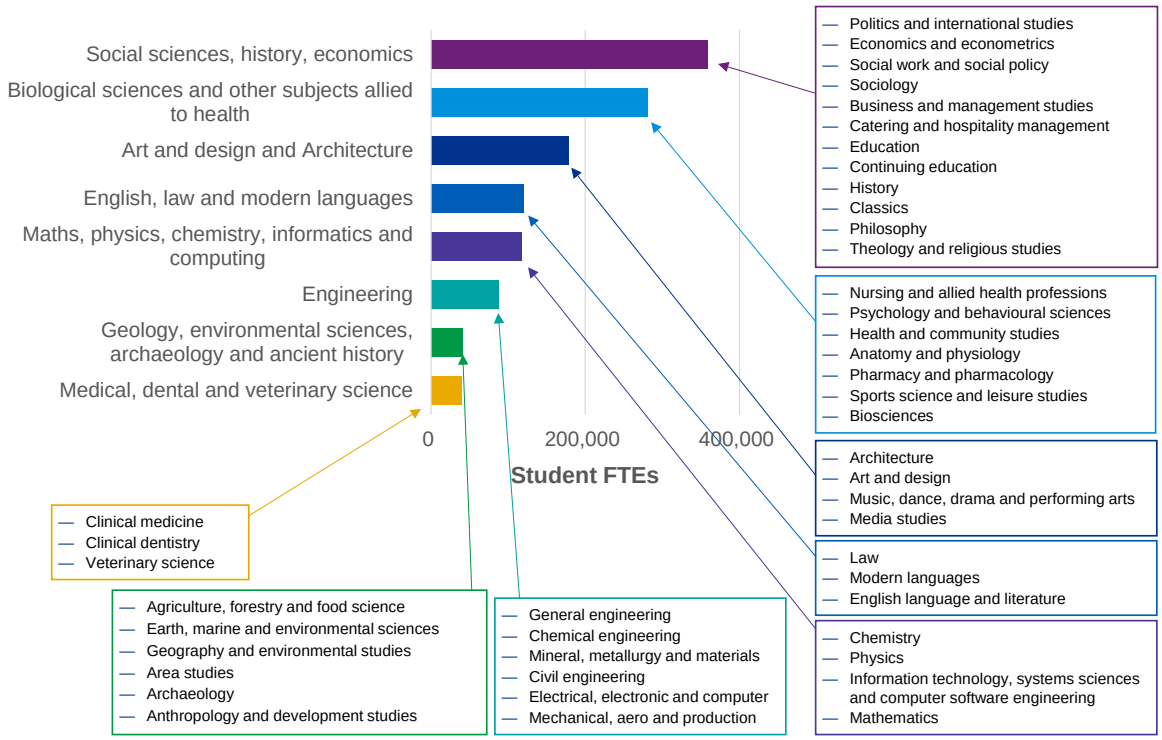
- The institution correctly assigned student FTE to the relevant HESA cost centres.
- It is assumed that a course with a 'sandwich' period will attract minimal costs for a year of its duration, irrespective of the student FTEs. The student FTE definition used in the study includes the FTE sandwich period. The calculation used to calculate unit costs therefore makes an adjustment for student FTEs based on the number of years of physical presence on campus. For example, a four-year (with sandwich of one year) course of 40 full-time students is 30 FTE for the costing calculation, a quarter less than the FTEs provided in the data return by virtue of 12 months of 'sandwich'.
- The in-scope student FTEs are representative of the institution's taught provision for year-end 2016-17 and broadly reconcilable to HESA data provided for the period. It also assumes that the FTE assigned to HESA cost centres is representative of the underlying modules and credits, and consistently applied across the portfolio of provision.
- The institution allocated staff time to courses on a consistent and reasonable basis.
- The weighting factors and FTEs supplied in respect of out-of-scope provision are reasonable and reflect the known delivery for the period.
- Sustainability adjustment costs were adjusted for out-of-scope modes using the total of cost deducted as a proportion of the quantum of cost. Sustainability adjustment costs were allocated to courses using their share of total costs by courses. The basis of allocation is consistent with how the sustainability adjustment is allocated by TRAC.
- That the declarations made in the data return are provided in good faith. The declarations sought to confirm that the costs declared are representative of those incurred in delivering the courses that are in-scope of this review, the basis for allocating costs to the headings specified at academic department level is not unreasonable and is materially correct, and that the responses declared are accurate and complete for the courses that are in-scope.
- The institution had submitted a compliant TRAC model, unless advised otherwise. Therefore we assume that the costs allocated to Teaching in TRAC are materially correct.
- The application by institutions of materiality to the course level will have resulted in the aggregated subject group costs not being materially mis-stated.

Institutions were required to apply a materiality threshold of 10% to the course costs. By instructing institutions to consider both student FTEs and cost, the aim was to ensure that the aggregated costs from all institutions would not be mis-stated by more than 10% at the subject group level. Whilst it is considered unlikely it is technically possible that the aggregation may have resulted in a difference of greater of 10%. However, institutions have provided an overall level of assurance on the figures submitted.

4.5.6 Subject groups

The costing model used the existing HESA cost centre classifications assigned to each course to aggregate costs into eight subject groups. We assigned each of the 45 HESA cost centres to one of eight broad subject group based on the discipline being studied, their pedagogy and the costs of delivery. Where a course was assigned to more than one HESA cost centre the costs were split by the associated student FTEs. Chart 7 shows the relative number of student FTEs for each subject group and the HESA cost centre in each subject group.

Chart 7 – Each Subject Group's HESA cost centres and overall student FTEs



Source: HESA Student record 2016-17 and KPMG analysis

The subject group with the greatest number of student FTEs is Social sciences, history and economics. It comprises 30% of the total student FTE population and is ten times greater than the Medical, dental and veterinary subject group.

We also performed a reasonableness check to find out how sensitive the unit costs were to the way in which HESA cost centres were assigned to subject groups. This was done by comparing our taxonomy with that of the Higher Education Funding Council for Wales which set out 12 academic subject categories (ASCs) based on the same 45 HESA cost centres.

We noted that the unit costs obtained for each of the eight subject groups in this study contain some differences, but are broadly similar to the unit cost which are obtained when the same 45 HESA cost centres are instead assigned to one of the 12 subject groups under the Welsh ASC categorisation, see Annex D. Though not conclusive, this gives us some confidence that our mapping of HESA cost centres to subject groups is reasonable and appropriate.

Once we had received the institutions' costs, we also reviewed the impact on weighted average unit cost of changing the subject group for the two HESA cost centres of Mathematics and Architecture:

- Architecture, built environment and planning (123), from the subject group of Art and design and architecture to Geology, environmental sciences, archaeology and ancient history; and
- Mathematics (122), from the subject group of Maths, physics, chemistry, informatics and computing to Social sciences, history and economics.

The resulting differences in unit cost do not appear significant to the subject group unit cost, see section 7.3 for details.

4.6 Costs and FTEs in-scope

We sought to determine the total relevant costs that participating institutions incurred in delivering undergraduate and foundation provision (both full-time and part-time). These costs were then divided by the number of student FTEs to determine a full economic unit cost per student FTE.

4.6.1 Costs

In this study, we used the following approach to identify the relevant costs:

- Relevant total costs were determined using the Teaching cost from the Annual TRAC return (both publicly and non-publicly funded Teaching)[19]. This approach also avoided the need for any significant subjective judgement to isolate costs relating to home and EU students;
- Excluded were any discrete non-teaching related costs to recruit and support overseas students;
- Excluded costs (and FTEs) including those associated with out-of-scope courses. These courses were associated with postgraduate teaching provision; distance learners; short courses, franchised out provision and apprenticeships; and
- Costs were analysed into 23 different types or items across six categories initially. Further details are provided in Annex H.

4.6.2 Student FTEs

We used a count of student FTEs including both overseas and home students (to match the scope of costs in the study). Definitions for student FTEs are varied, complex and supported by detailed guidance issued by various sector bodies. The guidance which we issued to the participating institutions stated that:

[19] As per the assumptions described in 4.5.5 the Teaching cost from the Annual TRAC return included teaching any overseas students. The logic of the methodology being that overseas students are mixed with home and EU student groups and therefore teaching overseas students costs no more or less than home students (once any discrete non-teaching related costs are removed to support overseas students).

- Student FTEs should be reported in terms of full-time equivalents (FTEs) using the 'Student instance FTE' definition recorded as STULOAD in the HESA return at the end of the academic year. Please click here for further information.
- As per the HESA guidance rationale, student FTEs represent student load and are relevant for analysing the load for part-time students.

Our guidance requested that institutions use the student recorded at the end of the course and not the registration FTE figure. This is consistent with TRAC(T). There was an expectation on participating institutions that their student FTE and headcount data submitted would match exactly the data held on their student record system and also the HESA Student Record.

4.7 Collection approach

Institutions participating in the study were required to complete a data collection return. This helped ensure that all the data submitted by institutions was in a consistent and comparable format. The data return was designed in a way that determined unit costs at the course level and at the subject group level using HESA cost centre codes. It also included a number of contextual questions to help gain a fuller understanding of the particular characteristics of the teaching provision, their costs and the nature of the allocation metrics used in determining the unit costs.

4.7.1 Cost information collected

To calculate the unit costs, each institution was required to provide the following information:

- The total expenditure (derived from audited financial statements) plus the target surplus for sustainable operations and within this their total Teaching costs, as reported in annual TRAC returns;
- Discrete overseas costs to recruit and support overseas students;
- Out-of-scope FTEs, a weighting to apply to the FTEs (compared to an undergraduate FTE) and calculate an out-of-scope cost, and a rationale for these weightings;
- Analysed or reported costs by academic department for courses in and out-of-scope for example from the institution's financial general ledger and TRAC system;
- Allocation methods, the statistics used to allocate costs from departments to courses and the basis of these statistics for estate and course delivery allocation of costs;
- The student and teaching FTEs for each in-scope courses;
- The student FTE for the out-of-scope courses in total;
- Details on any costs associated with sandwich or placement periods for each course; and
- A calculated average full economic unit cost for each course and the out-of-scope courses in total.

The template also included a series of validation and completeness checks, for example to check:

- Completeness of records for courses and allocation metrics;
- Adjusted TRAC costs to total academic department costs; and
- Adjusted TRAC costs to the total course costs once determined.

It also provided the institution with unit cost data for their courses and subject groups, to help support their sense checks before submission.

4.7.2 Contextual information collected

The data return collected supporting information regarding the costs, the courses and teaching provision. This included:

- Any significant one-off costs in 2016-17 and their nature;
- Any issues or factors that have changed teaching costs significantly since 2016-17;
- Factors that the institution considered when setting undergraduate or foundation course fees for undergraduate home or EU students;
- How the cost of provision influences decisions around teaching quality;
- How the cost of provision influences decisions around the diversity of subjects or courses offered;
- Whether the institution charged students for any additional materials or resources as part of their degree on top of the tuition fees they pay;
- The nature of any funding received for mandatory placements required by the relevant professional body;
- Any significant unit cost differences in instances where any part-time student studies a course alongside full-time students (i.e. they both attend the same modules);
- The nature of pension spend for teaching staff;
- Details on the institution's teaching-related capital expenditure from 2014/15 to 2019/20; and
- For each course; the length (the number of years of study), entry requirements, an assessment of the teaching staff seniority and experience, an estimate of whether the course can accommodate more students than present without any significant investment or change, in either estates or staffing, and whether the year groups for 2016-17 had a set of students in each year group or had gaps because it was in a process of cessation or development.

Institutions were instructed to review the results of their data, and consider whether these were in line with their expectations and understanding before submission. Institutions also declared that they were TRAC compliant, or where issues lay if not.

The detailed guidance which was sent out to participating institutions alongside the data returns, outlined the approach to data collection, its consistency with the TRAC methodology, and preferred treatment of allocation methods for costs. The guidance also contained a suite of instructions to quality assure and check the reasonableness of the results before institutions submitted them. Further details on the cost allocation process is provided in Annex H.

5 Coverage

5.1 Introduction

To achieve reasonable unit costs, it is important that participating institutions constituted a representative proportion of the student population.

Of the 133 English institutions invited to participate, 122 institutions delivered provision that was in-scope and had submitted data to the 2016-17 HESA student record. Excluded from this list of 133 institutions were:

- Nine institutions with postgraduate or distance learning only students;
- One institution who had not submitted a HESA student record in 2016-17 (as it was not yet publicly funded); and
- One institution, now closed, that was winding down its activities in 2016-17.

Fifty-four institutions indicated that they would submit a return at the main study stage (out of a total of more than 75 expressions of interest). Of these, 41 submitted completed returns representing 33.6% of the total number of institutions possible (41 / 122). One submission was subsequently rejected giving 32.8% of the total number of institutions possible (40 / 122).

For the analysis of coverage, we used the list of 122 institutions and the number of FTEs from the HESA student record for 2016-17. From the 40 returns used in the study, we assessed coverage based on the four following areas:

- Subject Groups (by institution number and student FTEs);
- HESA cost centres;
- Regional presence; and
- TRAC peer groups.

Section 5.2 details the approach to assessing coverage while sections 5.3 to 5.8 provide a numeric overview of the coverage results. Subsequent sections provide further detail on coverage through the dimensions of subject groups, HESA cost centres, regions and TRAC Peer Groups. The chapter concludes with a summary section at 5.9.

5.2 Approach to the coverage assessment

To assess the coverage provided by the data returns from 40 institutions, the 2016-17 HESA student record[20] was used. This provided a common basis for comparison to those institutions that did not participate. From this national dataset, the OfS extracted the relevant data across 122 institutions that provided student FTE data for this period. The dataset totalled 1,224,245 student FTEs across all in-scope areas of provision.

Please note that whilst it was possible to disaggregate certain coverage analyses into the three categories of undergraduate provision, our coverage assessment includes all provision. Given the dominance of the full-time provision from institutions applying the definitions used, it

[20] For more information, please see refer to the HESA website

was deemed a suitable approach that would not distort the coverage assessment for full-time provision.

For the coverage assessment, we used FTEs where the institution and HESA cost centre matched between the data returns for this study and the dataset based on the 2016-17 HESA student record. As a result for example, where Institution A delivers HESA cost centre courses for Chemistry and the Institution A reported 100 students in the HESA dataset, 100 students is counted towards the coverage analysis for Chemistry.

This approach provides a consistent assessment of the coverage that we have achieved, but is an approximation.

5.3 Coverage overview

We achieved an overall student FTE coverage of 38.4%, 470,165 of the 1,224,245 student FTEs[21]. By number of institutions, the coverage was 32.8%. Over 30% coverage represents a good level of overall coverage.

We assessed coverage across four key areas. The table below provides a summary of the coverage and the maximum and minimum coverage obtained. Further details follow in the remainder of this section.

Table 2 - Summary of coverage achieved by the 40 data returns

Area of coverage by the measure of:	Student FTE %coverage from the 40 data returns		Summary commentary
	Maximum coverage (%)	Minimum coverage (%)	
Subject Groups (see section 5.4)	52% for Medical, dental and veterinary science	36% for Social sciences, history, economics	Whilst the Medical, dental and veterinary science subject group had the lowest number of returns, it also provided the highest number of student FTEs across all subject groups. This is due to provision being concentrated in a small number of institutions.
HESA cost centres (see section 5.5)	56% for Clinical dentistry	8% for Continuing education	Whilst 8 of the 45 cost centres have a coverage less than 30%, their impact on their subject groups is lessened by the good level of coverage from a number of other cost centres.
Region	46% across the North	From institutions in the Midlands there	In the four regions assessed, coverage is lowest in the

[21] The total of 470,165 student FTEs is different to the number of FTEs returned by institutions and this is explained further in the Data validation section (6) and Annex L.

Area of coverage by the measure of:	Student FTE %coverage from the 40 data returns		Summary commentary
	Maximum coverage (%)	Minimum coverage (%)	
(see section 5.6)		were fewer than five submissions. In total, these submissions provided a coverage of less than 30% for both student FTEs and the number of institutions.	Midlands but this does not cause undue concern. It is a region with no significant cost differences to other regions outside London which have coverage over 30%.
TRAC Peer Groups (see section 5.7)	57% for the F Group	17% for the E Group	Assessing TRAC Peer Groups with similar characteristics, we combined Peer Groups A and B, and D and E. Peer Groups B and E were both less than 30% coverage. This provided a reasonable level of representation with coverage from 30% to 57%.

Source: Analysis of data returns

We identified the following mitigating factors for where coverage was low:

- The provision for Continuing Education is very small compared to other HESA cost centres. From the 122 institutions in the HESA student record, the total number of student FTEs in Continuing Education is 1,960, 0.5% of the student FTEs for the Social sciences, history, economics subject group; and
- Whilst combining East and West Midlands gave a coverage of 19%, the regional student FTE average was 38% for institutions outside of London.

5.4 Subject Group coverage

The 40 institutions provided data returns that covered all eight subject groupings. The table below summarises the frequency and coverage of these contributions by number of institutions and student FTEs.

Table 3 - Coverage comparison from institutions and student FTEs by subject group

Subject group	Number of institutions with provision (from HESA)	as a %	Student FTEs provision (from HESA) as a %
Art and design and architecture	37	32%	40%

Subject group	Number of institutions with provision (from HESA)	as a %	Student FTEs provision (from HESA) as a %
Biological sciences and other subjects allied to health that are not in other categories	32	32%	37%
Engineering	31	38%	40%
English, law and modern languages	30	31%	39%
Geology, environmental sciences, archaeology and ancient history	26	33%	45%
Maths, physics, chemistry, informatics and computing	31	33%	39%
Medical, dental and veterinary science	14	39%	52%
Social sciences, history, economics	34	32%	36%
Total			38%

Source: Analysis of data returns

As noted above, the total student FTE covered by the data returns of 470,165 from a possible 1,224,245 FTEs represents 38% coverage. From this analysis, the percentage coverage among subject groups is strong, ranging from 36% to 52%.

Further analysis was undertaken on a regional basis contributing to each subject group. This found that:

- The coverage ranged from 35% to 52% for institutions outside London, and for London institutions from 23% to 54%; and
- Across all subject groups and regions the lowest coverage was 23% for Geology, environmental sciences, archaeology and ancient history outside London, and 45% overall.

Although the Medical, dental and veterinary science subject group had the lowest number of institution returns (14 - as shown in Table 3), it achieved the highest percentage coverage for student FTEs (of 52%). The relevant professional bodies for this provision place a limit on the student numbers in training and with the relatively fewer number of institutions this helps explain the relatively higher student FTE coverage.

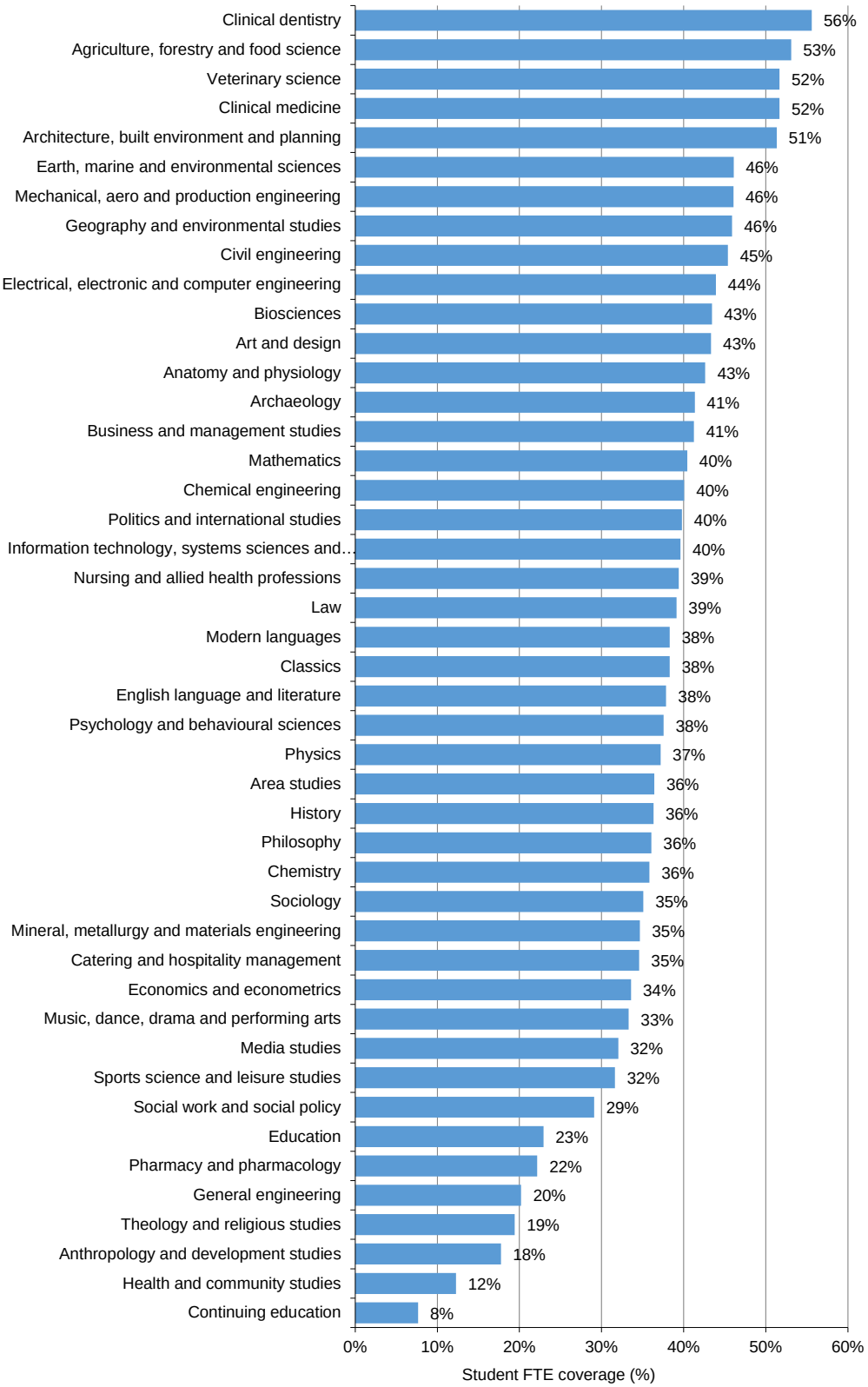
Whilst the lowest percentage student FTE coverage for the Social sciences, history and economics group was 36%, it was provided by 34 of the 40 participating institutions. It also worth noting that the level of coverage in this study is higher in each subject group than the 22% which was achieved in the costing study on postgraduate taught provision published in December 2014[22].

[22] This 2014 report published by the Higher Education Council for England is available here.

5.5 HESA cost centre

There were 732 instances of a HESA cost centre match for the 40 institutions included in the study. The percentage student FTE coverage provided by these 732 HESA cost centre level contributions is summarised in the following chart. This is produced on the same like-for-like basis, i.e. an analysis uses the student FTE from the HESA data where a match occurs between the institution and its HESA cost centre. A table of these results is also provided in Annex V together with the coverage based on institutions.

Chart 8 - Student FTEs coverage by HESA cost centre

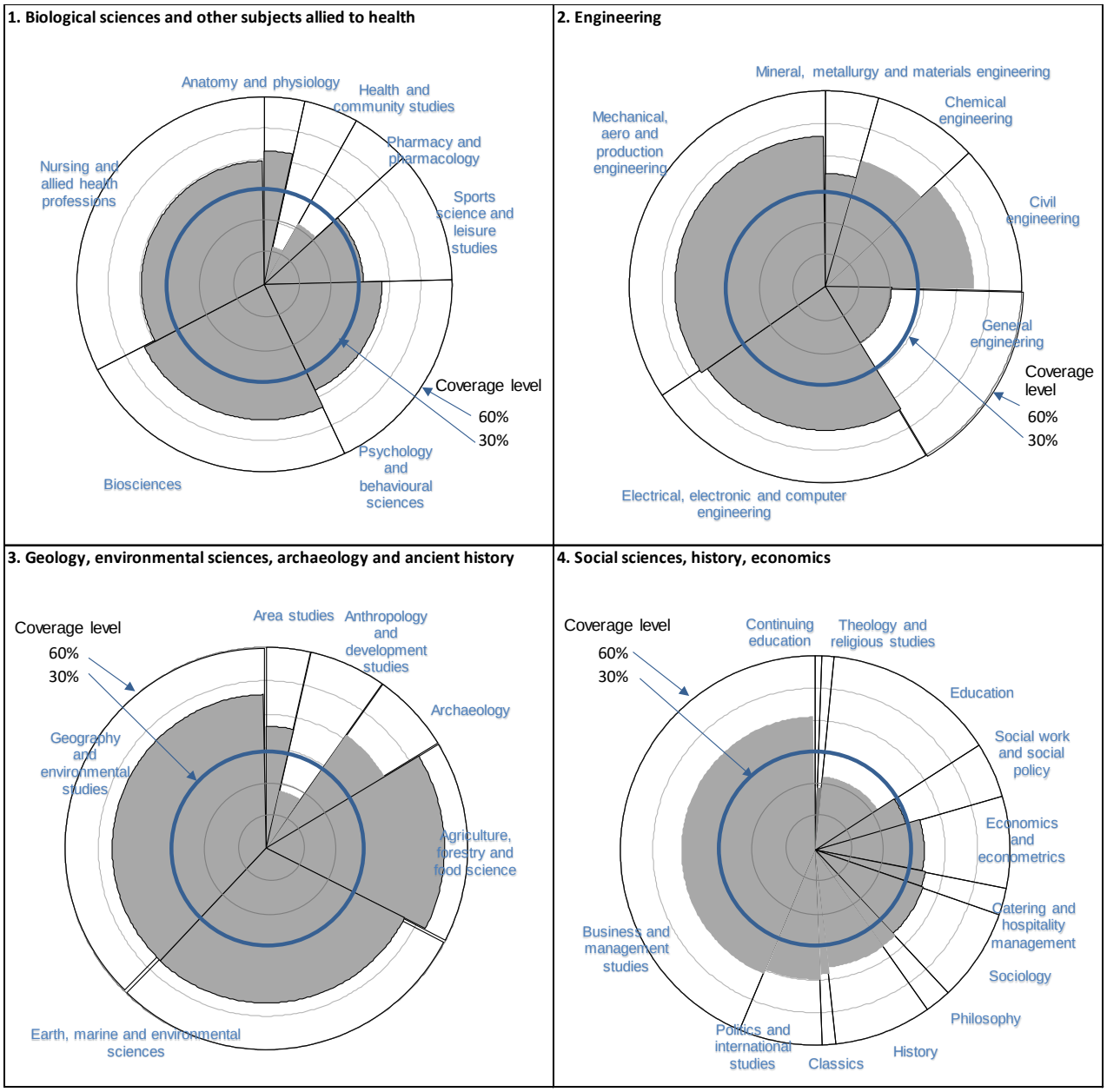


Source: Analysis of data returns

From this analysis, the percentage coverage varies across the cost centres, from 8% (for Continuing education) to 56% (for Clinical dentistry). When compared with the total HESA population for all institutions in England, the eight HESA cost centres with coverage of less than 30% had a combined student FTE of 117,840, 9.6% of the total FTEs.

Chart 9 shows the four subject groups with HESA cost centre coverage less than 30% coverage. For each subject group, all the HESA cost centres are shown, and a blue circle indicates the 30%, to help readily identify those less than 30%. The chart also shows the proportion of FTEs that each HESA cost centre covers (by the number of degrees it covers, for example Nursing contributes 32.5% of the total FTEs for its subject group and therefore has a slice of the chart of 117 degrees, 32.5% of 360 degrees).

Chart 9 – Coverage for subject groups and HESA cost centres



Source: Analysis of data returns

In each subject group, there are a majority of HESA cost centres that exceed the 30% threshold (indicated by the blue circle) and they combine to form a large proportion of the

subject group. Conversely, the white area inside the blue circle, where a shortfall of FTEs to the 30% exists, is relatively small compared to the overall student FTE coverage for each subject group. For example, within the Social sciences, history, economics subject group, the Education provision has coverage of 23% (the largest blank segment below the blue line), but overall a coverage of 36% was achieved for the subject group.

In conclusion, we achieved good coverage across most HESA cost centres. For the four subject groups affected by HESA cost centres with a lower coverage, these cost centres generally represented a lower share of the overall student FTEs in the subject group and therefore the four subject groups were well represented in terms of student FTEs.

5.6 Regional coverage

The 40 institutions covered all the regions in England. The table below summarises the frequency of institutions across each region using HESA Student record data provided by the OfS.

Table 4 - Regional coverage by submissions and student FTEs

Region	Number of data returns	Regional number as a % (using the regional population as a proportion of the total 122 institutions)	Student FTEs from HESA[23]	Student FTE coverage as a % (using the regional population as a proportion of the total FTEs of 1,224,245)	Regional share as a % of all student FTEs (using the regional population with a total of 1,224,245)
London	11	33%	86,645	39%	18%
Midlands	4	19%	47,710	19%	21%
North	12	40%	172,995	46%	30%
South West and East	13	34%	162,815	43%	31%
Total	40	33%	470,165	38%	100%

Source: Analysis of data returns. Differences due to roundings.

The student FTE coverage varies across the areas, from 19% (for the Midland region) to 46% (for the North). The lower coverage in the Midlands does not cause undue concern because this region has a relatively lower share of all student FTEs (at 21%) and does not exhibit characteristics that would have a material impact on costs compared to other regions outside of London. Annex F provides further detail on the regions summarised here.

[23] 2016/17 HESA Student Record data for 122 institutions with a total of 1,224,245 student FTEs.

5.7 TRAC Peer Groups

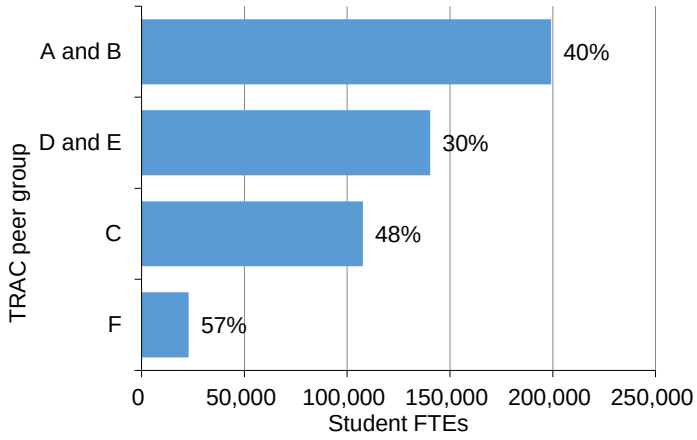
Using TRAC, each higher education institution is categorised into one of six Peer Groups depending on the similarity of their financial scale and research income. Further details are provided in Annex B. This study uses Peer Groups to help provide useful comparisons across similar institutions.

We summarised the percentage student FTE coverage across TRAC Peer Groups by these 40 contributions and found that:

- Peer Group F shows a low number of students but a high level of student FTE coverage. This is because this group has typically lower student volumes;
- Institutions with research income of 15% or more of total income achieved coverage of 20% (Peer Group B) and institutions with a research income less than 5% of total income and total income less than or equal to £150m achieved coverage of 17% (Peer Group E). Peer Groups B and E represent 30.4% of the total student FTEs in the HESA student record.

In common with other studies, we have grouped Peer Group B institutions with Peer Group A and Peer Group E institutions with Group D on the basis that they share similar characteristics. This approach preserves anonymity. The comparative levels of coverage using this combined approach is set out in Chart 10 below.

Chart 10 - Student FTEs coverage by summarised TRAC peer group



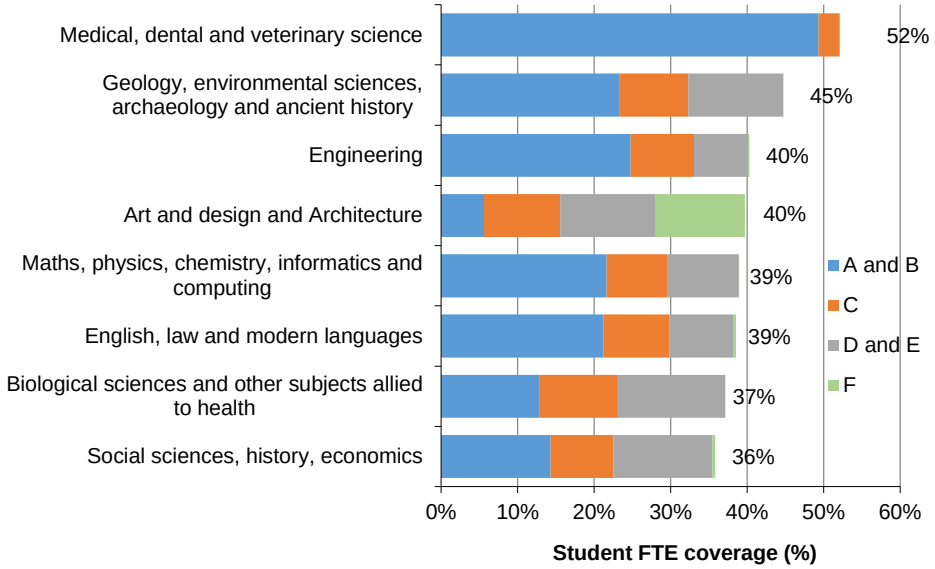
Source: Analysis of data returns. The bars indicate the number of student FTEs in each TRAC Peer Group. The percentage given indicates the proportion of coverage (for student FTEs) achieved at the TRAC Peer Group level.

Taken together, we achieved a good level of representation across summarised TRAC groups. As it was known that only some TRAC Peer Groups undertake certain types of provision, further analysis was undertaken to assess coverage across subject groups.

5.8 Subject Group and TRAC Peer Group coverage

We further assessed coverage across subject groups to help identify particular types of institutions where special attention need to be paid to the overall findings, see Chart 11.

Chart 11 - Student FTEs coverage by Subject Group by each TRAC peer group



Source: Analysis of data returns

The art and design and architecture subject group included the performing arts provision. It contained the vast majority of the TRAC peer group F, the specialist music and arts teaching institutions. This was in line with expectations. Also, those institutions teaching medical, dental and veterinary science were associated with institutions that derived a large proportion of their total income from research, i.e. Peer Groups A and B. These results were in line with expectations.

5.9 Summary

Across a range of measures, a good level of representation was achieved. The Midlands region had a lower level of coverage, but other regions outside of London achieved good levels of coverage. The use of combined TRAC Peer Groups achieved coverage among institutions and student FTEs of over 30%.

Across subject groups, the coverage provided by different types of institutions were over 35% and in line with expectations, see section 5.8. Coverage results were shared with the DfE and the Steering Group. They shared common views that the overall coverage results, including those lower coverage HESA cost centres were strong overall and above the threshold used in other costing studies.

6 Data validation

6.1 Introduction

A key focus of the study was to analyse the reasonableness of the data returns submitted by participating institutions. This included assessing whether the prescribed methodology for the study was applied consistently, based on the cost and contextual information provided in the data returns from all the participants. Where the methodology was not followed in full we reviewed the basis followed and assessed it for its reasonableness.

The course level data collected and analysed in this study was at a lower level of granularity compared with the TRAC data that the former funding body, HEFCE, routinely used to review its funding decisions. Therefore the level of checking that was possible on the data obtained in this study was more extensive compared with the checks performed on the TRAC data.

Costing can be subjective and inevitably requires a number of judgements and assumptions to be made. We draw your attention to the principles set out in section 4.5.3 regarding TRAC and the principles institutions should apply in using it, and also the limitations set out in section 1.7.

Data validation was designed into the data return and performed on all extracted data. In addition, we compared results in aggregate terms. Several institutions did not follow or meet aspects of the methodology entirely. Instances of non-compliance included:

- One institution obtained a dispensation from meeting TRAC requirements for 2016-17. As a small institution with small amounts of research, this submission remained in the study;
- Arriving at an in-scope academic department level adjusted total teaching cost from TRAC (quantum of cost) excluding out-of-scope costs by a different route. For two institutions, we reviewed the basis of their quantum of cost excluding out-of-scope costs and sought additional confirmations from the institutions before accepting these costs into the study.
- Not using course level data in their submission. This was limited to a few institutions. Whilst they continued with the allocation of costs from academic departments, this treatment placed limits on some comparative procedures in the study. However, the overall results were comparable to others and their approach evaluated as reasonable. We also gained assurances that they were comfortable with the aggregated results their submission produced; and
- Providing partial or incomplete contextual responses. Whilst as a result, we relied more on those with more complete contextual responses, it did not directly impact the costings.

One of the 41 submissions was rejected for a combination of reasons. Their submission deviated significantly from the expected approach and their out-of-scope costs could not be fully verified.

This section sets out the checks applied and the findings as appropriate from:

- The pre-submission validation checks;
- The individual validation procedures;
- The out-of-scope validation procedures; and

- The comparative validation procedures.

6.2 Pre-submission validations

As part of the data collection and prior to the submission process, institutions were asked to review their data, consider whether they were in line with their understanding of their institution and obtain senior officer sign-off. All the submissions were obtained and signed-off by the Director of Finance, or suitably senior equivalent. This sign-off confirmed that:

- The costs declared were representative of those incurred in delivering the courses that were in-scope of this review;
- The basis for allocating costs to the headings specified at academic department level were not unreasonable and were materially correct; and
- The responses declared were accurate and complete for the courses in-scope.

The costing return also contained a number of validation checks and summary information calculations to support the above process. These checked for unique information where required, and complete, consistent and valid data entry. A series of triggers were also available which culminated in a summary 'traffic light' for the user to assess completeness and any errors identified in the data return.

6.3 Individual validation procedures

Following submission of the data, each institution's data return was reviewed and a range of reasonableness checks were completed before the data was analysed further. The procedures aimed to address any internal consistency or completeness issues in the data. These submission checks included:

- Reviewing the 'traffic light' indicators used to assess completeness and any errors identified in the data return;
- Assessing the completeness of student FTE numbers using HESA data provided by the OfS. Institutions were asked to review differences of greater than 10% from HESA data for student FTE for 2016-17 with their submitted data at the aggregated HESA cost centre level. Institutions were also asked to review any differences between the HESA cost centre categories in the HESA return and the data return;
- Cross-checking the opening TRAC figures to 2016-17 TRAC figures provided by the OfS. Queries were raised with two submissions. One had already notified the OfS of the difference and one explained that the difference had been identified through this work. Neither figure was significant to the institution's total teaching cost;
- Reviewing the validity of rationales provided to adjust for out-of-scope courses and seeking further understanding where required, see section 6.4 for further details;
- Assessing the completeness of the cost categories used, compared with the costing guidance for this study. Annexes P, Q and R provide further details on unit costs by cost category by subject group;

- Assessing the reasonableness of figures input. Some negative figures were corrected through these checks;
- Undertaking a reasonableness check over the variation of unit costs across the HESA cost centres submitted. This was undertaken at the institution-level by reference to student FTEs before raising queries with institutions;
- Inspections of the contextual responses and course information to ensure reasonableness;
- Review to assess whether the courses returned were 'in-scope'; and
- Review of compliance with allocation methods. The more significant areas of cost where greater understanding was requested related to allocating course delivery costs (as part of the pay category) and estates costs. Not all the submissions detailed the basis used in allocating their pay course delivery costs. Where further details were provided, some of the alternative measures appeared to use more refined approaches than suggested in the guidance and were therefore accepted.

The data return also asked whether the 2016-17 costs were atypical. Three responses indicated that 2016-17 included some significant one-off costs to their institution, but none were considered material against the 10% threshold applied:

- One institution reported a capital planning write-off, of which a proportion ended up in the Teaching cost;
- One institution reported additional pension related costs and accounting adjustments; and
- One institution experienced a structural dissolution.

The total one-off costs declared in the submissions was £15.4 million, 0.3% of the total cost submitted for in-scope costing. Based on the explanations given and figures determined no further adjustments were made.

A small number of unresolved queries were reviewed and assessed for their impact through a series of sensitivity analyses. For example, where institutions had not responded to an in-scope FTE query, we used their HESA comparative figure to assess the impact on subject group unit costs. We also removed their submissions entirely to assess their overall impact. These procedures gave rise to very small deviations in unit costs, well below materiality.

6.4 Out-of-scope validation procedures

Institutions provided FTEs and supporting information to determine an adjusted Teaching cost from TRAC for both home and overseas students. To adjust for out-of-scope provision, they provided FTEs and a weighting to apply for the following areas of provision:

- Postgraduate
- Distance learning
- Franchised out
- PG / distance learning
- Apprenticeships

- Short courses
- Other – where the institution could specify the provision

These figures were then used to calculate a proportion of the Teaching cost to be removed from the costs. Institutions applied a weighting to these student FTEs to help reflect the differing resources consumed. To review these inputs, we:

- Considered the materiality of these adjustments (thereby taking into account the weighting applied);
- Compared the unit cost for each out-of-scope category across institutions;
- Compared the student FTE number to data provided by the OfS; and
- Compared the FTE weightings and reviewed the rationale provided to support the weightings used and made further enquiries where necessary. Since this involved an element of judgement, we sought confirmations that institutions applied balanced weightings appropriate to their provision.

6.5 Outcome of out-of-scope validation procedures

This section details the procedures undertaken across all the out-of-scope provision to assess the reasonableness of these costs. It details the characteristics of the out-of-scope provision (6.5.1) and the results of reviewing their associated FTEs and costs (6.5.2) and the weightings applied in the methodology (6.5.3).

In Annex N we also detail the out-of-scope procedures undertaken over the postgraduate provision and document reasons why postgraduate unit costs, the largest share of the out-of-scope provision, varied among institutions and could be higher or lower than undergraduate unit costs.

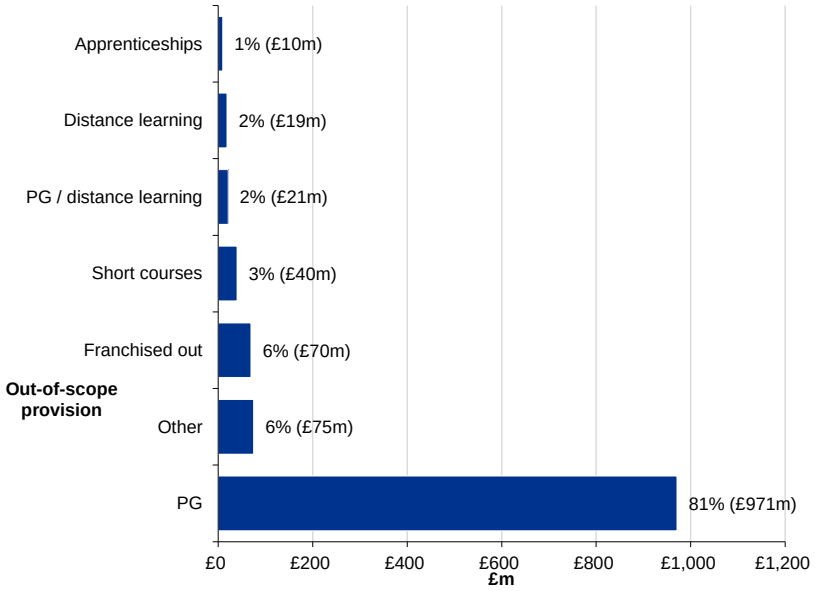
6.5.1 Characteristics of the out-of-scope provision

The proportion of out-scope cost and FTEs were 20.7% and 20.9% of their respective total of cost and FTE (£1,206 million out of £5,825 million and 118,331 out of 566,606 total FTEs).

One institution indicated nil out-of-scope costs but had in fact removed these through their overseas adjustment. Further evidence was provided by the institution to show that their Teaching cost from TRAC adjusted for foundation, undergraduate and postgraduate for both home and overseas students agreed to their TRAC submission for 2016-17 for publicly funded and non-publicly funded teaching costs. As a result, their submission remained valid but they were excluded from further out-of-scope validation procedures.

The postgraduate (PG) category is the most significant category of out-of-scope cost, being 81% and the next one being 6%. The following chart shows the total amount and share each out-of-scope provision has.

Chart 12 - Proportion of costs across the out-of-scope provision



Source: Analysis of data returns. Differences due to roundings.

The Other category comprised a variety of provision from ten institutions. It covered, for example their further education teaching and courses for associate students.

The sample cost for postgraduate teaching is more than four times larger than all the other out-of-scope categories combined (81% versus 19%). We used the postgraduate costs and FTEs provided by 39 of the sampled 40 institutions in our validation procedures and whilst it is important to note that the aim of this study was not to calculate robust unit costs for the out-of-scope provision, they were useful to collect and did lead to a number of resubmissions.

Important to note in terms of the impact on in-scope costs was the diversity of out-of-scope provision for many institutions. This came with both direct and additional costs, in terms of student management but also the opportunity to share overheads more broadly. Apprenticeships were expected to be a relatively low number for the period of data collected in 2016-17. Also, institutions with apprenticeships explained that these costs included set-up costs leading to a higher than expected unit cost result. Those smaller areas of provision are also based on relatively small numbers of student FTEs. Also noteworthy is that apprenticeships were in early evolution in 2016-17 and we would expect this provision to grow and therefore achieve a higher proportion of costs.

6.5.2 Validation of out-of-scope FTEs and costs using total FTEs and costs

The out-of-scope provision was the most significant opportunity for institutions to adjust their cost base for the in-scope provision. As a result, we undertook further procedures to assess the reasonableness of the figures provided.

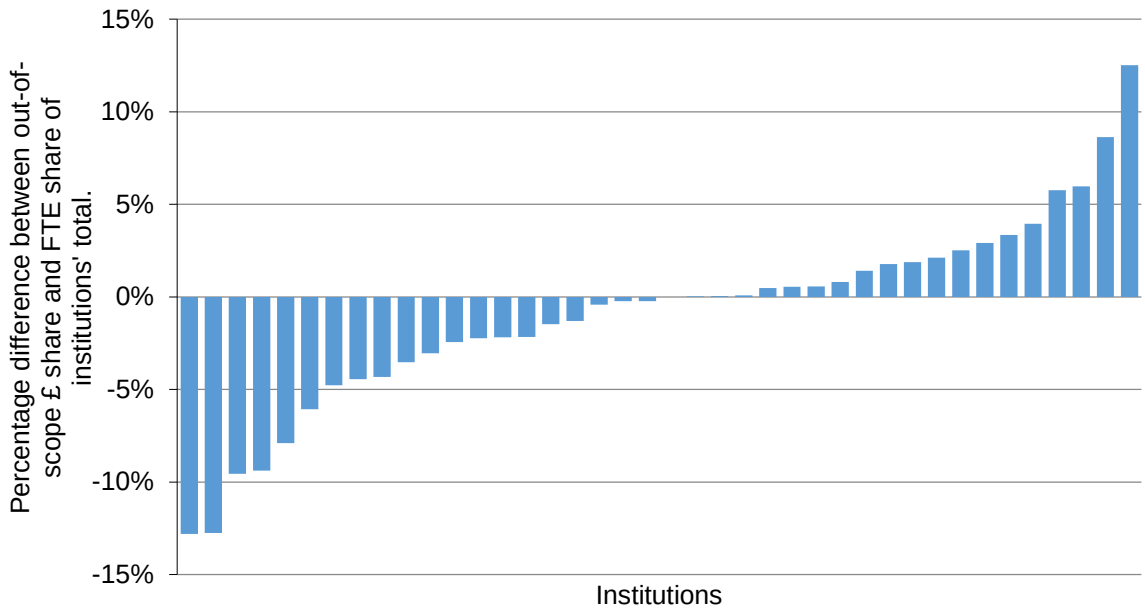
One procedure undertaken was to determine the level of correlation between the two proportions of cost and FTEs, as a percentage of their corresponding totals from the data provided. The amount of correlation would indicate a level of reasonableness over the figures provided from all the submissions. A correlation of 0.89 was calculated from the analysis, thereby indicating a high or strong amount of correlation between the two proportions of cost

and FTEs as a percentage of their corresponding totals, and so a reasonable amount of robustness in the costs provided.

A further procedure used out-of-scope costs and out-of-scope student FTEs, as a share of the institution's total costs and FTEs. This approach created a comparable percentage measure across all institutions. For example, institution X with a percentage of out-of-scope costs of 11% and out-of-scope student FTEs of 11%, had a comparable percentage measure of +1%. We expected to find some similarity for those institutions with similar characteristics and similar explanations for those institutions at either end of the range.

The procedure performed resulted in Chart 13. This was then ordered by the results to help identify institutions where the greatest differences were i.e. at either end of the range.

Chart 13 - Distribution of out-of-scope FTEs and costs as a percentage of the total FTEs and costs



Source: Analysis of data returns

The overall difference ranged from -13 to +13% (where one institution's share of the out-of-scope costs were higher than its share of out-of-scope FTEs. From further investigation, we found:

- At the left-hand side of the distribution (where the share of the out-of-scope costs were lower than their share of out-of-scope FTEs) were six institutions with a difference of more than 5%. Five of these six were post-92 institutions and outside of London. The other remaining institution was specialist in nature and relatively small in both student FTEs and teaching cost terms.
- At the right-hand side of the distribution (where the share of the out-of-scope costs were higher than their share of out-of-scope FTEs) were four institutions with a difference of more than 5%. Three of these four were London institutions and all belong to TRAC peer Group A or C. All four confirmed that their postgraduate cost (the majority of the out-of-scope provision) was typically higher than the undergraduate provision.

- One institution reported that it had adjusted its out-of-scope FTEs in order to arrive at the expected cost result based on existing internal information. Whilst this distorted this analysis, it was not material and is not a significant concern for the study's treatment of out-of-scope costs.
- Another institution admitted that some of its provision in the out-of-scope provision was without fully reliable information and on a wide diversity of courses. This was deemed not to have affected any in-scope unit costs and was not material to the in-scope cost calculation. The relevant out-of-scope cost was 1.1% of their total.

These results were broadly in line with expectations and did not result in any material concerns. It also helped scope our expectations for our later sensitivity analysis, see Annex M

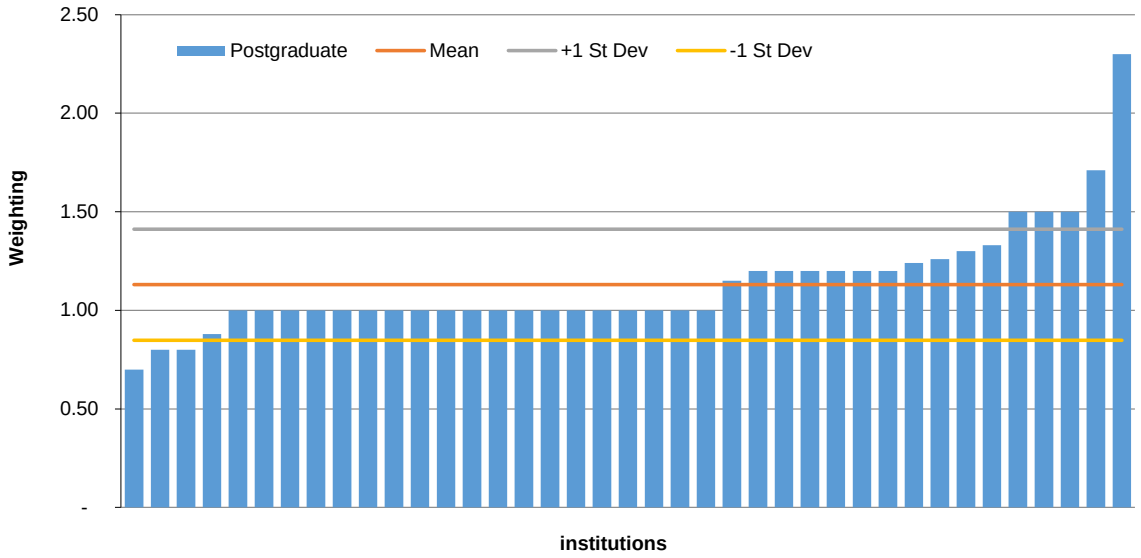
6.5.3 Validation of out-of-scope weightings

A range of weightings were provided by institutions to adjust their out-of-scope FTEs (both higher and lower than a factor of 1) and hence the cost calculations used for this study. A weighting of 1 meant the institution estimated that the cost of a student for the out-of-scope areas was the same as the in-scope provision. Whilst the data return did not require subject level information for the out-of-scope provision from institutions, they were requested to provide some background information to support the weightings used.

We undertook a comparative analysis of the factors applied and reviewed their supporting information. We raised further queries with institutions where necessary. From our work, we found that the lower factors tended to reflect categories where students had less physical presence in the institution; for example for distance and franchised out courses.

The following chart summarises the range of weightings used, in this case the 39 institutions with postgraduate provision.

Chart 14 - Factors applied to out-of-scope FTEs for postgraduate provision



Source: Analysis of data returns

We were informed that institutions used a range of information sources to determine their weightings for the postgraduate provision. The sources included departmental time allocation

survey results, internal management information, TRAC information (which tended to support a higher than 1 factor), their own internal course costing exercise, and consultations with Executive Deans of academic areas.

We found variation in the explanations for the weightings used. In addition to the explanations for the difference in unit costs outlined in the previous section, some institutions stated that there may be less face-to-face teaching time required for these types of provision than for undergraduate provision. Some also reported that the amount of overall resource used was not materially different to, say, full-time undergraduates (unlike collaborative arrangements which typically attracted a lower weighting). It was also reported that these weightings would be different among subject groups.

For the highest weighting used (of 2.3) the institution explained that they considered this correct due to their higher teaching staff mix and higher fee differential (by 38%). As a result of using this weighting, the institution classified more cost as out-of-scope and therefore lowered its costs for its in-scope provision.

The most common weighting of 1 was used by 19 of the 39 institutions for postgraduate provision. Some institutions stated that some postgraduate course modules were taught with undergraduate courses and this supported a weighting used of 1, whilst others stated that in the absence of alternative information sources they had 'defaulted' to a factor of one.

In conclusion, we found reasonable explanations were provided in the majority of cases, particularly outside of the weighting of 1. For those few institutions using a weighting of less than 1, a lower cost was attributed as out-of-scope. Whilst the common use of 1 provided some level of assurance for the population, we relied on those institutions with supporting evidence to conclude that these too were reasonable for the group as a whole.

6.5.4 Summary

In summary, these procedures helped validate the out-of-scope costs contained within the costing approach. As a result, we believe the approach determined a reasonable basis for the in-scope provision cost calculations and the likelihood of in-scope costs being materially mis-stated is low.

We also found a broad variety of provision that institutions deliver as out-of-scope, from short courses designed to act as 'tasters' to full-time provision, or for a particular local need, to courses partly funded by European funds, to variations in teaching approach that underpinned differing unit costs compared to undergraduate provision.

6.6 Comparative validation procedures

Further reasonableness checks were undertaken to identify potential outliers in the data returns and categories of cost that were incomplete or unusual. We undertook comparative procedures that:

- Reviewed outliers at the subject group level;
- Identified unusual course FTEs;
- Assessed subject group unit costs against TRAC(T) costs; and
- Sought to understand categories of cost missing or unusually different.

6.6.1 Outlier methodology

This section describes our approach to identifying the outliers in the collected sample of responses. Throughout this analysis, we focused on the unit costs of the provision at the HESA cost centre level.

The objective of these procedures was to identify data points that do not conform to the observed distribution of other responses. After identifying the potential outliers, queries were raised with the institutions to understand whether they represented a correct estimate of costs. The objective was to receive a satisfactory explanation and / or resubmission before considering their removal from the study.

By their nature, course costs are always positive, which suggests that the distribution of costs is unlikely to be symmetric and instead more likely to be skewed towards to the right, meaning it was logical to assume that some courses would have a cost difference from the mean greater than the mean itself. For this reason, we used a natural logarithm transformation of the data.

Any observations that were found to be more than three standard deviations away from the mean were analysed and queried with the reporting institutions. Using three standard deviations as the threshold is common practice and minimises the possibility of labelling normal variation found in data as an outlier. In practice, we investigated all outlier instances and kept them in the study if they were due to normal statistical variation. We also undertook this analysis by subject grouping at the HESA cost centre level to account for the systematic differences that may exist in the costs of providing different subjects. The procedure was also re-performed a number of times during the validation process to account for re-submitted data returns.

In all cases the institutions verified the accuracy of their submitted data and these observations were retained in the sample or corrected in a resubmission.

6.6.2 Course level validation

In addition to the validation checks at the subject group level, we reviewed the profile of the costs and student FTEs at the course level for unusual submissions. For example, the profile of student FTEs by course was examined and found to have a large number of courses with low FTEs. In discussing low student FTE figures with institutions, it was apparent that genuine reasons for low student FTEs existed, for example as a result of the final or first year of a course, or from the degree awarded, based on the modules completed.

For the purposes of the study, it was not necessary to make adjustments for these courses because in addition to the low proportion of cost, these courses had a range of unit costs that were similar to courses with more students.

6.6.3 TRAC(T) comparison

Each year, institutions in the scope of this study submit their TRAC for Teaching (TRAC(T)) return. This shows the annual cost of teaching a full-time equivalent OfS / Funding Council-fundable student for each HESA cost centre. This is referred to as ‘Subject-related full Average Cost of Teaching a student’ (Subject-FACTS). The subject-related costs of the OfS / Funding Council-fundable provision has a few notable differences to the scope of costs in this study. For example, the Subject-FACTS:

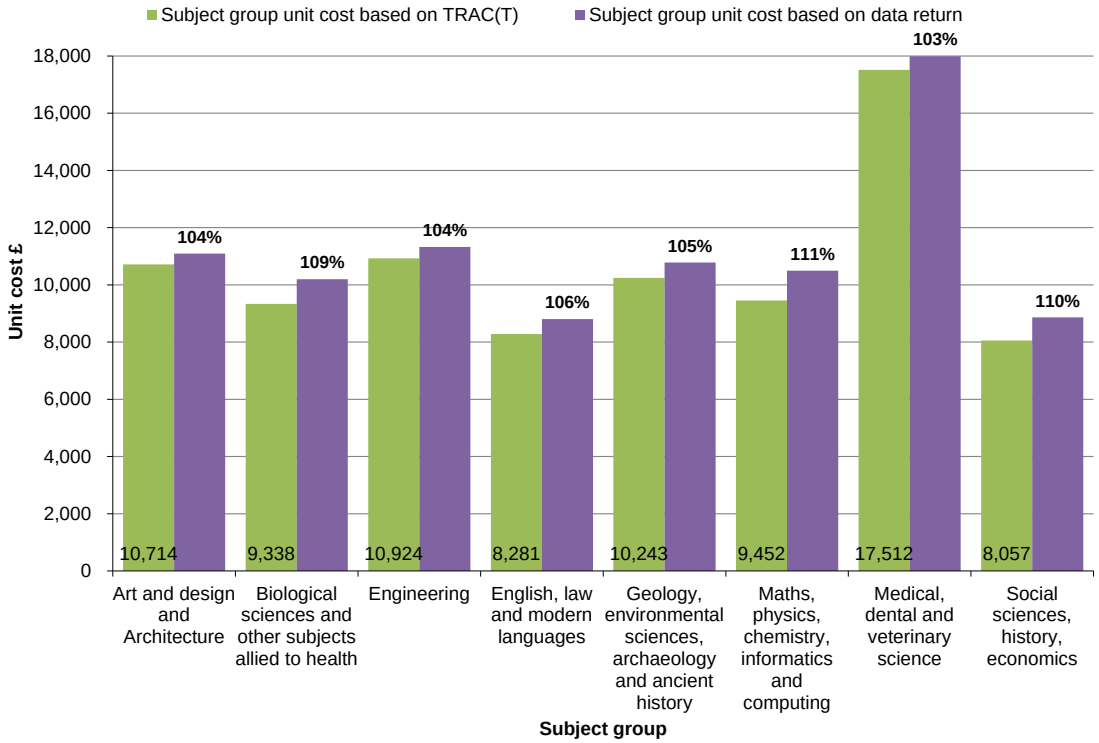
- Includes postgraduate (and distance learners’) teaching costs; and

- Excludes the costs of bursaries, teaching overseas students[24] and costs funded by other public sector bodies and the OfS / Funding Councils through targeted funding allocations.

Acknowledging these differences means that, whilst we would not expect the unit costs to match, we would reasonably expect to find some similarity in relative differences in unit costs across the subject groups. This is likely to be a consequence of the number and type of institutions in the sample.

To check the alignment in unit costs, we applied the study's subject group categorisation to the 2016-17 Subject-FACTS data for those institutions that participated in the study. We then compared the weighted average unit costs for each subject group between the study's results and from the Subject-FACTS data, see Chart 15 for the resulting comparison.

Chart 15 - Comparison of subject group unit costs from TRAC(T) and the data returns



Source: Analysis of data return and TRAC(T) data

Each subject group unit cost from the study is consistently higher than the Subject-FACTS unit cost. The range varies from 3% to 10% and is 6.8% in total. This analysis provided evidence that the relativity of unit costs used in the study was consistent to those previously reported through TRAC(T) data.

It is important to be clear that TRAC(T) is not course costing. TRAC(T) is rather a process that provides the OfS/Funding Councils with data on the costs of teaching that are relevant to any direct teaching funding provided for different subjects. This is used in aggregate to inform their teaching funding methods. TRAC(T) captures a specific denomination of costs, referred to as

[24] The impact of teaching overseas students is not deemed a significant factor in this comparison of unit costs as the study includes their FTEs.

'OfS / Funding Council fundable subject-related costs'. It is not therefore the 'total cost of teaching'.

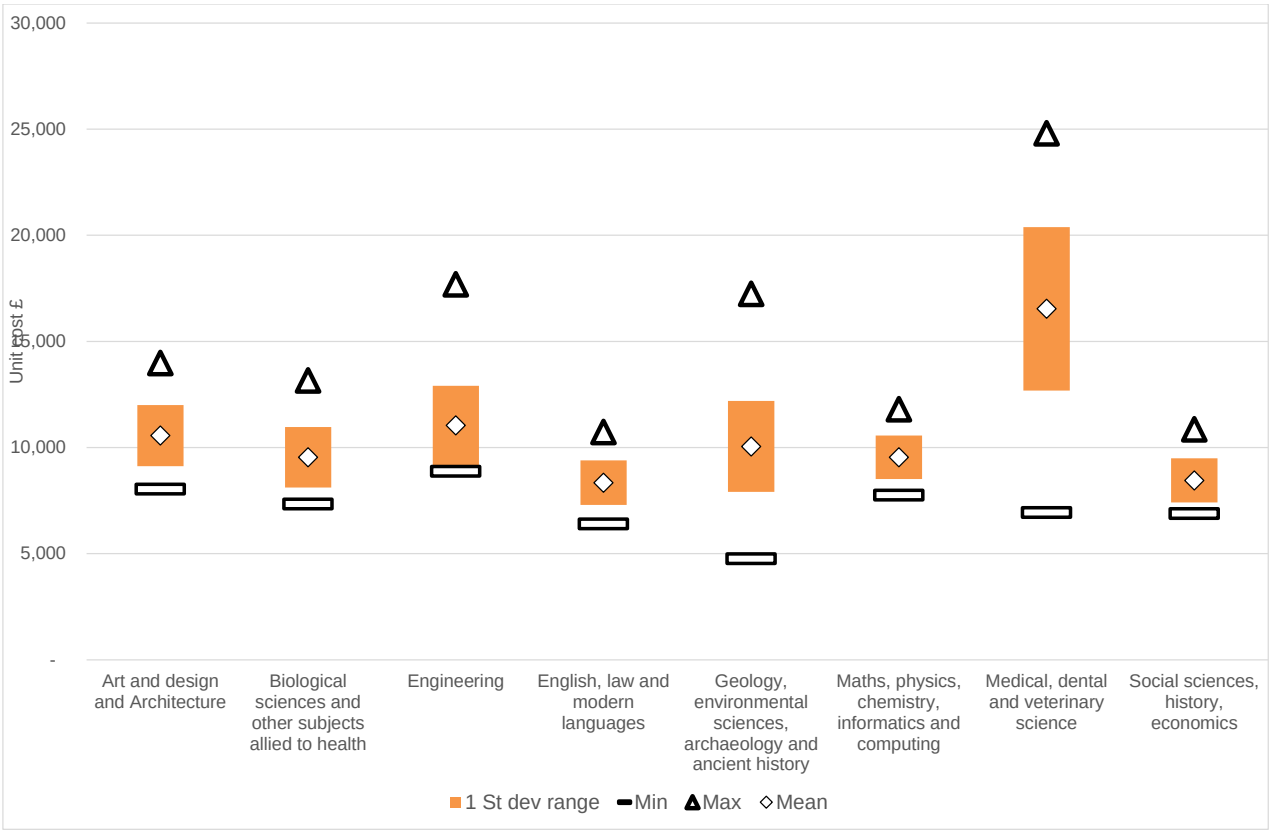
Part of the variation seen in Chart 15 can be explained by the lower cost base for Subject-FACTS. The specific activities for which the associated costs are removed are:

- Student-related (for example, widening participation and disabilities, bursaries, part-time provision);
- Provision-related (for example, sandwich year-out, accelerated and intensive provision); or
- Institution-related (for example, small institutions, specialist institutions, London institutions, specific initiatives).

The TRAC(T) cost does however, include all modes of provision (for example, postgraduate taught, distance learning, apprenticeships and all types of part-time), which is different to the modes of teaching that are within the scope of this study. Therefore, beyond anecdotal institution-level explanation for differences across subject groups, we were unable to undertake further procedures at the subject group level to understand these variations in more detail. However, we were able to review the impact of the cost of bursaries across all institutions in the study to understand the majority of the difference. The total cost of bursaries for the institutions in the study would add 5.4% to their Subject-FACTS unit costs, of the 6.8% difference calculated overall.

Using the same Subject-FACTS dataset, we reviewed the range of unit costs for those institutions that participated in the study, see Chart 16.

Chart 16 – TRAC(T) variation of weighted unit costs by subject group



Source: Analysis of TRAC(T) data

These results are similar to those presented by the participating institutions from completing the data returns (seen in Chart 15). This analysis provided further evidence that the variation exhibited in the costs from the study were not dissimilar to those previously reported in TRAC(T). It should be noted that the low Medical, dental and veterinary science unit cost is from an institution with specific characteristics. The second lowest unit cost was £12,900.

Whilst the study did not collect postgraduate costs at the subject group level, which was a factor in explaining some of the variation across subject groups, further work was undertaken at the HESA cost centre level, TRAC Peer Group and institution level to understand the differences more fully.

At the institution level, we were able to compare the total average weighted unit cost to the same unit cost from the Subject-FACTS data per institution. An x/y plot of differences in cost and FTEs was produced and an outlier analysis undertaken. From this work we did not identify any major outliers. However, further investigation and understanding was conducted for three institutions that appeared as minor outliers, and three different institutions from observation of the x/y plot. From this work we found that:

- Two institutions had submitted FTEs adjusted for non-completing students by including an FTE for the period they had attended. Neither were material and warranted a resubmission;
- Two institutions received additional teaching grants (targeted funding allocations), excluded from the TRAC(T) analysis. Of these one institution provided further evidence and we calculated their difference using calculations based on the standard grant figure per student;
- Differences were explained from a reconciliation between TRAC(T) and the study's definition of cost. Those differences included bursaries costs, funding adjustments and non-OfS / Funding Council-fundable publicly funded teaching costs; and
- The majority of FTE differences between the datasets were accounted for by Business and management studies (HESA cost centre 133), a good proportion of which were overseas which was a known difference.

6.6.4 Cost category review

Our review was designed to understand whether institutions had followed the guidance appropriately, included all the costs required and that the overall costs were not materially different or overstated in the costing returns. As a result, missing and 'odd' outlier costs were selected for inquiry and this raised 52 different queries.

Where a zero cost was indicated we found that many institutions had included the requisite costs in their submission, but had allocated them to a different category, for example non-pay to departmental running costs, or indirect cost items to a central cost category. Where institutions did not reallocate these costs in a resubmission, we did not make any amendments. Institutions cited time pressures, competing priorities and insufficient systems as reasons for not being able to adequately allocate these costs. Some institutions also explained that the scope of their central functions meant that direct departmental non-pay costs per the study guidance were very small and could not be disaggregated in the time permitted. All

institutions queried in this review confirmed that they were comfortable with the overall results provided and some made amendments as part of a resubmission of the data return[25].

Section 7 includes our analysis of cost drivers and cost components.

6.7 Outcome of validation procedures

As a result of the validation work, over 240 queries to institutions were issued to confirm and understand variations. Of the 41 submissions received, creating 2,172 institution-level cost category figures across the eight subject group submissions, 24 institutions made resubmissions. Many of these addressed cost category issues, but not all were rectified. For the remainder, institutions provided responses to the queries raised and confirmations that they were comfortable with their treatment and resulting cost.

Of the 41 returns received in total:

- One was excluded entirely;
- 40 were completed to the requisite level of completeness for the purposes of the costing exercise; and
- Not all submissions contained the non-financial data sought to support the study.

It should also be noted that some institutions undertake their own assessments and validation of cost.

A total of 6 queries across 5 institutions remained outstanding at the time of report production. We have assessed each one individually and collectively to determine whether there is any risk of a material error in the subject group unit costs. The nature and level of the outstanding queries leads us to believe that a material impact is unlikely. We are also satisfied that the procedures undertaken, specifically with regard to validating FTEs, gives us sufficient understanding to avoid any material errors.

Annex E provides detail on all the threshold considerations and exclusions applied.

6.8 Limitations inherent in the study

We collected, assessed and analysed a significant amount of data, including cost data for over 9,000 courses across almost 600 departments generated by the costing returns alone. This coverage and level of detail is greater than other Higher Education costing studies, and this should provide more reliable data, or visibility of anomalies.

There are however some inherent limitations in this study, as follows:

- Whilst a range of measures have been taken to assess the data, we have not verified, substantiated or audited the data provided by institutions;
- Trend analyses, statistical analyses and relative comparisons have been used to provide an indication of whether institutions have reasonably allocated and apportioned

[25] The charts produced in Annex L detail the amount of cost by each cost category. These include cost categories with absent figures.

costs to the in-scope courses, but this does not provide absolute certainty that the costs are fairly stated;

- Reliance placed on institutions judgement on the weightings applied to the out-of-scope delivery;
- In completing the cost returns, management judgement has been used in certain cases to determine the costs that have then been allocated to courses and the cost drivers used. These have been signed off by the Director of Finance or equivalent as appropriate;
- A 10% materiality threshold has been permitted in the guidance accompanying this study. This is consistent with principle of materiality applied within the TRAC methodology as a whole; and
- Responses to queries provided by institutions have been accepted and not verified.

7 Findings and analysis

7.1 Introduction

A key aim of the study was to establish the full economic cost for a student FTE studying full-time and part-time for an undergraduate or foundation course. This chapter presents the results and analyses undertaken to address the following questions:

- **What are the average full economic costs?** In section 7.3 we detail the cost of teaching provision expressed as a cost per student FTE, at a subject group level, institution level and split across the cost categories collected. The unit costs by TRAC Peer groups are provided in section 7.4;
- **What is the range and distribution of the unit costs?** Section 7.5 includes a series of charts showing a frequency distribution of unit costs for each subject group;
- **What unit cost variation exists at the HESA cost centre level?** Section 7.6 includes the detailed HESA cost centre unit costs and accompanying narrative;
- **Are some institutions consistently less or more costly?** Section 7.7 sets out the results from assessing each institution's overall unit costs and each subject group's unit costs;
- **What factors influence cost?** Section 7.9 sets out six factors considered in addressing this question. It includes analysis showing the relationship that exists between the six factors and unit costs and the characteristics associated with higher and lower unit cost calculations;
- **What costs are incurred?** This section sets out the types of cost data collected as part of the study, their relative proportions across subject groups and provision, and estimates the amount that is student related but classified as a central cost, see section 7.9;
- **How much more costly are institutions based in London?** This section sets out the increased cost for institutions located in London by cost categories (section 7.10); and
- **Is the annual cost of longer courses less than shorter ones?** A short analysis that sets out the cost difference between three and four year courses (section 7.11).

Section 7.7 contains analyses that provides a breakdown of the cost categories across full-time, part-time and foundation provision, and across subject groups. It also contains an analysis of the student related activities included in central costs and how they vary across institution peer groups.

Please note that the total student FTEs for full-time courses collected in the study was significantly higher than part-time or foundation courses. The student FTEs from the data returns were over 80 times higher than the part-time and foundation provision combined. As a result, the part-time and foundation provision had limited robustness, comparability and ultimately subject group representation. For completeness, the unit costs for part-time and foundation provision are provided at 7.13 and in more detail in Annexes J and K respectively.

7.2 How is the weighted average unit cost calculated?

The basis of the calculation uses the full Economic Cost that is drawn from TRAC. The full Economic Cost reflects the cost of sustaining provision over the longer term. The fEC calculation is based on the expenditure reported in the consolidated financial statements together with the margin for sustainability and investment. All unit costs quoted are for the one year of 2016-17. An indicative cost for the entire duration of the course would therefore need to take into account the length of the course.

The unit cost calculation uses the HESA cost centre or subject group level to perform a weighted average unit cost calculation. This is summarised in the following equation.

$$Unit\ cost = \frac{\sum total\ costs}{\sum number\ of\ students\ (FTEs)}$$

The number of students included both home and overseas students. The total costs included the relevant teaching costs for both these types of students and institutions confirmed that they did not treat differently the delivery of teaching to these students.

Where we calculated a weighted average unit cost for a subject group across more than one institution, all the relevant costs across all institutions are divided by all the relevant students for the same institutions.

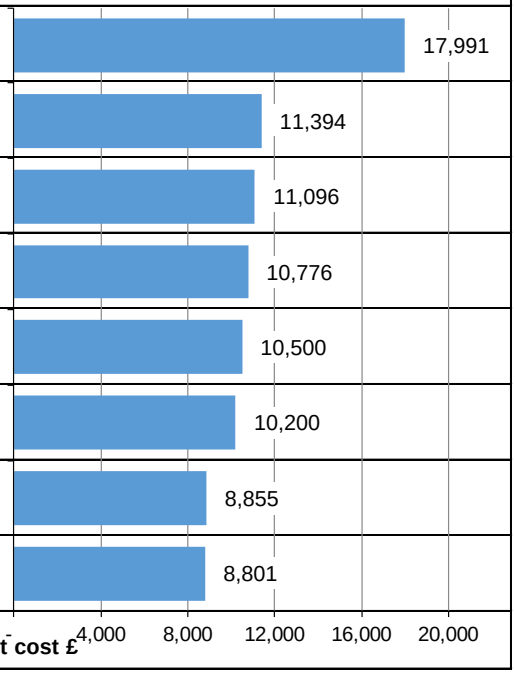
Further details on the costs and approach is given at Annex H and Annex O.

7.3 What is the average full economic cost for each subject group for full-time provision?

The following chart provides the weighted average unit costs for each subject group for full-time provision where more than four institutions' submissions were received. These costs are based on the data returns submitted by the 40 participating institutions.

Chart 17 - Weighted average unit cost for each Subject Group[26] for full-time provision

Number of institutions in study	Number of student FTEs in study	Subject group and their weighted average unit cost £
14	20,591	Medical, dental and veterinary science
31	31,778	Engineering
37	64,974	Art and design and Architecture
26	16,991	Geology, environmental sciences, archaeology and ancient history
31	40,050	Maths, physics, chemistry, informatics and computing
32	97,258	Biological sciences and other subjects allied to health
34	109,727	Social sciences, history, economics
30	41,552	English, law and modern languages



Source: Analysis of data returns

The chart shows that:

- Medical, dental and veterinary science is the subject group with the highest weighted average unit cost of £17,991 by a significant margin, over £6,400 above the next highest group;
- Five of the eight subject groups have a weighted average unit cost between £10,000 and £11,500; and
- The two lowest weighted average unit cost subject groups are within £100 of each other; Social sciences, history and economics at £8,855, and English, law and modern languages at £8,801.

The two largest subject groups to this study in terms of student FTE (and total cost) were:

- Biological sciences and other subjects allied to health (that are not in other categories) with £992.0 million (22% of the full-time total) and 97,258 student FTEs (23% of the total); and
- Social sciences, history, economics £971.7 million (22% of the full-time total) and 109,727 student FTEs (26% of the total).

It should be noted that the Medical, Dental and Veterinary sciences subject group also includes some placement cost, along with some other provision within biological science and other subjects allied to health. Placement activities occur when a student is in a location where

[26] The institutional full-time provision costs reported here do not include those costs that are incurred and paid for separately outside of the institution, for example for the health education and training of medical students by Health Education England.

they receive supervision and undertake work associated with their professional studies. For medical students, they receive provision in conjunction with a health provider, or trust. Health Education England funds this activity, but this can be paid directly to the placement provider or via the institution. We understand that these arrangements can vary by Health Education England region.

The data return asked for further details on placement. It requested details on placement costs (and separately pay and non-pay), the period of placement and background information on the funding arrangements in place to support placement provision. Whilst some institutions provided further placement costs and information, it was not provided consistently by all institutions which had placement activity as part of an undergraduate programme. A full reconciliation for medicine and nursing would have involved detailed discussions with Heath Education England to understand the arrangements in place across different health regions.

This variation in data return completion meant that we could not extrapolate the impact and treatment of placement costs robustly. Whilst 14 institutions contributed to the medicine subject group, it may also mean that the unit costs may be inconsistent and show wider variations at the institution level, perhaps reflecting whether placement costs were included or not.

It is also worth noting that the teaching costs on placement outside of the 'higher education' sector can vary and be significant. Institutions quoted very different rates per student across different professions.

Also, our data collection did not request detailed information on cost and student activity for each year of study that took place in the 2016-17 period. As a result, we could not isolate any impact on cost arising from the gradual lifting of student number controls since 2012-13. From discussions, we are aware that this could have mixed results on unit costs. For example, some institutions may have had capacity and therefore may have reduced their unit cost, whereas others may have needed to have invested to create capacity thereby increasing unit costs in the short-term. The 2016-17 year will only have two years groups where recruitment will have been completely free of student number controls for some subjects, noting that between 2012-13 and 2015-16 students with AAB grades at A-Level were not included in the student number cap.

During the analysis stage of the study, the placement of the Architecture and Mathematics HESA cost centres in their respective subject groups was questioned. It was agreed that we would produce the results of a change, but not make any permanent change to the subject group placement.

As a result, we modelled the impact on unit costs for the following changes:

- Architecture, built environment and planning (123), from the subject group of Art and design and architecture to Geology, environmental sciences, archaeology and ancient history; and
- Mathematics (122), from the subject group of Maths, physics, chemistry, informatics and computing to Social sciences, history and economics.

The resulting differences in subject group unit costs are shown in Table 5.

Table 5 - Impact of full-time provision HESA cost centre changes to subject group unit costs

HESA cost centre moved	Subject Group affected	Subject Group unit cost £	

		Before	After	Difference in unit cost £ (and as a %)
Architecture, built environment & planning (123) removed from:	Art and design and architecture	11,096	11,286	+190 (1.7%)
Architecture, built environment & planning (123) added to:	Geology, environmental sciences, archaeology and ancient history	10,776	10,523	-252 (-2.3%)
Mathematics (122) removed from:	Maths, physics, chemistry, informatics and computing	10,500	10,963	+464 (4.4%)
Mathematics (122) added to:	Social sciences, history, economics	8,855	8,902	+47 (0.5%)

Source: Analysis of data returns

Removing Maths from its subject group has the largest impact on the unit cost calculation for the remaining provision in the Maths, physics, chemistry, informatics and computing subject group. Maths has a weighted average unit cost of £9,348. The weighted average unit costs for the 'non-Maths' provision in the subject group is higher across all cost categories including course delivery staff cost (17%), corporate services (34%) and estates (43%). These higher cost category rates reflect the higher levels of teaching for the same number of students and the type of equipment typically required and supported for courses in this subject group. Its 11,494 student FTEs represent 29% of the total subject group FTEs and therefore its removal has a notable impact of 4.4% on the subject group unit cost.

7.4 What are the unit costs by TRAC Peer groups?

Table 6 shows the unit costs by each TRAC peer group[27] for full-time provision where more than four institutions' submissions were received.

Table 6 - Full-time provision weighted average unit cost for each Subject Group by each summarised TRAC Peer Group

Subject group	TRAC Peer Group (grouped)			
	A and B	C	D and E	F
Art and design and architecture	9,950	11,129	11,041	11,636
Biological sciences and other subjects allied to health	10,945	9,666	9,830	note 2
Engineering	11,230	12,158	11,112	note 2
English, law and modern languages	8,580	9,027	9,238	note 2

[27] Annex B describes the nature of the six TRAC Peer Groups depending on their nature and research income.

Subject group	TRAC Peer Group (grouped)			
	A and B	C	D and E	F
Geology, environmental sciences, archaeology and ancient history	10,105	10,550	12,506	note 1
Maths, physics, chemistry, informatics and computing	10,468	10,785	10,310	note 2
Medical, dental and veterinary science	17,793	note 2	note 1	note 1
Social sciences, history, economics	8,480	9,417	8,859	note 2

Source: Analysis of data returns

Note 1 indicates that no subject group provision existed in the sample. Note 2 denotes that data from fewer than five institutions were received and therefore the results are not published.

Except for full-time Biological sciences and other subjects allied to health (that are not in other categories), institutions in TRAC group A and B had consistently lower unit costs than the other groups. Factors explaining these differences are explored at 7.9 and whilst not conclusive, they appear to reflect a combination of characteristics typically present in this group, namely a larger scale (that allows overheads to be shared more broadly) and a higher number of students per member of staff. We outlined in section 4.5.6 the basis for the subject groups. It is however the case that the grouping of HESA cost centres into the subject groups can affect the subject group costs. Table 4 outlined a scenario for changing the mix of cost centres within the subject groupings and although the change was not material, it does nevertheless illustrate the impact that a change in the subject groupings can have.

7.5 What is the variation and distribution of unit costs?

To assess the variation amongst unit costs, we used each institution's unit cost submission to determine for each subject group:

- The frequency – the number of responses received;
- The median – the unit cost that is halfway in the data once arranged in order from least to greatest;
- The mean – unweighted across all the institutions that provided that unit cost;
- The standard deviation – based on the unit costs for each institution;
- The weighted mean – all costs divided by all student FTEs; and
- The frequency distribution of unit costs.

The table below summarises the full-time provision for each subject group, see Annex I for further information.

Table 7 - Subject group average unit costs for full-time provision

Subject group	Art and design and architecture	Biological sciences and other subjects allied to health	Engineering	English, law and modern languages	Geology, environmental sciences, archaeology and ancient history	Maths, physics, chemistry, informatics and computing	Medical, dental and veterinary science	Social sciences, history, economics
Frequency	37	32	31	30	26	31	14	34
Median	10,734	10,106	11,498	8,874	10,370	10,410	17,480	8,953

Subject group	Art and design and architecture	Biological sciences and other subjects allied to health	Engineering	English, law and modern languages	Geology, environmental sciences, archaeology and ancient history	Maths, physics, chemistry, informatics and computing	Medical, dental and veterinary science	Social sciences, history, economics
Mean	11,408	10,664	11,590	8,948	10,725	10,619	18,003	9,364
Standard Deviation	2,399	1,994	1,775	1,219	2,210	1,220	2,723	1,662
Weighted average	11,096	10,200	11,394	8,801	10,776	10,500	17,991	8,855
Maximum	20,071	17,995	16,808	11,106	17,716	13,256	24,033	14,779
Minimum	7,642	8,185	8,196	6,258	7,463	8,213	14,302	7,401

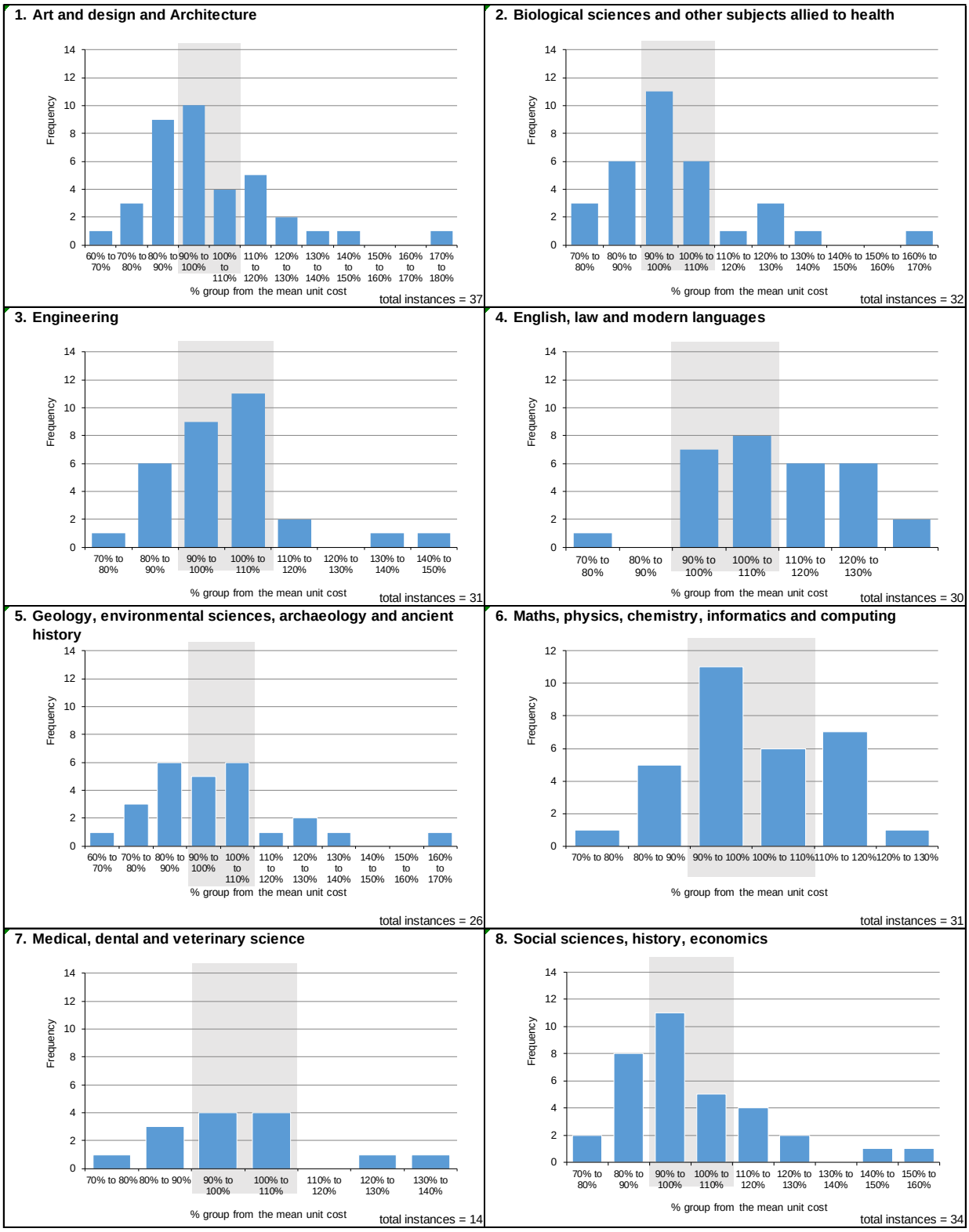
Source: Analysis of data returns. Differences due to roundings.

The range of subject groups' median unit costs (from Table 7) for those studying full-time shows that:

- In six out of the eight subject groups, the institutions were all London based. Staff to student ratio information was available for six of the eight institutions reporting the highest unit costs. For three of these six, the institutions reported a lower number of students in their staff to student ratio;
- Of the institutions reporting the lowest unit cost in each subject group, five of the eight institutions are based in the North of the country. Four of the eight institutions have a higher number of students in their staff to student ratios;
- The lowest respective median, mean and weighted average unit cost was for English, law and modern languages. This subject group and Social sciences, history, economics were the only ones with a weighted average unit cost less than the £9,250 tuition fees level for one student in 2016-17 (by 2.5% and 1.8% respectively).
- Medical, dental and veterinary science has the highest median cost of £17,480 and the greatest standard deviation of £2,723. This subject group exhibited a wide range. Its mean plus 10% was greater than the maximum value for a 95% confidence interval;
- Art and design and architecture and Geology, environmental sciences, archaeology and ancient history, both had a standard deviation greater than £2,000; and
- The subject groups with the largest numbers of student FTEs (Biological sciences and other subjects allied to health, and Social sciences, history, economics) were not exceptional in their standard deviation compared to others, being neither at the high or low end of the range.

We also produced a frequency distribution chart for each subject group, indexing each institution's unit cost against the mean to help show variation across subject groups. The following group of charts (grouped under Chart 18) show the distribution of unit costs and a shaded area to show the range for +/- 10% of the mean in each subject group.

Chart 18 - Subject group unit cost distributions for full-time provision



Source: Analysis of data returns

Whilst the frequencies at this level become fewer (with none of the subject groups achieving a peak frequency above 12), these charts show a mix of unit costs that extends above and below 10% of the weighted average unit cost (between 90% and 110%). The subject groups exhibit a range of types of distribution and 'peakedness':

- Normal distributions, with some skew to the right or left, for Engineering; English, law and modern languages; and Social sciences, history, economics.
- Bimodal distributions where two 'peaks' are apparent, for Art and design and architecture; Biological sciences and other subjects allied to health; Geology, environmental sciences, archaeology and ancient history; Maths, physics, chemistry, informatics and computing; and Medical, dental and veterinary science. For these subject groups, the mode may be a more appropriate unit cost. However, many institutions provide the full range of courses for this subject group.

Similar charts were produced using HESA cost centres and these too contained some bimodal distributions. Whilst caution needed to be exercised as there were comparatively fewer data points for each HESA cost centre, they highlighted that these bimodal distributions are likely to be a combination of factors including the underlying nature of the provision contained in subject groups. For example, the Architecture, built environment and planning subject group contains four HESA cost centres. Three of these four produced a normal distribution at the HESA cost centre level. Chart 19 shows the distribution of HESA cost centre unit costs within each subject group, for the full-time provision.

These different variations do not undermine the validity or accuracy of the costings provided. In many ways it reflects the multi-factorial nature of the provision being costed as institutions design their own course content, from the detailed topics to cover, the choice and number of modules studied, to the number of teaching hours or support a student may receive and how the broader provision is to be delivered.

Variation was a topic explored throughout our discussions with institutions. They described further variations among individual courses, across courses managed by the same department (and in all likelihood contributions to the same subject group) and more broadly across their entire portfolio. For example, one institution explained that their English course was experiencing a period of staff 'refresh and development'. As a result, they incurred increased running costs attributable to this one course as new staff overlapped outgoing ones. In this study they calculated a course unit cost in excess of £30,000 which was much higher than others in the same faculty. In their view however, it was correct and reflected the changes that a particular course was experiencing and that this was a normal part of evolving programmes. Another institution described the wholesale relocation of their sports science department to another location that was part completed. This too resulted in a high unit cost across a number of courses because of the 'additional' estate cost being attributed to these courses. These higher unit costs were balanced by other courses with lower unit costs, often operating at full capacity and long established in their delivery.

Another institution described an organisation structure which was very flat, specialised and small in individual nature, coupled with a relatively few number of courses on offer, but highly tailored to individual student preferences. This model meant students could receive their provision from a number of small schools, or colleges. They explained that they expected their unit costs to be much higher than other more 'centralised' institutions, which they also gave as a reason for their success, both academically and with students. On the face of it, their course in Maths for example would reflect the same credits as any other undergraduate programme, but it would be delivered in an entirely different manner.

Whilst institutions can exercise discretion over the level of resource to courses, this is influenced by a number of factors that can limit flexibility in the short-term. From our discussions with institutions we were informed that these factors include: whether courses are accredited by professional oversight bodies and therefore set requirements for aspects of the

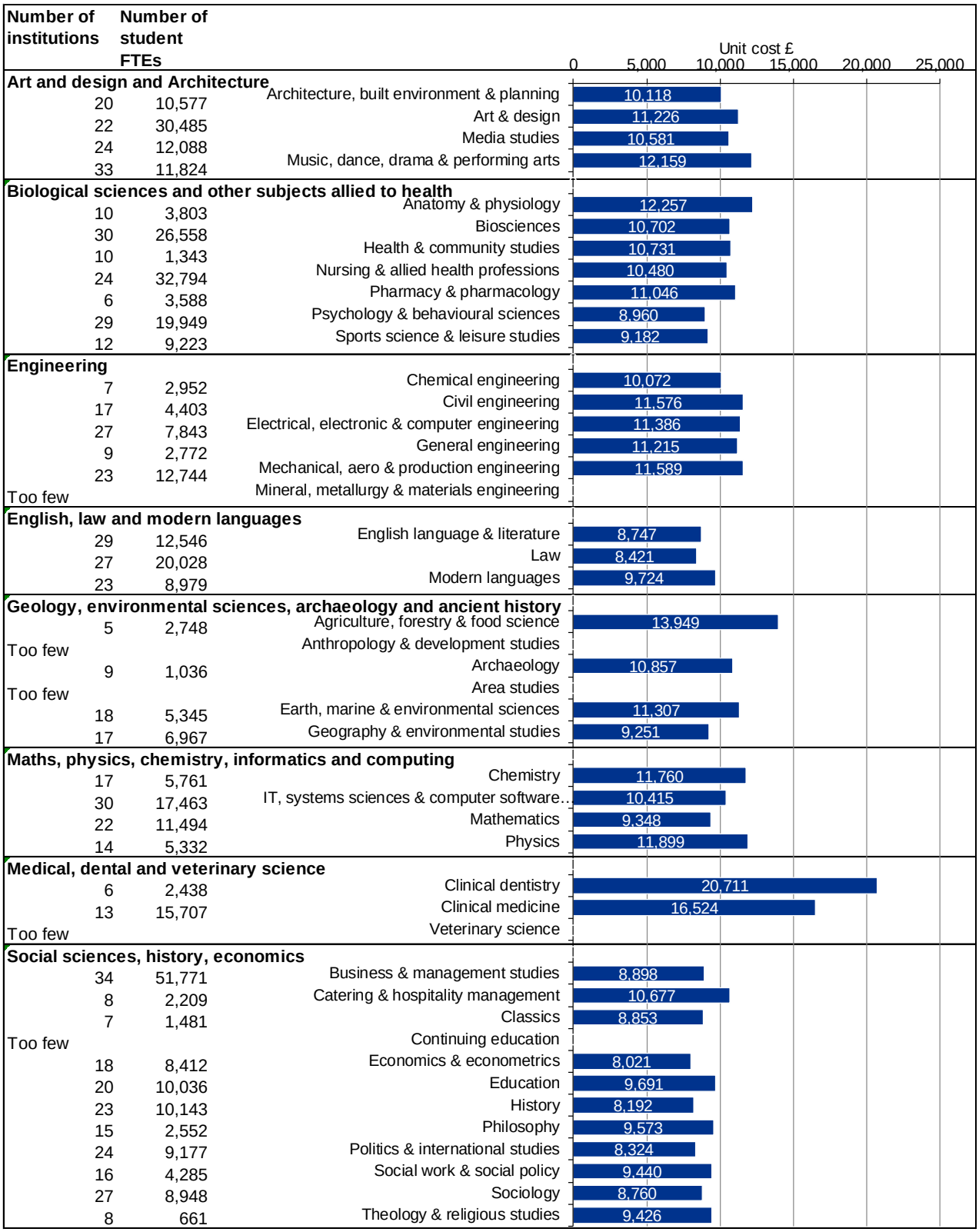
course content; the resource intensity of the subject (i.e. the level of equipment and facilities required to deliver the course), widening participation plans and the demands and expectations of students in the context of operating in a more market driven environment. In section 8 later, we outline some other issues that limit the flexibility of the cost base.

7.6 What unit cost variation exists at the HESA cost centre level?

We assessed the weighted average unit costs for each HESA cost centre to assess the range of unit costs and to identify variations. Chart 19 shows the results for the full-time provision.

Charts and tables for part-time and foundation provision are provided in Annexes J and K. We have not provided HESA cost centre level information for part-time and foundation provision due to the small number of data returns received from participating institutions and the low number of student FTEs involved.

Chart 19 – HESA cost centre unit cost by subject group for full-time provision



Source: Analysis of data returns. The 'Too few' note indicates that data from fewer than five institutions were received and therefore the results are not published. All unit costs calculated on a weighted average basis.

The number of HESA cost centres varies from 3 in Medical to 12 in Social sciences. With a few exceptions, the data returns submitted by participating institutions enabled us to report weighted average unit costs for most HESA cost centres.

The chart shows variation among the highest and lowest unit costs for HESA cost centres within each subject group, ranging from £1,303 (English, law and modern languages) to £4,697 (Medical, dental and veterinary science, and specifically between dentistry and medicine).

This analysis informed our discussions with institutions and we noted that:

- Within the subject group of Biological sciences, the Anatomy and physiology HESA cost centre had the highest unit cost. This reflected the higher professional grade of staff typically involved in teaching all aspects of this provision and the contact time reported.
- The variation in the Geology subject group was partly due to the higher unit cost associated with the Agriculture, forestry and food science cost centre and the lower unit cost for Geography and environmental studies. These costs and variation appeared consistent because:
    - In the main, the higher cost provision was driven by a few specialist institutions outside of London; and
    - Of the institutions with Geography and environmental studies provision (unit cost £9,251), 13 institutions also provided the Earth, marine and environmental sciences provision (unit cost of £11,307).
- Medical and dental had the highest unit costs across all HESA cost centres. This was expected in light of the nature of the course delivery staff costs and supervision required plus the expense of the specialist estate and meeting professional standards and oversight. The dentistry provision cost was 25% higher than the medical provision. Part of the explanation appears to be in the economies of scale that exists within Medicine. The number of students per institution between the two was almost three times higher for medicine, (1,208 versus 406). The number of students in their staff to student ratio was also higher for medicine contributing to a lower unit cost of course delivery.
- For the five institutions contributing to the Agriculture, forestry and food science unit cost, a small number of specialist institutions provided over 80% of student FTEs.

7.7 What costs are incurred?

We developed seven cost categories to help collect and analyse the teaching costs provided by participating institutions. Annex H gives fuller details on each category, but in summary teaching costs were split between:

A) Course delivery staff costs – those pay costs directly incurred in the provision of a course;

B) Non-pay costs – those non-pay costs directly incurred in the provision of a course;

C) Departmental running costs – those department held costs that were directed by academic leads in the provision of courses, for example local administrative support;

D) Student facing support services – support costs led and managed centrally across the whole institution for Marketing and Admissions, Financial support to students, Libraries and museums, Outreach activity and Student Facilities. IT is also included here though it is noted that some of this service may be provided for the benefit of other corporate services, for example the network infrastructure. The Marketing and Admissions category also contain some costs that further the institution as well as supporting students and wider participation. This cost category is further analysed in section 7.7.4;

E) Corporate services - support costs led and managed centrally across the whole institution for Finance, HR, Legal services and other (typically including the senior leadership and management teams);

F) Estates costs – for the maintenance and running of the estate. This includes rates, estates personnel costs, buildings depreciation, insurance, cleaning and security but excludes any capital spend as not a revenue item; and

G) Sustainability adjustment – the MSI figure previously described in section 4.5.3.

We adopted the same weighted average approach to calculate each cost category unit cost by totalling all the costs provided by each cost category and then dividing by the total number of student FTEs for the subject group.

7.7.1 What proportion of cost categories exist across provision?

We collected 23 different types of cost items across six categories of cost. Annex H sets out further details on the types of cost provided. The following tables summarises the share of these costs for each of the categories of full-time, part-time and foundation courses.

Table 8 - Category costs by provision type

Cost category	Full-time		Part-time		Foundation		Total	
	£	As a %	£	As a %	£	As a %	£	As a %
Course delivery staff costs	1,127,964,795	26%	14,170,475	25%	6,240,497	29%	1,148,375,766	26%
Non pay costs	242,022,660	6%	3,321,444	6%	861,928	4%	246,206,032	6%
Departmental running costs	456,222,046	10%	4,759,296	8%	1,010,352	5%	461,991,694	10%
Student related central services	1,107,962,409	25%	14,476,059	26%	4,872,898	23%	1,127,311,366	25%
Corporate services	454,345,214	10%	7,377,648	13%	3,277,648	15%	465,000,511	10%
Estates costs	547,257,940	12%	5,978,774	11%	2,886,688	13%	556,123,403	12%
Sustainability adjustment	450,690,593	10%	5,938,684	11%	2,339,428	11%	458,968,706	10%
Total	**4,386,465,658**	**100%**	**56,022,380**	**100%**	**21,489,440**	**100%**	**4,463,977,478**	**100%**

Source: Analysis of data returns. Differences due to roundings.

We note that:

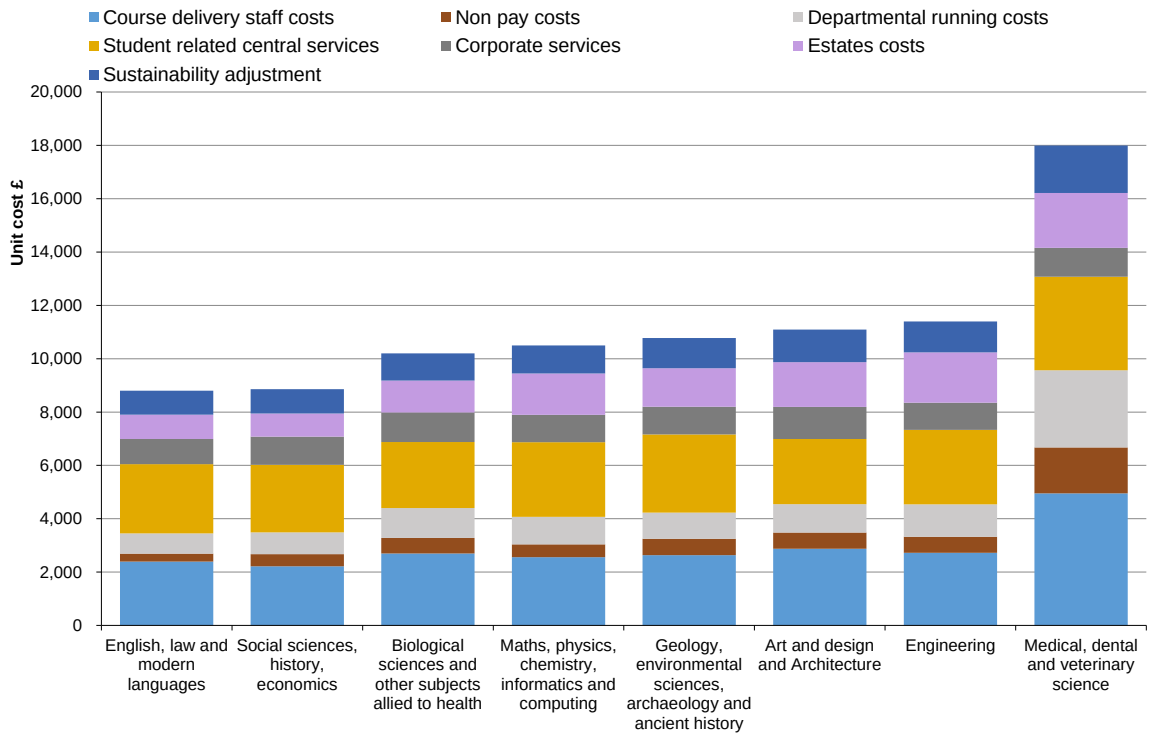
- Course delivery staff costs and Student related central services have the largest proportions, with a range of between 23% and 29% of the total across all provision. Section 7.7.4 contains more analysis;
- Non-pay costs have the smallest share of course category costs, at 6% for full-time provision;
- Departmental running costs vary the most across the categories, notably accounting for as little as 5% of total costs in the case of foundation courses (and at the same time constituting one of the smallest areas of cost at £1 million); and
- Estates and Sustainability adjustment costs have similar proportions and ranges, of 11% to 13% and 10% to 11% respectively.

7.7.2 What proportion of cost categories exist across subject groups?

The following two charts show the full-time unit cost by each cost category for each subject group and the proportion of cost by each cost category for each subject group.

Charts for part-time and foundation provision are provided in Annex J and K. Charts for each subject group by institution and cost category are provided in Annex P, Q and R for full-time, part-time and foundation provision respectively.

Chart 20 - Weighted average unit cost for full-time subject groups by cost category



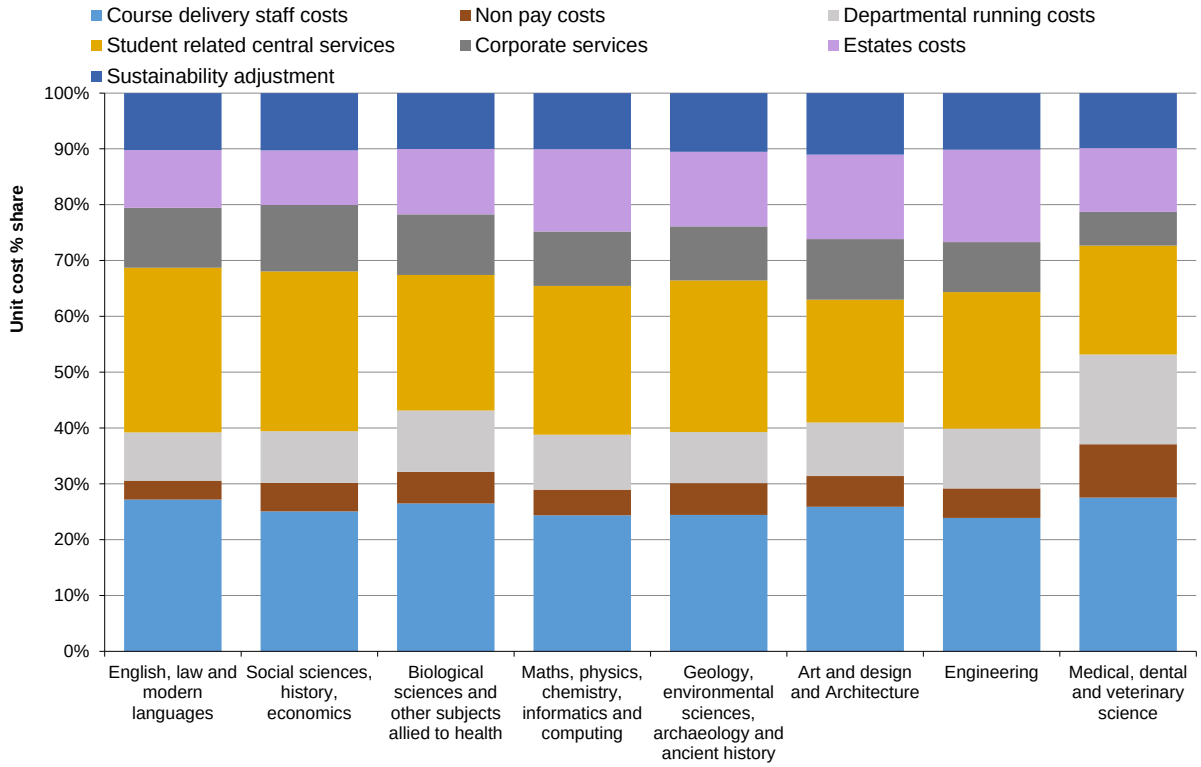
Source: Analysis of data returns

Among the costs provided, we found:

- Some similar levels of cost among the course delivery staff unit cost, (with the exception of Medical), and sustainability adjustment categories of cost; and
- A lesser extent of similarity in the unit costs among the categories of cost for non-pay, departmental running costs, central service costs and estate where the organisational structure of an institution appeared to influence, to some extent, the allocation of costs among these categories. For example, one institution had devolved some of its marketing activities to its academic departments, whereas others operated all their marketing activity centrally as a corporate function for the institution.

As different subject groups have different absolute unit costs, Chart 21 has been produced to show the proportions of cost by subject group:

Chart 21 - Weighted average unit cost proportions by cost category and full-time subject groups



Source: Analysis of data returns

The figures for these charts is available at Annex I (Table 26). We noted that:

- Student related central services costs are a large cost category for most subject groups of between 22% and 30%, except for Medical, dental and veterinary science (at 19%). For this subject group course delivery staff costs are higher (at 28%);
- Course delivery staff costs are between 24% and 28% for each subject group. These costs are recorded at the academic department level and do not include

other pay costs that institutions record at the departmental running cost, student related central cost, central services and estate level;

- Departmental running and Estates costs have similar proportions and ranges, 9% to 16% and 10% to 17% respectively; and
- Sustainability adjustment costs are very close in range, between 10% and 11%. The weighted mean MSI for the UK sector as a whole was 9.8% in 2016-17[28].

From our queries with, and visits to, institutions, we understood that there are a variety of ways in which institutions organise, control and report their expenditure during the year. As a result, there is some variability in where costs are coded in the financial ledgers in respect of centrally run services, estates and departmental running costs. More centralised institutions will tend to record a higher share of student related central costs, corporate services and estates costs, whereas some institutions allocate the costs of these activities through their financial ledgers to the academic departments, which in turn increases the reported departmental running cost and lowers the student related central costs, corporate services and estates costs reported.

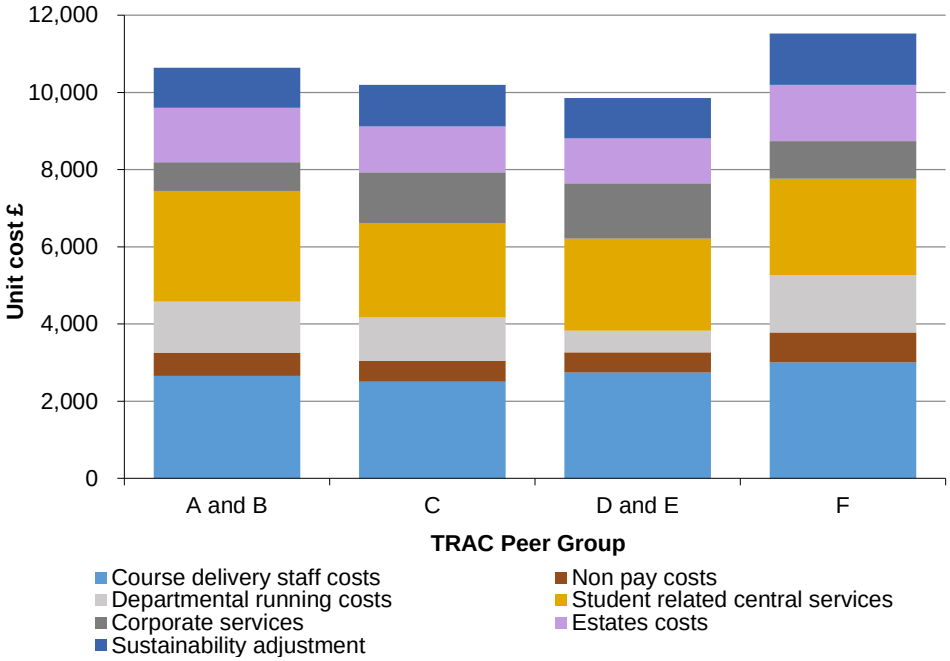
Therefore, whilst the study captured all the relevant teaching costs, any analysis using the detailed cost category levels needs careful understanding to avoid misrepresentation.

7.7.3 What proportion of cost categories exist across TRAC Peer Groups?

We calculated the unit costs by cost category and their proportions across the four TRAC Peer Groupings used in this study. Based on the final data returns submitted, the TRAC Peer Groups appear to have consistency in the proportion of costs despite the differences in weighted average unit costs, see Chart 22 and Chart 23.

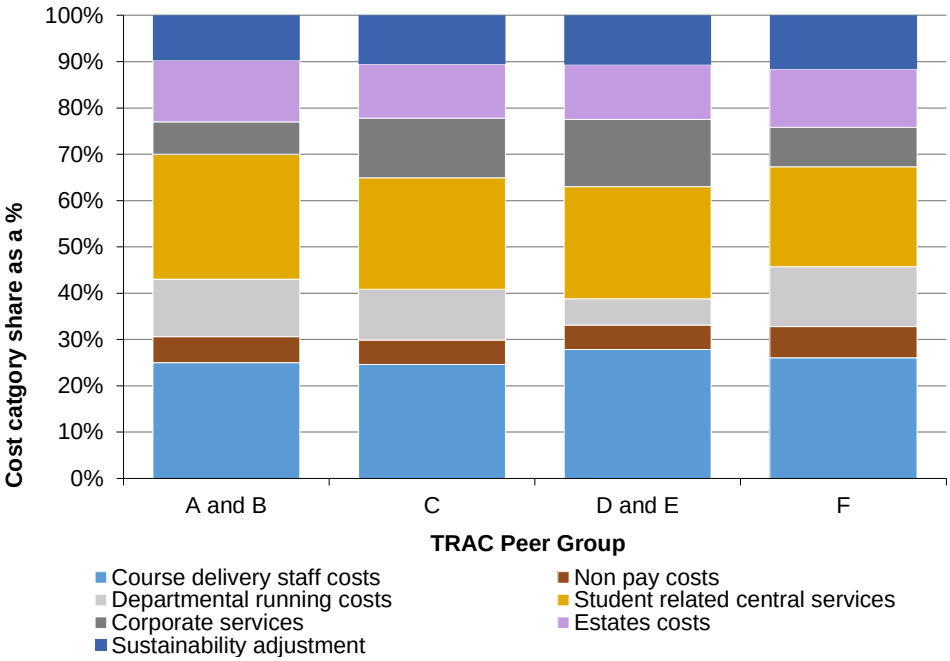
[28] Figure based on the mean (weighted) on an income basis. Margin for Sustainability and Investment: analysis of 2016-17 data, Sustainability Metrics Steering Group, August 2018, please click here for link.

Chart 22 - Weighted average unit cost by cost category by TRAC Peer Group



Source: Analysis of data returns

Chart 23 - Cost category proportions by TRAC Peer Group



Source: Analysis of data returns

The main points arising from this analysis are:

- The comparatively higher share of course delivery staff costs in the D and E Group (28%) and smaller departmental running costs' share (6%). This could be partly explained by the generally smaller amount of research activity which typically takes place at these types of institutions compared to TRAC peer groups A, B and C, so a higher proportion of staff time could be spent teaching.

Equally we explored entry tariff as a possible factor, but insufficient data was received to enable any conclusions to be reached as to the relationship between course delivery cost and entry tariff;

- All institutions tended to have a similar share of student related central costs;
- The smaller share of corporate services for Peer Groups A and B may also be accounted for by their ability to offset a proportion of their overheads across other non-Teaching activities, for example Research, and/or have comparably more costs allocated to academic departments. For Peer Groups D and E the larger proportion of corporate services costs and lower departmental running cost could reflect the more centralised organisation of these institutions; and
- The higher unit cost and higher share of departmental running costs and lower share of corporate service costs in TRAC Peer Group F may be partly explained by the size of the institution and its tendency to organise activities at the departmental running cost level that others would do more centrally.

Anecdotally, an institution's approach to organise and control differed by virtue of scale. Larger institutions appeared to have more autonomous academic departments with broader financial powers. They tended to have more local control over non-pay for example, and accordingly may have been treated in this study as directly associated with the provision being delivered. Smaller institutions tended to control more spend centrally, often because they simply could, and this was then treated as departmental running costs or centrally allocated costs in the data return. For example, two small institutions that we visited explained that all vacancies were subject to executive scrutiny prior to recruitment. Whilst the categorisation of course delivery staff costs appeared more straightforward, this too was subject to some local variation between 'Other – staff costs' (in the course delivery staff cost category) and staff costs in the departmental running cost category. In summary, it appears that TRAC Peer Groups A and B are able to share their non-student facing costs across their research activities. Whilst this may lead to greater economies of scale, we did not collect information to assess whether these activities were more, or less, efficient in practice.

In certain instances, some institutions highlighted that as part of their resource allocation process they apportioned costs direct to academic departments, but others kept them within central cost centres, for example in the estates category for the maintenance of academic teaching space. These inconsistencies affect how certain costs are classified which therefore means some caution is needed in interpreting aspects of these cost categories, particularly between departmental running costs, student related estates and central costs. However, we conclude that the scale of the institution is having some impact on unit costs across different TRAC Peer Groups.

7.7.4 What student related services were assessed and how much do they cost and vary across types of institution?

The data return set out 10 cost headings within the central cost category plus the option to add any items of a significant nature (to a maximum of two) at the institution's discretion. These costs were allocated to either a 'Corporate services' or 'Student related central services' category, Annex CC details the approach taken. Annex H provides further detail on the costs requested through the data return for each cost item.

It should be noted that this study only reflects the share of any central costs related to teaching and not those allocated to research or other activity. There can also be inconsistencies in the central costs reported by institutions. For example, an inconsistency may arise where an

academic department has undertaken a marketing activity and therefore the cost will be a departmental running cost, whereas another institution would incur this cost centrally and classify the cost as a student related central cost. Therefore, the costs reported are only the 'central' element of those operations and not necessarily the total cost of the service.

The following table shows the total corporate services costs. The miscellaneous category represents costs such as pension charges, insurance costs and any unspecified central costs.

Table 9 - Corporate services cost summary

#	Corporate services cost item	Total £	as a % of total costs
1	Corporate services - Finance	91,710,064	2.1%
2	Corporate services - HR	53,322,611	1.2%
3	Corporate services - Legal	13,640,090	0.3%
4	Corporate Services - other	103,607,001	2.3%
5	Miscellaneous central costs	202,720,745	4.5%
	Total	465,000,511	10.4%

Source: Analysis of data returns. Differences due to roundings.

The following table shows the total Student related central services costs by each item collected.

Table 10 - Student related central services cost summary

#	Student related central services cost item	Total £	as a % of total costs
1	Corporate services - IT	219,371,418	4.9%
2	Corporate services - Marketing and Admissions	202,400,159	4.5%
3	Financial support to students	174,908,068	3.9%
4	Libraries and museums	198,093,870	4.4%
5	Outreach activity	59,999,498	1.3%
6	Student Facilities	272,538,354	6.1%
	Total	1,127,311,366	25.3%

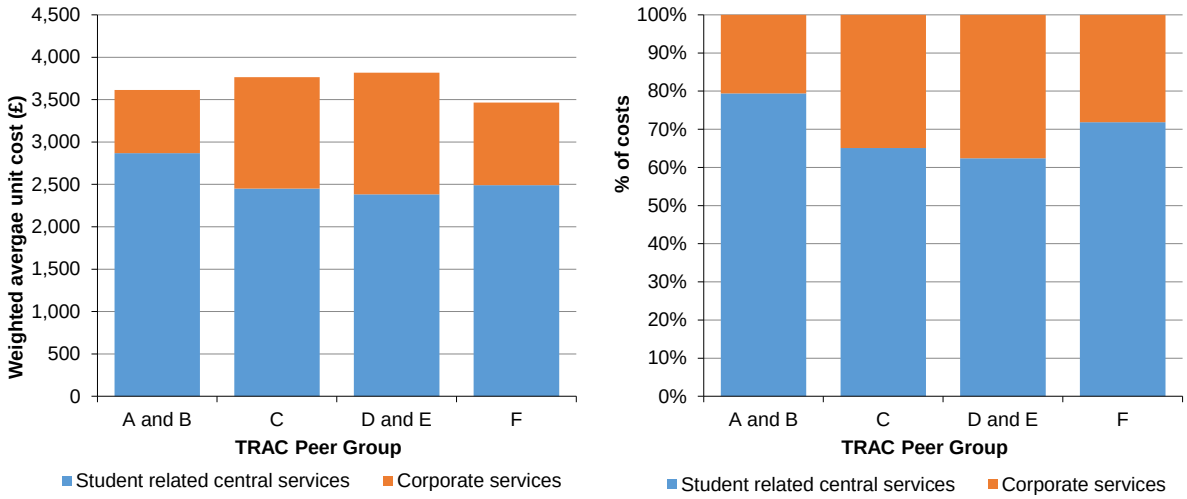
Source: Analysis of data returns. Differences due to roundings.

The largest areas of cost organised centrally and collected from the data return were student facilities and IT services, with 6.1% and 4.9% of the total costs respectively.

From our discussions many institutions referenced the increased investment in IT services for students (and staff and management) as part of strategies to support student learning and their well-being. For example, they reported investments to create and sustain more extensive wi-fi networks and hubs, mobile timetabling, and support applications into software development for online learning and learning analytics, plus management tools to help timetabling, resource scheduling, student financing and student tracking. Several cited future increases in IT services as being necessary to address future efficiencies as well as to continue to improve student experience and match expectations in an increasingly competitive market.

Analysing this further, we compared the share of central cost category across TRAC Peer Groups.

Chart 24 – Comparison of student related central services costs and corporate services costs across TRAC Peer Groups (as a proportion and by unit cost)



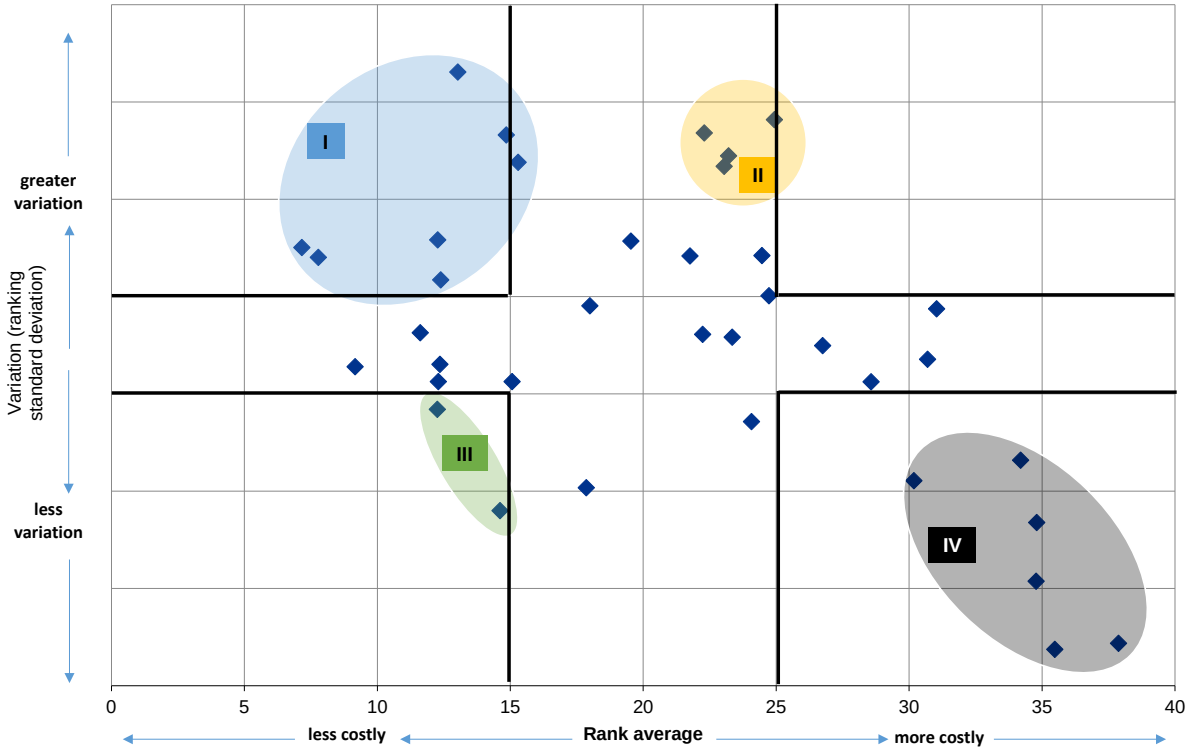
Source: Analysis of data returns

The results may reflect that TRAC Peer Groups A and B are arguably able to share their fixed non-student facing costs across their research activities, and possibly able to benefit from greater economies of scale. Conversely, those institutions with less research spend and the smaller specialist institutions in group F appear to have spent more on non-student facing activities as a proportion of their total central services cost. This was a point made on several of our field visits.

7.8 Are some institutions consistently less or more costly?

To address this question we ranked each institution according to their weighted average unit cost within each subject group, and then determined their average rank and how much variation each institution produced across their subject groups. Further details on the ranking approach are given in Annex X. Plotting each variable in an x/y chart gave the following result.

Chart 25 - Plot of average rankings and ranking variation



Source: Analysis of data returns. The darker grid lines help indicate the four quadrants for more / less costly versus greater / less unit ranking variation.

Discounting those institutions that had a zero variation as a result of submitting one subject group unit cost (specialist institutions), we identified four clusters which we have labelled I to IV broadly outside of the average rank and middle ranking variation. We reviewed the nature of each institution within each one. While it is not possible to draw definitive conclusions on account of the subjectivity of the cluster boundaries and the small number of institutions contained in some of them, we made the following observations:

- Category I (highlighted in blue) comprised seven institutions which appeared to have greater variation in their subject group unit costs, but were slightly less costly overall. These institutions did not share many common characteristics; they were geographically dispersed, belonged to TRAC Peer Groups from A to E and were a variety of sizes. Three of the seven had unit costs for every subject group, and not one had six or less. With the exception of one, they all shared the same staff to student ratio (SSR) range, (15 to 30 students to one staff FTE).
- Category II (highlighted in orange) comprised four institutions which appeared to have greater variation in their subject group unit costs and were more costly overall, although not the most costly. Though few in number, these institutions shared some common characteristics; three of their SSRs were in the range of 15 to 30 students to one staff FTE, two were from TRAC Peer Group B and they were all situated in the South. There was no common size across the four.
- Category III (highlighted in green) comprised a small group of institutions which appeared to have less variation in their subject group unit costs and were relatively less costly overall. Both were located outside London but in different

regions and had different SSRs ranges and TRAC Peer Group. Both submitted data returns on at least six HESA cost centres to the study.

- Category IV (highlighted in grey) comprised six institutions which appeared to have consistently higher subject group unit costs. This appeared to be the most clearly and well-defined cluster in the chart. All these institutions were either located in London or specialist in nature, or both. Further analysis on the London institutions is provided at 7.10. Their provision was more limited, submitting data returns on six or less subject group unit costs. All but TRAC Peer Group B and C were represented.

In conclusion, this analysis further underlined the variation in costs across the sector. While the limited number of data points means that it is not possible to draw any definitive conclusions, it is apparent that no homogeneous group of institutions dominated the lower unit cost provision, though being outside of London and large were contributing factors. The analysis also identified a group of institutions which have more consistently higher costs (in Category D). These institutions also shared some common characteristics being London based and / or specialist in nature.

7.9 What factors influence unit cost?

We sought to understand the different factors which influence the unit costs of provision. Using data collected from the study and HESA data on the size and characteristics of institutions, we sought to identify the particular factors which helped explain the comparatively higher and lower unit costs of provision which we found. This study focused on the following six factors:

- TRAC Peer Group;
- Region;
- Financial scale of institution;
- Non-continuation rates;
- Number of HESA cost centres; and
- Staff to student ratio (SSR).

Many of these factors were referenced in our discussions with institutions as key drivers of cost. We also discussed with institutions aspects of class size and contact teaching time which may also play an important role in determining unit costs. Whilst we did not collect specific comparative evidence from the costing approach on these factors (owing to the challenging timescale which limited our ability to carry out more in-depth analysis), the staff to student ratio provided by institutions, whilst not perfect, represented a reasonable gauge of the influence that these factors can have on unit costs.

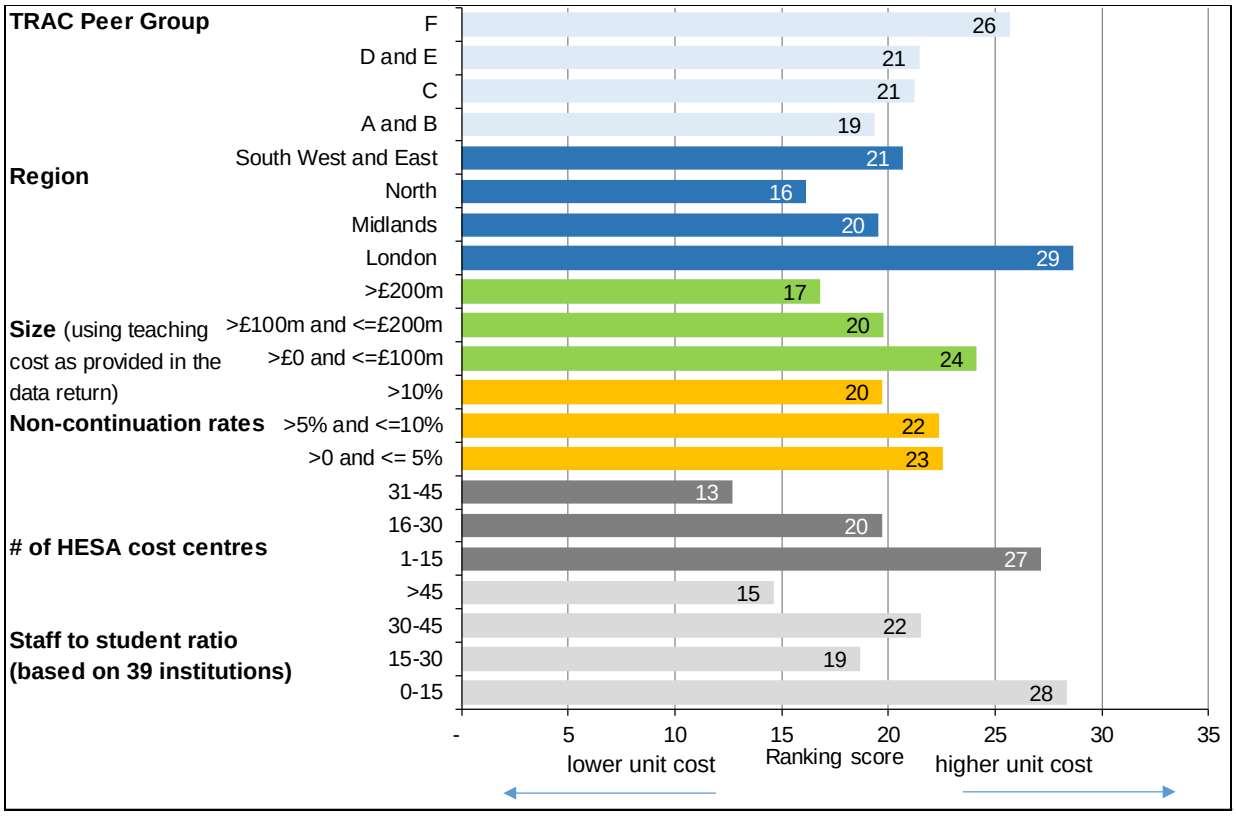
It should be emphasised that some of the factors considered in this report are not independent of others, for example financial scale is also partly a function of the numbers of HESA cost centres in which institutions deliver provision. It is also important to note that financial scale is a factor that underlies a number of the factors, for example, financial scale is also linked to physical area and TRAC Peer Group.

7.9.1 What factors influence the weighted average full economic unit cost?

We responded to the Steering Group's request to consider and compare a range of factors' influence on cost. So that the different factors could be analysed on a consistent and comparable basis, we averaged the rank that each institution obtained by ordering their weighted average subject group unit costs (from 1 being the lowest in unit cost to 40 being the highest) and averaged the results against each of the factors above. Annex X provides further detail on the methodology.

From the analysis we produced the following chart for the 40 participating institutions (except for the staff to student ratio analysis where only 38 institutions provided data).

Chart 26 – Average ranking results of subject group costs from each institution



Source: Analysis of data returns. The non-continuation rates are based on 2015/16 data and this metric and SSRs are based on whole institution level data and not aggregated subject groups.

This analysis supported a number of existing expectations across five of the six factors:

- Specialist institutions tend to have a higher unit cost, although size is also likely to be a factor in this together with a narrower range of subjects taught;
- Institutions in London tend to have a higher unit cost. Our further analysis indicates that the unit cost is 14.1% higher on average (see section 7.10);
- An institution with a smaller total teaching cost is likely to be more costly on a unit cost basis though this factor is not independent of other factors such as the number of HESA cost centres;
- An institution with more HESA cost centres, a proxy measure of course variety, is likely to have a lower unit cost and conversely the institutions with fewer

HESA cost centres had a higher cost (this is also likely to be linked to scale); and

- A higher number of students in the ratio of staff to students has a lower unit cost, and conversely the institutions with higher unit costs had a higher proportion of staff to students.

The ranking analysis also enables a comparison across factors. Institutions with a higher unit cost tended to have:

- Fewer HESA cost centres; and
- The ratio of staff to students (where a lower number of students in the ratio has higher unit costs);

For these two factors, the converse appears true:

- The ratio of staff to students, where a higher number of students in the ratio of staff to students exhibits lower unit costs; and
- The diversity of HESA cost centre provision, where institutions with a greater number of HESA cost centres have lower unit costs.

Annex Y contains a summary of the ranking analysis by subject group and Annex BB on the SSRs across subject groups.

In conclusion, our analysis suggests that differences in weighted average unit costs are driven by a combination of factors, some of which are highly likely to be inter-related. For a higher unit cost, the factors included being located in London, being smaller in size, having a more limited range of provision and a lower number of students in the staff to student ratio. Discussions with institutions also confirmed these factors as important but further illustrated the multi-factorial nature of influences on cost.

7.9.2 What influence does non-continuation rates have on cost?

Non-continuation rates here denote the percentage of full-time students who do not continue at the same institution following their year of entry (two years in the case of part-time students). Non-continuation rates used in the study are based on 2015/16 data[29].

Non-continuation rates are of interest in this study as a potential factor that may influence unit costs, the hypothesis being that higher non-continuation rates could lead to higher unit costs, assuming that all other factors being held constant. As outlined in section 4.6.2 and 7.2 the study has not included the FTE relating to non-continuing students, which depending on the level of non-continuation, may have some impact on the student FTE.

It has not been possible in this study to empirically analyse the role of non-continuation because of limited data availability. More specifically, data on non-continuation is only reported at the institution rather than course or subject level and 2015/16 is the most recent data published at the time data was provided, see Annex DD.

[29] The source of the non-continuation data was UK domiciled full-time undergraduate entrants 2015/16 from Table T3 of the HESA student record. The data and further information is available in full here.

The mixed perspective and experiences of participating institutions highlighted the complex and nuanced relationship which is likely to exist between unit costs and non-continuation rates for example being influenced by course or module level factors. In addition, the non-continuation rates can affected by the personal characteristics of students on the course, the support they receive and the advice and guidance they received prior to selecting the course.

Those institutions with higher non-continuation rates cited higher costs with regard to their widening participation investments and access agreements. Those with lower non-continuation rates cited their investment in reputation and teaching quality to support and retain students. Some institutions also reported that their annual intakes were often made with an assumed rate of non-continuation built into their operational and financial plans for teaching (and that this was variable amongst their provision).

From this work we acknowledge that non-continuation rates influence unit costs in both teaching and support resources, but from our discussions with institutions this did not appear as a common reason to explain material cost variations at the subject group level. To some extent this is to be expected as different courses will have different rates of non-continuation. Therefore, when such differences are aggregated these could counter balance each other. The data available to us only provided institution level rates of non-continuation (and only for the first year students) and therefore a more detailed analysis would be required to better understand the impact of non-continuation on unit costs. Notwithstanding this, several discussions were had with senior officers with experience from more than one institution which confirmed the impact of varying rates of non-continuation on different courses.

In conclusion, based on the limited data available, the institutions' management of non-continuation appeared to be an inconclusive factor on the reported costs.

7.9.3 What other factors were considered as influencing cost?

Institutions described a variety of challenges to their long-term financial sustainability at the same time as achieving other objectives relating to quality and choice of provision. These include balancing staff to student numbers (an often cited reason in our discussions for course investment to improve quality, student satisfaction and league table positions) and the desire to invest in a broad portfolio of provision. Even specialist institutions cited examples where they were seeking to broaden their mix of provision rather than seeking to gain ever higher student numbers for existing courses. This broadening of provision tended also to reflect ambitions to diversify income, typically from increasing their research activity. Most institutions reported that their Vice Chancellors communicated strong messages on financial sustainability, meaning that in the long-term, all cost factors must be controlled and met by activities from across their portfolio.

Institutions also cited their reputation and existing credentials as key reasons for course investment (and disinvestment). This was described in both strategic and tactical terms. Institutions described the need to respond and develop provision that met their broader community needs, quality aims and outlook.

We also discussed with institutions their circumstance and history as an underlying factor in their existing cost base and approach to cost control and planning. This varied from their estate (which often included legacy assets), its location and number of sites leading to certain costs and constraints, to their history and place in the community as factors for how they are organised and operate. Whilst anecdotal, there were also examples where institutions had changed their provision on campus, shifting the location of provision with a view to changing

costs significantly, and also in re-organising academic departments, albeit via a change in leadership, to achieve better organisational congruence.

Central to cost control and planning was the focus institutions have on gaining clarity around their expected future student numbers as early as possible. Once the academic year starts, and using existing continuation trends and current funding mechanisms, institutions seek financial certainty over their income for the short to medium term (depending on their mix of course lengths). This in turn feeds into their ability to plan expenditure over the longer term and put in place measures to control costs, where needed, in the short to medium term. From our discussions, the key areas where institutions sought to influence costs were over pay and centrally organised activities. Pay was uniformly regarded as an area with some control over the short to medium term, significant in itself for a department and with the most impact on cost overall. Many institutions described strict pay controls over vacancies. Several institutions cited revisions to provision delivery as a direct response to needing to reduce their pay spend. Equally, institutions often cited the need to invest in staff and SSRs particularly as a direct response to student feedback, market pressures or as a part of a wider strategy. A few cited robust workload planning models as a useful tool to aid workforce planning.

Institutions cited several examples where greater economies of scale were being sought, for example to address corporate costs. One typified the experience of others in describing their historic approach to the resourcing of professional services support (HR, finance etc.). They described an 'atomised' approach across academic departments resulting in many separate finance functions. Over the course of two major organisational changes they restructured and centralised the functions, driving out variation and laying the groundwork for eliminating other out-dated systems. Academic departments' autonomy also appeared to be an important feature in weighing up the benefits and disadvantages of certain changes to central processes. Our earlier analysis of costs (in section 7.7.4) illustrated the types of student related and other activities that institutions are committing under the heading of central costs.

Investment in IT was often cited as an enabler of these changes and reason to generate surpluses in the first place. Many institutions reported that their grip over resource utilisation would be enhanced with planned future investments in IT.

Institutions commonly cited the use of financial information in making decisions about future costs. Specifically, they used contribution levels (for example income to net costs) to help gauge and prioritise investments. For example, one institution described its investment decision in a business school facility as prioritised because it provided further contributions to overheads to help fund future costs. This appeared to be a typical approach by institutions in helping to weigh up the relative merits of different decisions across different academic departments.

Whilst finance staff evidenced a great deal of knowledge over their cost base and where those costs lay and why certain pressures existed, they appeared less fluent in the cost of activities more generally and where this was evidenced, admitting that this knowledge was likely to be limited to the finance function and to the University Board and executive team. Many participants had not undertaken course costing prior to the study, though several had undertaken some module level costing. Several cited the use of benchmarking tools to help them understand their costs further.

From our analysis (shown in Chart 26), an institution's estate does not appear to be a key factor in lower unit costs, conversely it provides evidence that a smaller estate can go hand-in-hand with a comparatively higher unit cost, although the scale and diversity of provision

offered will be related to the size of the estate. Several institutions reported that managing space was a significant challenge and clearly an area of priority. Institutions reported that the increasing use of technology was a further factor necessary to take into consideration in their future thinking on estate needs. Therefore it is likely that estates costs will become an example of increasing unit cost difference among institutions, depending on the course studied and method of delivery.

In conclusion, our discussions highlighted further variation between institutions across a range of further factors. In summary, these included the extent of centralisation, use of IT and progress towards strategic goals (to both reduce or increase unit costs as a result of investment in delivery and / or the student experience).

The understanding of cost also varied among participants and whilst used to help decision-making, it appeared limited by information systems able to produce robust information and, as a potential consequence, limited in use beyond the finance function.

7.9.4 How strong are the factors influencing cost?

To help gauge the strength of the factors' influence on unit costs further, we assessed the total cost and unit cost at the institution level set out in section 7.9.1, namely using the factors of SSR, financial scale of teaching, and number of HESA cost centres[30]. Further empirical analysis was also undertaken to understand the relationship between unit cost and student FTEs. At a more detailed level, we assessed unit costs and student FTEs by each subject group level, region and TRAC Peer Group and we also plotted the overall weighted average unit costs for all subject groups for all institutions against student FTEs provided by the 40 submissions for full-time courses.

As expected, we found evidence of a strong correlation between the number of students and the total teaching cost for an institution (+0.98). We also found a reasonably strong relationship from an institution's broader portfolio (higher numbers of HESA cost centres) and its total teaching cost (+0.86). However, this strength of relationship is not replicated for unit costs.

We found two factors with correlation coefficients above 0.7 between unit cost and student FTEs at the subject group level. This was where the institution was London based or in the D and E TRAC Peer Group. For the other factors at the subject group level we found a weak correlation between each factor and the unit cost at the institution level. Part of the reason is that the unit cost analysis was conducted at the institution level and therefore included a mix of provision. The weak relationship is also likely to be attributable to the staff to student ratios across different subjects and ultimately the mix of subjects across an institution.

At the subject group level, there was no evidence to support a strong relationship between the student FTE and unit cost meaning that the unit cost is not influenced heavily by the student FTEs, even among a subject group.

In conclusion, because a number of factors are working together and institutions are diverse, our ability to draw firm conclusions is limited. Chart 26 suggests the absolute size of the teaching cost and the ratio of staff to students has a stronger bearing on unit costs.

[30] TRAC Peer Group was excluded as not a quantitative measure.

7.10 How much more costly are institutions based in London?

The cost of provision in London has been recognised by past funding bodies as more costly compared to other regions for many years[31]. A study published in December 2017 examined the regional variation in costs and benefits for higher education providers in England[32]. It found that:

- Land and building costs in inner London were more than three times the national average; and
- Average academic staff costs in inner London were between 12% and 14% higher than the national average.

This study aggregated the costs and student FTEs and summarised the weighted average unit costs for each subject group and region, see Table 11 and Table 12. Two subject groups were omitted from the subject group analysis as fewer than five submissions were received, Geology, environmental sciences, archaeology and ancient history and Medical, dental and veterinary science.

Table 11 – Weighted average unit costs for each region by Subject group for full-time undergraduate provision

Subject group	London £	Number of London submissions (above 4)	Non-London £	Weighted average unit cost £ for all England	London % difference to England
Art and design and architecture	12,575	9	10,288	11,096	13%
Biological sciences and other subjects allied to health	11,933	8	9,935	10,200	17%
Engineering	12,382	6	11,194	11,394	9%
English, law and modern languages	9,744	5	8,635	8,801	11%
Maths, physics, chemistry, informatics and computing	11,469	7	10,302	10,500	9%
Social sciences, history, economics	9,561	7	8,721	8,855	8%

Source: Analysis of data returns.

[31] For 2016/17 HEFCE used a funding formulae to determine the allocation of funding for higher education institutions in the form of recurrent grants for teaching and research. The formulae applied a regional cost adjustment in the form of London weightings. A 12% uplift was applied to institutions in inner London and an 8% uplift in outer London.

[32] Regional variation in costs and benefits for higher education providers in England, Report to HEFCE by Deloitte, December 2017, please click here to access from the national archives.

Table 12 - Weighted average unit costs for each region for all provision

Region	Number of institutions	Number of student FTEs	Weighted average unit cost £	% difference to the total study average
London	11	81,443	11,824	14.1%
Midlands	4	45,266	9,975	-3.8%
North	12	161,919	9,826	-5.2%
South West and East	13	142,069	10,267	-0.9%
Total	40	430,698	10,365	

Source: Analysis of data returns. Differences due to roundings.

The average weighted average unit cost for each student FTE for England for all provision was £10,365. In common with the funding weighting, the unit cost for London was 14.1% higher than the England average.

Further analysis examined the unit costs by cost category. This is summarised in the following table.

Table 13 - Weighted average unit costs for all provision, London vs England average

Cost category	London Weighted average unit cost £	All England weighted average unit cost £	% difference to all England average £
Course delivery staff costs	2,833	2,666	6.3%
Non pay costs	442	572	-22.7%
Departmental running costs	1,867	1,073	74.1%
Student related central services	2,762	2,617	5.5%
Corporate services	1,240	1,080	14.8%
Estates costs	1,490	1,291	15.4%
Sustainability adjustment	1,189	1,066	11.6%
Total	11,824	10,365	14.1%
Number of institutions	11	40	
Number of student FTEs	81,443	430,698	

Source: Analysis of data returns. Differences due to roundings. Please also note that course delivery staff costs here are direct and that other pay costs will be included within Departmental running costs, Student related central services, Corporate services and Estates costs.

Irrespective of the base years used, these results appear different to the December 2017 study results, most notably concerning course delivery staff costs. However, as both studies indicate, figures need to be interpreted and compared with care, in part because of differences in the definition of cost categories used. For example, the course delivery staff costs do not include *all* staff costs in an institution, such as those that exist in the central functions and academic departmental running costs. The difference of 74% in the departmental running costs is an example of one group of institutions in our sample with a propensity for devolving costs to the academic department. This approach also limits the comparative analysis of percentages for the other cost categories.

The higher departmental running costs are likely to reflect the types of institutions in London and the way in which they organise, control and hence report their expenditure.

The December 2017 study used staff FTE as the denominator for its unit cost comparison. It also included research and teaching in its calculation. For this study, the student FTE was used as the denominator for calculating a unit cost. Also the institution's course delivery staff costs included the actual grade of staff employed in the period and how they were organised in providing the provision. We substituted staff FTE data from institutions for comparative purposes and calculated a difference in course delivery staff cost of over 14% for London versus the England average. However care needs to be taken in interpreting this figure as this data was not collected for the purposes of determining this measure.

7.11 Is the annual cost of longer courses less than shorter ones?

We collected cost data for over 9,000 full-time, part-time and foundation courses as part of this study. From this sample, we extracted over 3,000 full-time courses from 28 institutions on which further information had been provided on course length (either 2, 3, 4 or 5 years) and it could be determined that during 2016-17 each course had a complete year group. Also excluded from this sample were sandwich courses, as these were deemed to disproportionately affect the longer length courses. This sample represented 33% of the student FTEs received for the full-time provision.

It should be noted that it was not possible to assign courses to any subject group as each course had student FTEs recorded against one or more HESA cost centre. So for example, a Maths and Business studies degree assigned costs to both the maths and business studies HESA cost centres and with the cost, the relevant proportion of student FTEs.

The following table summarises the results. Courses in our sample which were found to last more than 4 years were excluded from our analysis as they were relatively few in number.

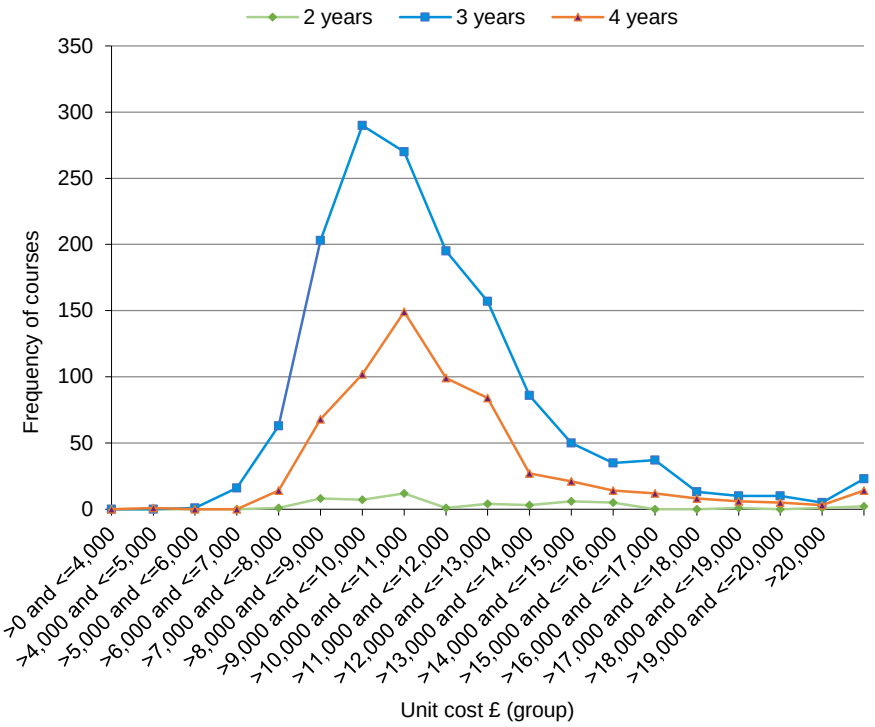
Table 14 – Full-time provision average course costs by length of course

Length (in years)	Number of courses	Average unit cost £	Median unit cost £
2	51	11,126	9,689
3	1,464	10,299	9,610
4	627	10,759	9,879
Total	2,142		

Source: Analysis of data returns. Differences due to roundings. An indicative cost for the entire duration of the course would need to take into account the length of the course.

The table shows increasing unit costs for courses greater than three years. The cost of the four-year length course average is 4.5% higher than the three-year length course average. Part of the explanation lies in the type of courses provided by institutions which are of 4 rather than 3 years duration. The frequency of unit costs is shown in the following chart.

Chart 27 – Frequency of course unit costs for full-time provision



Source: Analysis of data returns

The chart shows similar distributions for the three- and four-year length courses. The four-year distribution curve is slightly to the right of the three-year curve reflecting the slightly higher unit cost for the four-year course length over the three-year course length. The two-year courses show as a very low proportion of the provision.

From our discussions with institutions, we identified factors likely to impact on unit costs from differing course lengths. Most institutions cited a higher administrative cost associated with longer courses, but some felt that this was offset by larger student cohorts and greater stability. They also expected the nature of the course to have a larger impact on cost than simply the length of the course itself, for example a medical degree being clearly a more expensive course to teach and one which takes longer to complete.

Our results do not appear to disagree with these views but the evidence is not compelling. From our sample, the average course size was 79 students for a three-year course versus 25 for a four-year course. Without being able to aggregate the course information into categories it was not possible to analyse these differences further.

In conclusion, our analysis suggests that for a mixed sample, four-year courses are marginally more costly for each student than those three years in length sample, by 4.5%. However, caution should be applied as whilst this result is taken from a broad mix of institutions and reasonable student FTE coverage it contains inherent variations which are likely to bias the result. It is likely that the four-year courses will include different types of provision to the three-year courses.

7.12 What cost factors influence an institution's teaching portfolio?

As part of this study, we also gathered evidence on the cost factors that influence an institution's teaching portfolio. We found a wide variety of views on this topic from the data returns. The data return contained three related questions regarding how the cost of provision influenced decisions affecting course portfolio and more broadly:

- How does the cost of provision influence decisions on teaching quality?
- What issues have changed teaching costs significantly since 2016-17?
- How does the cost of provision influence decisions around the diversity of subjects / courses offered?

7.12.1 How does the cost of provision influence decisions on teaching quality?

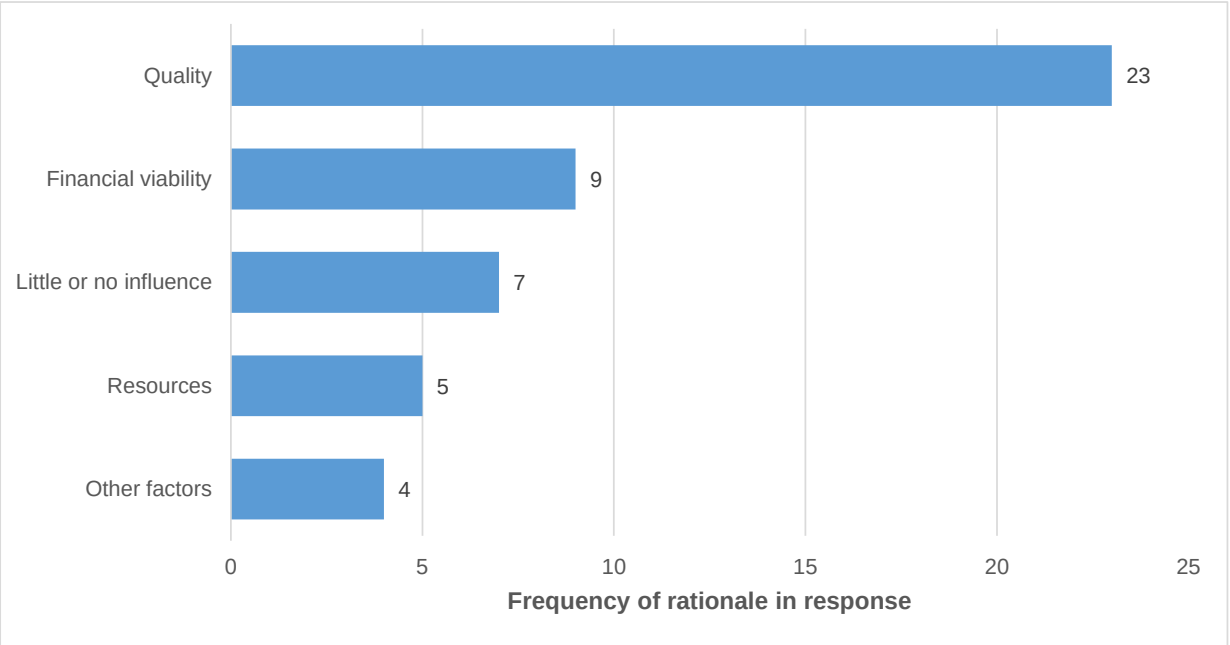
To help gauge the relative importance of the wider factors cited, we noted the frequency of the different responses we received, which we then grouped under broad themes:

Factor	Our findings
Quality	On whether cost influences teaching decisions, institutions were fairly unanimous in responding that whilst cost was important, quality was an equal if not more important factor. A typical response from institutions made reference to managing cost whilst meeting quality requirements or strategic objectives. Our analysis concluded that cost information is used in decision-making, but its importance varies among institutions and among different subject areas within an institution. This was the most common aspect in the responses. Some institutions were resolute in their view on quality saying that, '*we do not allow costs to influence decisions which could compromise quality. Our priority is to improve teaching quality while managing costs. This can require decisions which focus on the range of provision we offer, or the effectiveness of delivery models, but not [to adversely affect] quality*.'
Financial viability	Several institutions referred to reviewing course costs on a regular basis as part of ensuring ongoing sustainability. For example, one institution reported that, '*all programmes of study are fully costed before being launched and are routinely evaluated thereafter to ensure that teaching quality can be maintained within the cost envelope'*. Another one reported that '*the financial viability of each course is regularly reviewed alongside quality measures*'. Several quoted common aspects of significant cost that are assessed in any portfolio development such as estate and support costs. One institution provided some greater insight into how costs influence teaching stating that, '*the costs tend to influence the number of unique modules that get offered as part of the course. Cost goes up steeply with unique modules, but shared modules less so. The seniority of the staff mix can also affect the costs and there may be occasions when senior staff have, where appropriate, been replaced with lower grade staff to reduce costs*.' Other institutions made reference to the wider value for money balance in this quality and cost equation, saying, '*we always seek to maintain or*

Factor	Our findings
	improve teaching quality, however that has included a regular review of costs to improve efficiency and seek value for money'. Another stated a similar view, '*the volumes of resource are managed in line with overall financial affordability in each faculty*'.
Resources	Institutions made reference to the importance of cost in considering the resources that a programme or course may need to teach effectively. They typically cited a range of equipment and estate resource requirements that often need to be considered during the development of the provision as part of a business case or plan.
No influence	A few institutions dismissed cost as a factor quite starkly '*it [the issue of cost in decision-making] doesn't*'. Another stated that it aimed to, '*provide high quality teaching and facilities across all courses provided, regardless of the structure, length or cost of course'*.
Other factors	A few responses contained references to how they considered costs, the importance of course structure, the amount of teaching and a range of widening participation issues that in were important in their consideration.

The following chart summarises the results from 40 institutions.

Chart 28 - Decision factors referred to in making decisions about teaching quality provision



Source: Data return responses

Assessing cost information is clearly a consideration in decision-making for many, but quality is equal and in many cases more important. One response summarised a common view that we found, that higher comparative costs '*would not directly and immediately influence [changes to] teaching quality but may contribute to wider discussion about investment in staff and facilities'*.

Institutions explained that the relatively fixed cost base associated with the teaching provision and the time it takes to make a stepped change to the cost base, means that the financial planning process is key. They timed their key financial decisions regarding teaching to take place ahead of decisions about the portfolio of courses to offer and the associated resource

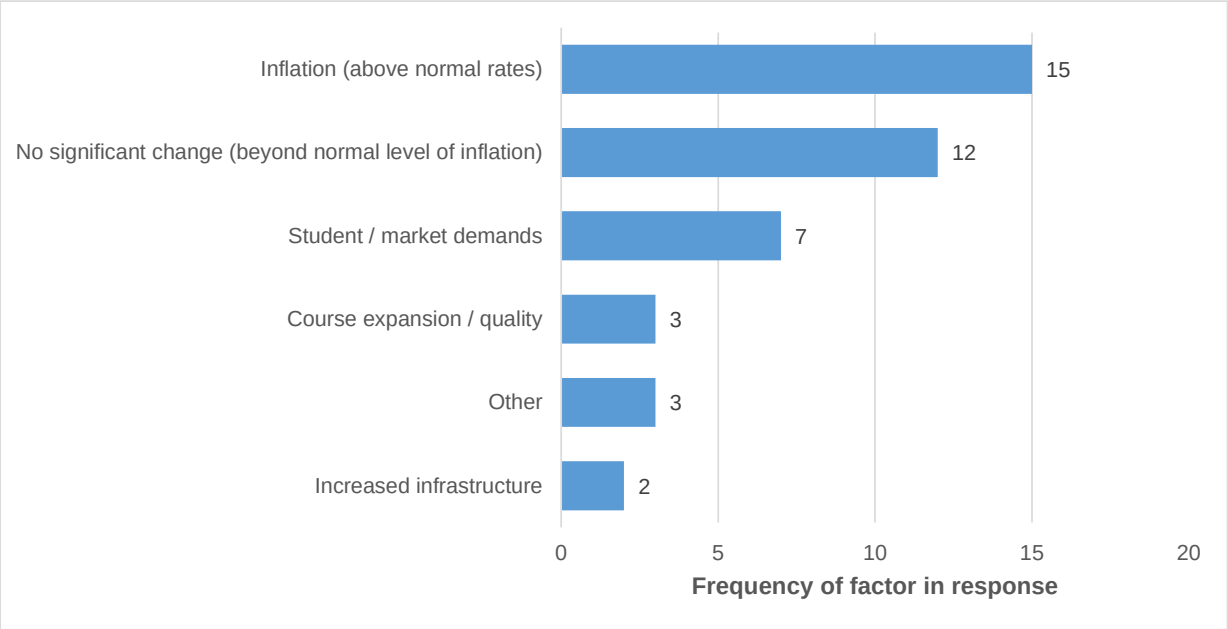
allocation. Depending on recruiting the target number of students, institutions then found the in-year costs of teaching predictable and well-known.

The larger investment decisions tend to be strategic in nature and use executive time to assessing options and impact, using both financial and non-financial criteria. Institutions described similar mechanisms to each other to control and influence costs irrespective of size, particularly when having a broader impact across the institution, for example in the development of IT. However, institutions also operate differing levels of financial autonomy and ways to hold academic departments to account for meeting their objectives. In line with the findings to this question, teaching quality is a consideration that appears always equal and sometimes greater than the influence of cost.

7.12.2 What issues have changed teaching costs significantly since 2016-17?

The following chart summarises the responses we received from the 33 institutions as to what factors may have changed teaching costs significantly since 2016-17.

Chart 29 - Frequency of factors significantly affecting teaching cost since 2016-17



Source: Data return responses

Inflation was the overwhelmingly common factor, cited by 27 institutions. Whilst 12 institutions stated that there was no significant impact (beyond expected inflationary costs), 15 others stated that inflation had had a significant impact. Within inflation, additional pay and pension costs were the most quoted reasons for the underlying change in teaching costs and taken together, inflation was the biggest factor that affected teaching costs after 2016-17.

The student and market demands, though cited fewer times, gave some further insight into the fact that volatile changes (up and down) in student numbers caused a significant financial impact. Within the Other category were a variety of factors including servicing debt, regulatory changes (including the Prevent duty and GDPR) and the apprenticeship levy.

In conclusion, it is inflation-related costs that were reported to have affected teaching costs the most since 2016-17. Student numbers were also acknowledged as a having a volatile impact

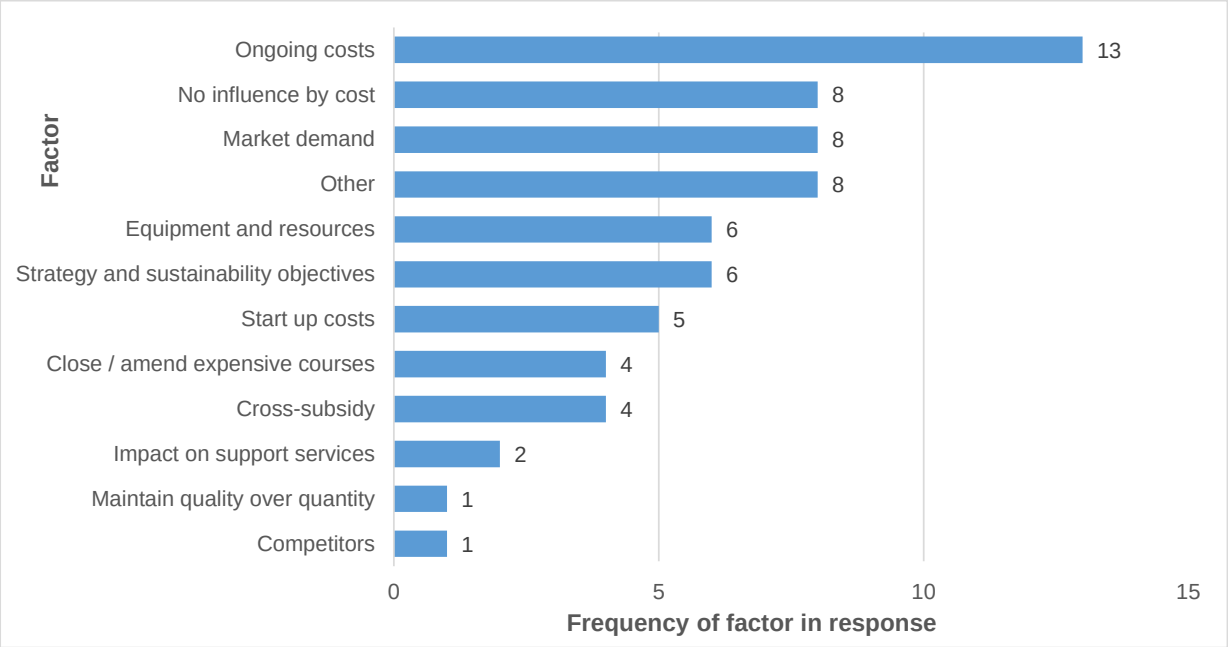
on unit costs but the way in which teaching was delivered was not deemed to have a significant impact on costs.

7.12.3 How does the cost of provision influence decisions on the diversity of provision offered?

Institution's responses indicated that the same or similar factors influence decisions on the diversity of provision offered as teaching quality.

The following chart summarises all the sample responses received and shows the diversity of responses. Three institutions did not respond to the question.

Chart 30 - Frequency of responses to factors influencing diversity of subjects



Source: Data return responses

Many institutions provided responses in a similar vein to these examples, saying that:

- 'The institution would not wish to reduce [its] provision or restrict the subjects offered purely on the grounds of cost';
- 'Our cost of provision does not by itself directly determine our decisions in relation to our academic offer'; and
- 'We do not allow costs to influence decisions which could compromise quality'.

Eight institutions which responded said that it would have little or no influence (seven responded similarly to the question on the decision factors influencing teaching quality provision).

A few stated that if courses were, or became, high cost then this would lead to changes in provision. For example one stated that they would 'close courses that are too expensive to run'. Others provided a broader perspective and insight stating that, 'where cost per student is high because of low student numbers on a course this leads to course closure decisions' and 'longer term decisions on growth/decline/significant course change (including new and ceasing courses) utilise a cost proforma but this is only one of a range of factors'.

One institution provided some insight into its process for considering the various costs of delivery stating that it operated a 'New Programme Approval process'. This type of process appeared in several responses. In this example, the process 'considers the financial business case of any new programme. The cost of provision is captured within the financial business case template and is a key consideration when deciding whether or not to run a new programme.' Another stated that its 'annual review of the financial contribution from programme, forms part of the decision-making process'. These business case approaches included demand as a key consideration on financial sustainability and teaching resource requirements.

Many responses provided further details on influencing factors other than cost of delivery. The majority of these commented on the need to achieve ongoing course or faculty sustainability (as opposed to the broader sustainability of the institution). These responses also included factors such as; start up and ongoing costs (for equipment and resources), impact on support services (such as library and computing provision), competitors, market demand for courses, academic expertise and teaching quality.

7.12.4 What additional charges are made to students?

Whilst the teaching costs of undergraduate and foundation provision were the focus, we also asked whether institutions charged students for any additional materials or resources as part of their degree on top of the tuition fees. Of the 39 responses received to this query, 26 indicated that they charged students for additional materials ranging from some course materials and equipment to contributions to fieldtrips or visits and to some placement costs and costs associated with study overseas. None of the responses appeared to indicate this expenditure was significant to the cost of courses.

The following tables provide an overview of the 26 responses received, by TRAC Peer Group and a regional analysis.

Table 15 – Number of institutions charging students for additional materials by region

Region	Number of institutions	% of institutions making a charge
London	8	67% (8/12)
Outside the London region	18	67% (18/27)
Total responses	26	67%

Source: Analysis of data returns

Table 16 - Number of institutions charging students for additional materials by TRAC Peer Group

TRAC Peer Group	Number of institutions	% of institutions making a charge
A and B	10	71%
C	6	86%
D and E	6	55%
F	4	57%
Total responses	26	67%

Source: Analysis of data returns

The share of institutions charging students appears relatively even across region and peer groups. However, it should be noted that only 26 of the 40 participants provided responses to this question and therefore these findings may not be representative of the 133 HE institutions in England.

7.13 What is the average full economic cost for part-time and foundation provision?

The scope of this study also included determining the subject group weighted average unit costs of part-time and foundation provision. The scale of this provision (by cost and student FTEs) delivered by participating institutions was considerably lower than that for full-time provision (by a factor of 80), and therefore, the results are far less reliable.

For part-time provision, the maximum number of returns from institutions for any one subject group was 17, and for foundation provision it was 7. As a result, the number of student FTEs submitted was also limited. As a further safeguard, a further threshold of 100 student FTEs has been applied to published results. Irrespective, these limited results should be interpreted with caution.

A further study on part-time and foundation provision could explore these areas more fully and seek to collect more representative costs.

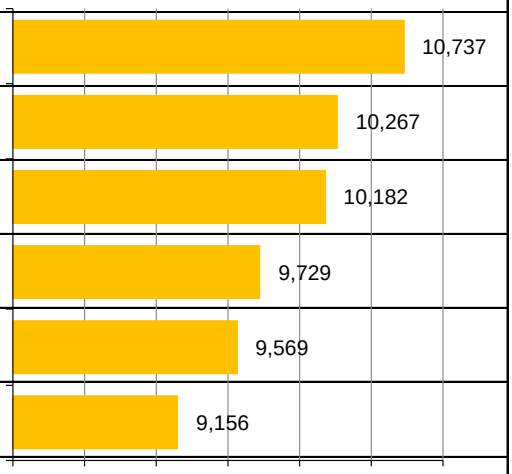
Where we have five or more submissions and more than 100 student FTEs represented, the unit costs are provided in the following two charts. In Annexes J and K for part-time and foundation provision respectively, we have set out:

- The weighted average unit cost for each subject group including the number of participating institutions and student FTEs;
- The variation of weighted average unit costs by subject group;
- The absolute weighted average unit cost by cost category; and
- The relative weighted average cost proportions by cost category and subject groups.

The part-time unit costs for six subject groups is provided in Chart 31.

Chart 31 – Weighted average unit cost for each Subject Group for part-time provision

Number of institutions in study	Number of student FTEs in study	Subject group and their weighted average unit cost £
14	1,123	Art and design and Architecture
17	1,796	Biological sciences and other subjects allied to health
16	1,060	Social sciences, history, economics
11	152	Maths, physics, chemistry, informatics and computing
11	487	English, law and modern languages
9	831	Engineering



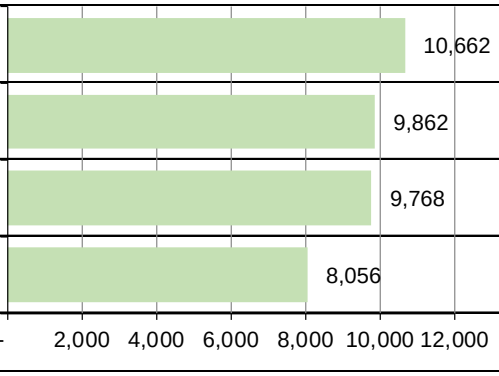
Source: Analysis of data returns

The order of subject group unit costs follows a similar pattern to the full-time undergraduate provision with the exception of Engineering which has the second highest full-time provision unit cost and Social sciences which is the second lowest for full-time undergraduate. It should be noted that the number of data returns and students for each subject group is lower than that for full-time undergraduate provision.

The foundation unit costs for four subject groups is provided in Chart 32.

Chart 32 – Weighted average unit cost for each Subject Group for foundation provision

Number of institutions in study	Number of student FTEs in study	Subject group and their weighted average unit cost £
5	339	Maths, physics, chemistry, informatics and computing
7	633	Biological sciences and other subjects allied to health
5	213	Engineering
7	577	Social sciences, history, economics



Source: Analysis of data returns

The order of subject group unit costs follows a similar pattern to the full-time undergraduate provision with the exception of Engineering which has the second highest unit cost for full-time undergraduate. It should be noted that the number of data returns and students for each subject group is much lower than that for full-time undergraduate provision.

The difference in weighted average unit costs between full-time and these provisions is summarised in the table below.

Table 17 - Unit cost difference among provision types

Subject group	Part-time submissions	Foundation submissions	Full-time unit cost less Part-time unit cost £	Full-time unit cost less Foundation unit cost £
Art and design and architecture	14	4	359	too few institutions
Biological sciences and other subjects allied to health	17	7	-67	338
Engineering	9	5	2,238	1,626
English, law and modern languages	11	4	-768	too few institutions
Geology, environmental sciences, archaeology and ancient history	5	4	too few student FTEs	too few institutions
Maths, physics, chemistry, informatics and computing	11	5	771	-162
Medical, dental and veterinary science	1	0	too few institutions	nil

Subject group	Part-time submissions	Foundation submissions	Full-time unit cost less Part-time unit cost £	Full-time unit cost less Foundation unit cost £
Social sciences, history, economics	16	7	-1,327	799

Source: Analysis of data returns

Whilst there are large differences and inconsistencies among the unit costs across subject groups from this analysis, it is difficult to draw firm conclusions from these small number of submissions. The number of 'pure' part-time courses (the basis of collecting costs and student FTEs for this study) we received was few.

From our discussions with institutions, the part-time provision was generally viewed in different terms managerially compared to the way in which the study has approached it here from a costing perspective. This was recognised in the questions posed in the data return. The overriding view from institutions, and confirmed in the data return, was that there were no significant unit cost differences in instances where any part-time student studies alongside full-time students i.e. they both attend the same modules. It was also clear that there was further ways in which a part-time student studying a full-time course could be accommodated.

In addition to the small number of returns for part-time and foundation provision, we also note that even in aggregate for the subject group, there were institutions with low student FTEs. As a result, their unit costs would be sensitive to small changes in FTE and produced greater variation among cost categories.

8 Other cost considerations

8.1 Background

The study was based on the full economic costs incurred in the academic year 2016-17. This approach provides a consistent basis for the DfE to consider the relative cost of the provision in the scope of this study, with the other teaching activity it funds.

As the DfE will use this study to inform its funding policy for future years, the costs for institutions in the future will be different for a variety of reasons. This section identifies some issues where costs are subject to change and the DfE should factor these into its use of the data presented in this report.

8.2 Other areas of cost

This study did not consider changes or uplifts in some cost categories that are likely to increase total and unit costs across the sector in future years. Equally, it did not consider the amount of return from invest-to-save schemes or cost improvements that institutions made during 2016-17. The known or likely changes to costs since 2016-17 include:

- Pensions - The changes to the employer contribution levels for the Universities Superannuation Scheme (possible 7% increase in employer contributions), the Teachers' Pension Scheme (confirmed 7.2% increase in employer contributions from September 2019), the Local Government Pension Scheme, the NHS and institutions' own defined benefit pension schemes where institution's financial obligations are subject to change, irrespective of the funding environment. Institutions outlined that they have limited control to be able to mitigate these increased costs and therefore noted that these changes will lead to increases to the cost of teaching in future years.
- Inflation - The retail price index from August 2017 to December 2018 indicates inflation of 4.8% and the consumer price index indicate inflation of 3.8%[33];
- The impact of BREXIT on EU and Overseas student recruitment, could create financial challenges if there is a significant reduction in the recruitment of overseas and EU students, given the financial reliance that many institutions have on these markets. There is also concern regarding the retention and recruitment of staff from the EU;
- The cost base supporting Nursing, Midwifery and Allied Healthcare provision was stated as being in transition for some institutions in 2016-17 following the changes in the funding arrangements for this provision. This could mean the cost of delivering this provision will be subject to change in future years.
- Institutions have reported an increasing commitment to improving the student experience and broader support, for example in well-being services to students.

[33] From August 2017 compared to December 2018 (107.1 – 103.2)/103.2 as a %, from CPI: Index and (285.6 – 272.9)/272.9 as a %, from RPI: Index (Table 1 of the Consumer Price Inflation), 13 February 2019, ONS, please click here for details.

It is not clear how significant these costs will be, but institutions have indicated that expenditure is increasing in this area;

- Staff vacancies being carried –institutions will have experienced this in 2016-17 and this will have affected the level of costs reported in this study; and
- Although not quantified, institutions stated that their research agendas provide knowledge benefits to teaching, but the costs of acquiring these benefits are not included in the teaching costs reported in this study.

8.3 Other issues for consideration

In addition to the factors outlined at 8.2, institutions reported the following matters:

- Institutions anticipate that greater costs will be incurred in future years' in respect of regulatory compliance with the introduction of the OfS;
- Future capital expenditure. Separate to the full economic costs collected, 35 institutions provided further cost data regarding their capital expenditure over the period from 2014-15 (actuals) to 2019-20 (planned). This provided some insight into the overall level of investment in teaching that institutions had planned for the future. Future investment may have some impact on individual course costs in future years (see Annex Z).

  The HEFCE report on the 'Financial Health of the higher education sector 2016-17 to 2019-20 financial forecasts' publication also noted the increases in capital expenditure and how this has increasingly been funded by borrowing. Institutions outlined that these are long-term finance obligations that have to be fulfilled.

8.4 Summary

In conclusion, there appears to some potentially significant costs facing the sector that were not present in 2016-17 and therefore the costs in this study. Costs arising from pensions, Brexit and the impact of changes to tuition fees were the main source of institutions' focus. Whilst an in-depth review of financial plans was not in the scope of this study, from the visits undertaken we found that institutions are assessing their future finances from both a cost and income perspective. It was however noted that their ability to mitigate pension cost increases was limited.

9 Annexes

Annex A: Group memberships and responsibilities

A governance structure was established to oversee and guide the work undertaken. The DfE established a Steering Group, which was further supported by a Technical Group. The Steering Group membership included representation from:

- Higher Education Analysis, DfE
- Post-18 Review Team
- Higher Education Funding Strategy and Policy team, DfE
- Skills Policy Analysis, DfE
- Office for Students
- KPMG

The aim of the Steering Group was to bring together analytic and policy experts to ensure that research into 'Understanding the absolute and relative cost of undergraduate provision' is appropriately planned, designed, analysed and delivered. The Group aimed to ensure that the research meets its overall objectives and that it provides timely and robust evidence to support the Review of Post-18 Education and Funding. Its specific objectives were:

- To review project delivery against the timeline
- To advise on the scope of the project
- To advise on contractors' proposals for engaging with and recruiting HE providers, and on minimising the burden of the research on these providers
- To ensure the quality and robustness of the methodology, for example, in relation to data collection tools and activities, and data validation and quality assurance procedures
- To monitor risks and emerging issues throughout the delivery of the project, and to advise on suitable mitigations where appropriate
- To quality assure analysis
- To review findings and identify where further evidence was needed
- To review the final report

The Technical Group provided technical support and experience. It comprised representatives from:

- King's College London
- Leeds Beckett University
- The Royal Central School of Speech and Drama
- The University of Hull
- The University of Salford
- The University of Surrey
- University of Derby
- University of Plymouth

Annex B: TRAC Peer Groups

Using TRAC, each higher education institution is categorised into one of six peer groups depending on their nature and research income. The Peer Groups are used to enable analysis of the TRAC data and benchmarking of institutions with similar characteristics. Details of the peer groups are provided in the table below.

Table 18 - Peer Groups and criteria

Peer group	Criteria
A	Institutions with a medical school and research income* of 20% or more of total income
B	All other institutions with research income* of 15% or more of total income
C	Institutions with a research income* of between 5% and 15% of total income
D	Institutions with a research income* less than 5% of total income and total income greater than £150 million
E	Institutions with a research income* less than 5% of total income and total income less than or equal to £150 million
F	Specialist music/arts teaching institutions

Source: TRAC peer groups

*Research income is defined as the Research England / funding council recurrent research grant plus the total research grants and contracts returned in the HESA Finance Statistics Return. The groups were defined by the financial thresholds applicable to 2012-13 data.

To ensure that participating institutions are not identified, we have followed the same approach used in previous studies whereby Peer Groups have been combined in cases where there have been fewer than five responses. The groupings used in this study are:

- A and B – both having higher levels of research income; and
- D and E – both are likely to be smaller research institutions.

For further information on the Annual TRAC data 2016-17: analysis by TRAC peer group, please refer to the TRAC website or click here.

Annex C: Subject group classification

We devised eight subject groups based on similar areas of study and pedagogy. These groups are derived from the 45 HESA cost centres and in consultation with officials from the DfE, the OfS and the Technical Group.

The following table assigns one of eight subject groups to each of the 45 HESA cost centres used in this study.

Table 19 – Subject group and HESA cost centres

Subject group	HESA Cost Centre	Cost centre description
Art and design and architecture (including performing arts)	123	Architecture, built environment and planning
	143	Art and design
	144	Music, dance, drama and performing arts
	145	Media studies
Biological sciences and other subjects allied to health that are not in other subject group categories	103	Nursing and allied health professions
	104	Psychology and behavioural sciences
	105	Health and community studies
	106	Anatomy and physiology
	107	Pharmacy and pharmacology
	108	Sports science and leisure studies
	112	Biosciences
Engineering	115	General engineering
	116	Chemical engineering
	117	Mineral, metallurgy and materials engineering
	118	Civil engineering
	119	Electrical, electronic and computer engineering
	120	Mechanical, aero and production engineering
English, law and modern languages	130	Law
	137	Modern languages
	138	English language and literature
Geology, environmental sciences, archaeology and ancient history	110	Agriculture, forestry and food science
	111	Earth, marine and environmental sciences
	124	Geography and environmental studies
	125	Area studies
	126	Archaeology

Subject group	HESA Cost Centre	Cost centre description
	127	Anthropology and development studies
Maths, physics, chemistry, informatics and computing	113	Chemistry
	114	Physics
	121	Information technology, systems sciences and computer software engineering
	122	Mathematics
Medical, dental and veterinary science	101	Clinical medicine
	102	Clinical dentistry
	109	Veterinary science
Social sciences, history, economics	128	Politics and international studies
	129	Economics and econometrics
	131	Social work and social policy
	132	Sociology
	133	Business and management studies
	134	Catering and hospitality management
	135	Education
	136	Continuing education
	139	History
	140	Classics
	141	Philosophy
	142	Theology and religious studies

Annex D: HESA cost centre assignment to subject group

We performed a robustness check to test whether unit costs were sensitive to the way in which HESA cost centres were assigned to different subject groups. This was done by comparing our taxonomy with that being proposed by the Higher Education Funding Council for Wales in its recent publication document[34].

The Welsh proposal contained 12 academic subject categories (ASCs). It divided six HESA cost centres into different subject groupings from the study based on module data returns (the six were Clinical medicine, Clinical dentistry, Sports science and leisure studies, Geography and environmental studies, Economics and econometrics and Social work and social policy). It also apportioned some HESA cost centres to more than one ASC. In addition, Veterinary Science and Area Studies are excluded, which adjusts their subject group unit cost for this comparison.

We calculated a weighted average unit cost for each of the HESA subjects groups set out in the Welsh proposal and then mapped these against this study's subject groups and unit costs. This approach isolates the impact of grouping the HESA cost centres in different ways so as to help identify any potential areas of concern.

The two sets of unit costs were then compared, noting any marked differences or significant variations, either among the English groupings, or to the total weighted average for the subject group. The following table shows the weighted average unit cost mappings, in brackets is the difference to the subject group weighted unit cost (+ for higher, - for lower). Where the Welsh approach splits HESA cost centres to more than one ASC, this creates more than one comparison to a subject group cost in this analysis.

Table 20 – Mapping of weighted average unit costs by academic subject category and subject groups

Welsh academic subject category	Weighted average total unit cost £ (Wales)	Subject groups in study							
		Art design and architect-ture	Biological sciences and other subjects allied to health	Engineer-ing	English, law and modern lang-uages	Geology, environm-ental sciences, arch-aeology and ancient history	Maths, physics, chemistry, informatics and computing	Medical, dental and veterinary science	Social sciences, history, econo-mics
Weighted average total unit cost £ (England)		**11,092**	**10,199**	**11,327**	**8,805**	**10,807**	**10,498**	**17,087**	**8,864**
1. Art, Design and Performing Arts	11,487	11,487 / (+395)							
2. Built Environment	10,146	10,146 / (-946)							

[34] Consultation on changes to funding methods for 2019/20 and future developments, Higher Education Funding Council for Wales, Consultation document, September 2018. This paper, whilst updating its current academic subject category (ASC) relativities, acknowledged that they 'are around 20 years old, and there is limited background information available about how they were established'.

Welsh academic subject category	Weighted average total unit cost £ (Wales)	Subject groups in study							
		Art design and architect-ture	Biological sciences and other subjects allied to health	Engineer-ing	English, law and modern lang-uages	Geology, environm-ental sciences, arch-aeology and ancient history	Maths, physics, chemistry, informatics and computing	Medical, dental and veterinary science	Social sciences, history, econo-mics
3. Business and Management	8,846								8,846 / (-18)
4. Clinical / 5. Non-clinical Medicine/Dentistry	17,087							17,087 / (+0)	
6. Education non-QTS	9,683								9,683 / (+819)
7. Engineering and Technology	11,327			11,327 / (+0)					
8. Humanities	9,372	10,606 / (-486)			9,158 / (+353)	10,832 / (+25)			8,572 / (-292)
9. Mathematical Sciences, IT and Computing	9,998						9,998 / (-500)		
10. Science	10,311		9,898 / (-301)			10,849 / (+42)	11,814 / (+1,315)		
11. Social Sciences	8,487				8,421 / (-383)	9,053 / (-1,754)			8,549 / (-315)
12. Subjects and Professions Allied to Medicine	10,541		10,658 / (+459)						9,503 / (+639)

Count of intersections (common HESA cost centres)	**3**	**2**	**1**	**2**	**3**	**2**	**1**	**5**

Source: Analysis of data returns and Higher Education Funding Council for Wales consultation document

The count of intersections gives a measure of how common the classifications between the two approaches are. For example, the Engineering subject group has the same HESA cost centres as the ASC Engineering and Technology. The Geology, environmental sciences, archaeology and ancient history subject groups has HESA cost centres shared across three ASCs, including one with the largest unit cost difference of £1,503.

Where a blank cell in the table exists, there is no HESA cost centre between the Welsh or English categories.

The subject group with the least commonality, across five different ASCs, is Social sciences, history and economics. It had a total weighted unit cost of £8,864 with a range of differences from -£315 to £819, a difference of 9.2% for the highest difference. This is possibly not

surprising as the subject group contained 12 HESA cost centres and there are only 7 in the ASC for Social Sciences.

Though not conclusive, there is a broad amount of similarity between the Welsh ASC proposal and the approach taken in this study both with regards the make-up of subject groups (in terms of HESA cost codes have been assigned) and their corresponding unit costs.

Annex E: Threshold and exclusion considerations

The table summarises the issues considered and impact arising from the validation procedures undertaken.

Table 21 - Issues and impact arising from validation procedures

Issue	Analysis	Impact
A data return contained student FTE figures for its staff FTE at the course level.	This approach had the impact of invalidating their staff to student ratio, as always 1:1. For the costing calculations, its direct impact was limited, firstly because the costs remained in the allocation process and secondly because the allocation metrics affected was limited. In the allocation of costs this approach affected six cost category headings with a combined share of the in-scope total teaching cost of less than 7%. It resulted in all these costs being allocated using student FTE rather than a mix of cost drivers.	Courses removed from staff to student ratio analysis, see Annex DD. In understanding the rationale for the institution's approach and its limited impact on unit costs, we did not remove the submission from the study.
Different methodology to exclude out-of-scope cost, courses with very high unit costs (because of low student FTEs) and low compliance with the methodology.	One institution's costs appeared in line with other submissions and the assurances were provided over the costs. However, the methodology deviated significantly from the expected approach and their out-of-scope costs could not be fully verified.	Removal of one submission to avoid potential distortions.

Annex F: Regions in the study

The table below provides some further detail on the regions covered in the study and how these were summarised into four regions.

Table 22 – Region summary

Summary region	Region
London	Inner London
	Outer London
Midlands	East Midlands
	West Midlands
North	North East
	North West
	Yorkshire and the Humber
South West and East	East of England
	South East
	South West

Annex G: Contextual questions

The data return contained a range of contextual questions at the institution level to provide an understanding of the costs provided and to address the broader questions posed in the study. These included:

- Did the institution incur any significant one-off teaching costs (using a 10% materiality level) in 2016-17 that make this an unrepresentative year?
- What issues or factors have changed teaching costs significantly since 2016-17?
- What does the institution consider when setting undergraduate or foundation course fees for home/EU students?
- How does the cost of provision influence decisions around teaching quality?
- How does the cost of provision influence decisions around the diversity of subjects or courses offered?
- Do you charge students for any additional materials or resources as part of their degree on top of the tuition fees they pay to you?
- Further details on the impact of periods of placement by a professional body.
- Any significant unit cost differences in instances where any part-time student studies a course alongside full-time students? (I.e. they both attend the same modules).
- Details on the institution's pension schemes.
- Details on the institution's teaching-related capital expenditure (not revenue).

Whilst not all the questions were addressed fully we had the opportunity through the validation process and institution visits to explore the topics raised where required.

For each course further information was collected regarding the length of course (the number of years of study), entry requirements, an assessment of the teaching staff seniority and experience, its utilisation and whether the year groups for 2016-17 were complete.

Annex H: Cost details and the allocation process

This Annex provides further detail on the categories of cost collected and how these were allocated in the cost model using information provided by the institutions. It is based on guidance issued to participants.

We collected and categorised the items of cost detailed in Table 23. In total, there were 23 individual cost items shared across six categories of cost initially (A to F). Table 24 lists the detail in each cost group in further detail.

Table 23 – Cost categories and items collected

Cost category	Cost item
A – Course delivery staff costs	Course delivery
	Pay placement management
	Other - staff costs
B – Non-pay costs	Direct running costs - directly allocated
	Direct running costs - other
	Non-pay placement
	Other - non pay costs
C - Indirect departmental costs	Staff costs
	Non staff costs
	Other - indirect cost
D - Centrally allocated indirect costs	Financial support to students
	Outreach activity
	Libraries and museums
	Student facilities
	Corporate services - HR
	Corporate services - Finance
	Corporate services - Legal
	Corporate services - IT
	Corporate services - other
	Other central running costs
E - Estates costs	Maintaining estate and teaching campuses
	Other - estate costs
F - Sustainability adjustment	Sustainability adjustment

Different costs were captured in each category. Within each category;

- The categories of A and B were costs directly incurred and controlled by academic departments. These categories included academic teaching and technical staff, and direct costs for the courses, for example materials and stationery.
- Category C was also controlled by academic departments but tended to be indirect in nature to the course provision, for example administrative support to the academic departments.
- Cost categories D, E and F were typically, though not exclusively, costs outside of the direct control of the academic department. Where these costs were reflected in management accounts, institutions used this information to help

allocate costs to an appropriate heading for the purposes of this study within the cost category. Centrally allocated indirect costs tended to be service centres, or corporate functions which institutions arranged in cost centres separate to academic departments within their own management account structure.

If required, institutions could also provide up to two further entries in the 'Centrally allocated indirect costs' category (D). These typically included items such as the VC office, registry services and finance charges such as interest, charges and provisions.

In addition to aggregating costs across each of the categories given in Table 23, we categorised the 'Centrally allocated indirect costs' to one of two headings; either 'Corporate services' or 'Student related central services'. Annex BB provides further detail on the approach.

Table 24 provides the detail of each cost group in further detail and Annex BB describes how these the central cost categories were subsequently aggregated.

Table 24 - Cost item details collected in the data return

Cost group	Cost item	Cost item detail	Preferred cost driver used
A. Course delivery staff costs	Course delivery	All pay costs (Salaries, national insurance, pensions and other on-costs) of academic staff, technicians and non-academic staff associated with delivering student learning activities, for example in direct face-to-face teaching, preparation and assessment. This cost item should also include any off-payroll payments incurred in course delivery, for example on visiting professors or lecturers. It is also important that these costs go hand in hand with the corresponding teaching FTE.	Course delivery information
A. Course delivery staff costs	Placement costs - pay	This included all pay related management costs dedicated to managing placements where placements include industrial type placements or when 'a student is in a location where they receive supervision and undertake work associated with their professional studies'. It also included all academic staff time associated with placement activities, either on site or at the institution. This included for example, travel, placement meetings, support to students and any related preparatory work. Any student oversight activities on site related to learning were classified as Course delivery.	Placement inputs

Cost group	Cost item	Cost item detail	Preferred cost driver used
A. Course delivery staff costs	Other – staff costs	Any other costs not covered by the previous cost items within the cost group such as costs in undertaking compliance activities such as management of regulatory oversight bodies, reporting, audits and governance as well as ensuring academic staff are suitably qualified and up to date on relevant professional knowledge.	Student FTE
B. Non pay costs	Direct running costs – directly allocated	Costs directly assigned to a course, the typical and routine annual expenditure on items for running courses, equipment, materials, consumables and (likely to be) low cost miscellaneous items.	Direct non pay
B. Non pay costs	Direct running costs – other	Costs not directly assignable to a course where these are typical and routine annual expenditure on items for running courses. For example, this may include equipment, materials, consumables or (likely to be) low cost miscellaneous items, for example, paper and printing.	Staff/student FTE blend
B. Non pay costs	Placement costs – non-pay	Included here are all non-pay related costs here that the institution incurs to support placement. We did not expect institutions to record significant sums with respect to industrial placements.	Student FTE
B. Non pay costs	Other - non pay costs	Any other costs not covered by previous cost items within the cost group	Staff/student FTE blend
C. Indirect departmental costs	Staff costs	All other pay costs within the academic department that have not been allocated above, typically remaining administrative staff and a proportion of senior management time.	Student FTE
C. Indirect departmental costs	Non staff costs	All other non-pay costs within the academic department that have not been allocated above.	Student FTE
C. Indirect departmental costs	Other - indirect cost	Any other costs not covered by previous cost items within the cost group.	Student FTE
D. Centrally allocated indirect costs	Financial support to students	Include here all directly related costs of bursaries and hardship funds including any directly related staff costs.	Student headcount
D. Centrally allocated indirect costs	Outreach activity	Any non-marketing activity contained in the institution's Access agreement with schools and communities that helps to raise awareness, aspirations and attainment	Total spend allocated to items A to C

Cost group	Cost item	Cost item detail	Preferred cost driver used
		among people from disadvantaged or under-represented groups. In deducting the out-of-scope provision (for postgraduate, distance learning, franchise out, apprenticeship and short course student costs) from the adjusted Teaching cost from TRAC, the outreach cost is not adjusted. The assumption therefore is that this outreach activity does not contribute to these student numbers and is instead allocated to undergraduate and foundation courses on the basis of all other direct and indirect expenditure.	
D. Centrally allocated indirect costs	Libraries and museums	Include libraries service and associated e-resources.	Staff/student FTE blend
D. Centrally allocated indirect costs	Student facilities	All facilities available to students (and can used by staff) that support their broader welfare and university experience. These could include the following types of support resources and activities; careers advisory services, student union/societies grants, health services, crèche, counselling, chaplaincy and sport facilities. These costs should be net of any contributory income (for example gym membership fees).	Student FTE
D. Centrally allocated indirect costs	Corporate services - HR	Human Resource function – staff and non-pay.	Staff/student FTE blend
D. Centrally allocated indirect costs	Corporate services - Finance	Financial services (including treasury, payroll, financial management and TRAC) – staff and non-pay.	Staff/student FTE blend
D. Centrally allocated indirect costs	Corporate services – Legal	Legal services, in-house and contracted out.	Staff/student FTE blend
D. Centrally allocated indirect costs	Corporate services – IT	All IT service provision, pay and non-pay.	Staff/student FTE blend
D. Centrally allocated indirect costs	Corporate services - Marketing	Marketing, communications and admission resources and activities, for example publishing student information, managing admissions, recruiting and reaching out to	Student FTE

Cost group	Cost item	Cost item detail	Preferred cost driver used
	and admissions	future students (not covered in specific outreach activity above), promoting the institution to employers, community and more broadly.	
D. Centrally allocated indirect costs	Other	Any other costs not covered by previous cost items within the cost group D.	Student FTE
E. Estates costs	Maintaining estate and teaching campuses	Costs of estate usage costs where significant, identifiable and attributable to a specific academic department teaching.	Direct allocation / estates utilisation
E. Estates costs	Centrally allocated estates costs	This is the Department / Faculty / School share of estates costs that is allocated from TRAC. This includes costs for rates, estates personnel costs, buildings depreciation, insurance, cleaning and security.	Student FTE
F. Sustainability adjustment	Sustainability adjustment	The Margin for Sustainability and Investment (MSI) is a forward-looking, institution specific measure, which is intended to calculate the level of cash generation the institution requires for sustainability based on its own financial strategy and investment needs. The MSI measure replaced the previous adjustments made in TRAC for 1) the cost of infrastructure and 2) the return for financing and investment. MSI is a standard part of the TRAC methodology and therefore this model extends the application of MSI already allocated to Teaching at the academic department level out to courses.	Sum of costs A to E

We are aware that institutions have different coding structures in their financial systems, Therefore it has been assumed that institutions have allocated costs appropriately to the cost categories.

Table 25 details the cost driver information that institutions collected and used (in the main) to allocate costs from departments to courses.

Table 25 - Cost driver information

#	Cost driver	Detail	Where applied
1	Course delivery information	Time based figures by relevant staff, or proxy, derived from workload planning data, timetabling (or calendar information) and judgement where gaps exist. For example, days spent by academic staff preparing and delivering the course. This should include any off-payroll time (as included in the cost pool). We would expect similar courses to consume similar amounts of time and this be reflected in the metrics produced. We suggested the metrics are explained to each academic department lead for their consideration. Institutions tended to use student FTE to supplement this cost driver or in the absence of available information.	Course delivery
2	Staff FTE (teaching)	The staff teaching FTE drawn from timetable or workload planning data. Some institutions found it useful to start with the teaching staff FTE used in TRAC as a basis for determining course level FTEs. This cost driver also reflected any time incurred in course delivery by visiting professors or lecturers. It was also important that these FTEs went hand-in-hand with the corresponding course delivery cost.	Used to support Staff / Student FTE blend drivers
3	Student FTE	This used a count of student FTEs including both overseas and home students. A full description is provided at 4.6.2.	Other - staff costs Other - non pay costs Course delivery staff costs Non staff costs Other - indirect cost Libraries and museums Student facilities Corporate services - HR Corporate services - Finance Corporate services - Legal Corporate services - IT Corporate services - Marketing and Admissions Other central running costs Other - estate costs

#	Cost driver	Detail	Where applied
4	Staff / Student FTE	Based on cost drivers #2 and #3 weighted by the selected percentage using academic department or finance judgement.	Other - non pay costs Libraries and museums Corporate services - HR
5	Student headcount	The number of students used in recording the student FTE.	Financial support to students
6	Direct allocation / Estates utilisation	TRAC allocates the teaching element of the estate cost to the academic department. This driver used cost from that starting point. The requirement was to use a weighted estimate of estates costs consumed using area, cost and usage. Where the actuals were known institutions allocated directly first, then added remainder based on available estates, timetabling and / or finance information. Ultimately this figure should reflect, at the academic department level, the amount of academic department estate consumed, ideally in terms of a figure that reflects area, cost and usage. For example, if course A has a figure of 75 and course B, 25, then course B uses a third of the same estate as A, assuming no other differences. An equally valid explanation is that A uses estate that is three times as expensive as B for the same length of time.	Maintaining estate and teaching campuses
7	Pay placement information	A calculated expenditure figure for the total external cost of placement for each course. In aggregate this figure needed not balance to the costs input at the academic department level. It was important that it reflected the relative cost of placement among the courses.	Pay placement management costs
8	Non-pay placement information	A calculated expenditure figure for the total external cost of placement for each course. In aggregate this figure need not balance to the costs input at the academic department level. It is important that it reflected the relative cost of placement among the courses.	Non-pay placement costs

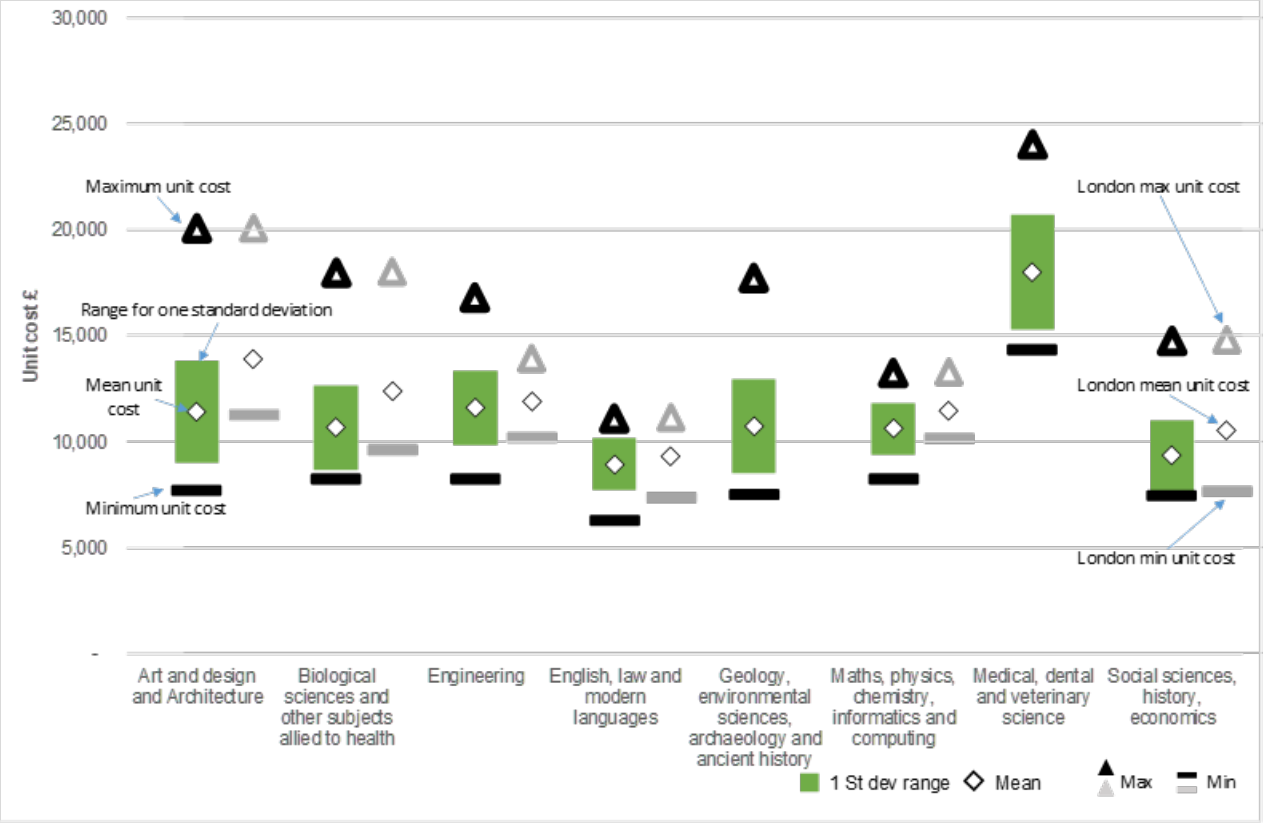
#	Cost driver	Detail	Where applied
9	Direct non pay	This information is expenditure data mainly, based on known resource consumption factors for a course, in combination with weighted student numbers. It was not used by some institutions to more precisely reflect some courses costs. This information was used to allocate the total direct running costs - directly allocated costs set out in the academic department cost pools courses.	Direct non pay – directly allocated

Annex I: Full-time unit cost provision

For the full-time provision, this Annex details:

- The variation of weighted unit costs by subject group (Chart 33);
- The weighted average cost proportions by cost category and subject group (Table 26); and
- The maximum and minimum HESA cost centre unit costs for each subject group (Table 27).

Chart 33 - Variation of weighted average unit costs by subject group for full-time provision



Source: Analysis of data returns

The figures in the following tables provides the cost proportions by cost category and subject group.

Table 26 - Full-time weighted average unit cost and cost proportions by cost category

Subject group	Course delivery staff costs £	Non pay costs £	Departmental running costs £	Student related central services £	Corporate services £	Estates costs £	Sustainability adjustment £	Total £
Art and design and architecture	2,873	610	1,063	2,443	1,202	1,681	1,223	11,096
Biological sciences and other subjects allied to health	2,700	577	1,123	2,475	1,108	1,196	1,020	10,200
Engineering	2,722	601	1,218	2,787	1,021	1,888	1,156	11,394

Subject group	Course delivery staff costs £	Non pay costs £	Departmental running costs £	Student related central services £	Corporate services £	Estates costs £	Sustainability adjustment £	Total £
English, law and modern languages	2,394	297	760	2,597	945	910	899	8,801
Geology, environmental sciences, archaeology and ancient history	2,632	614	985	2,929	1,043	1,438	1,135	10,776
Maths, physics, chemistry, informatics and computing	2,558	483	1,033	2,798	1,023	1,549	1,055	10,500
Medical, dental and veterinary science	4,952	1,721	2,894	3,507	1,085	2,056	1,776	17,991
Social sciences, history, economics	2,219	452	820	2,534	1,055	866	909	8,855
	as a %							
Art and design and architecture	26%	5%	10%	22%	11%	15%	11%	100%
Biological sciences and other subjects allied to health	26%	6%	11%	24%	11%	12%	10%	100%
Engineering	24%	5%	11%	24%	9%	17%	10%	100%
English, law and modern languages	27%	3%	9%	30%	11%	10%	10%	100%
Geology, environmental sciences, archaeology and ancient history	24%	6%	9%	27%	10%	13%	11%	100%
Maths, physics, chemistry, informatics and computing	24%	5%	10%	27%	10%	15%	10%	100%
Medical, dental and veterinary science	28%	10%	16%	19%	6%	11%	10%	100%
Social sciences, history, economics	25%	5%	9%	29%	12%	10%	10%	100%

The following table summarises the difference between the HESA cost centre maximum and minimum unit cost for each subject group.

Table 27 - Maximum and minimum HESA cost centre unit costs for each subject group for full-time provision

Subject group	Max HESA cost centre unit cost £	Min HESA cost centre unit cost £	Difference £
Art and design and architecture	12,159	10,118	2,041
Biological sciences and other subjects allied to health	12,257	8,960	3,297
Engineering	11,589	10,072	1,518
English, law and modern languages	9,724	8,421	1,303
Geology, environmental sciences, archaeology and ancient history	13,949	9,251	4,697
Maths, physics, chemistry, informatics and computing	11,899	9,348	2,551
Medical, dental and veterinary science	20,711	16,524	4,187
Social sciences, history, economics	10,677	8,021	2,656

Please refer to Chart 19 for all the HESA cost centre unit costs for full-time provision, given in section 7.6.

Annex J: Part-time unit cost provision

The scale of part-time provision (by cost and student FTEs) delivered by participating institutions was considerably lower than that for full-time provision (by a factor of 80), and as a result, far less reliable.

For part-time provision, the maximum number of returns from institutions for any one subject group was 17. As a result, the number of student FTEs submitted was also limited. As a further safeguard, a further threshold of 100 student FTEs has been applied to published results. Irrespective, these limited results should be interpreted with caution.

The overall weighted average unit cost between full-time and part-time was very similar (£10,299 full-time versus £10,155 part-time). For the part-time provision this Annex details:

- The variation of weighted unit costs by subject group (Chart 34);
- Weighted average unit cost by cost category and subject group (Chart 35); and the
- Weighted average cost proportions by cost category and subject group (Chart 36 and Table 28).

Subject group information is not provided in the tables where less than five submissions were provided.

Chart 34 - Variation of weighted average unit costs by subject group for part-time provision

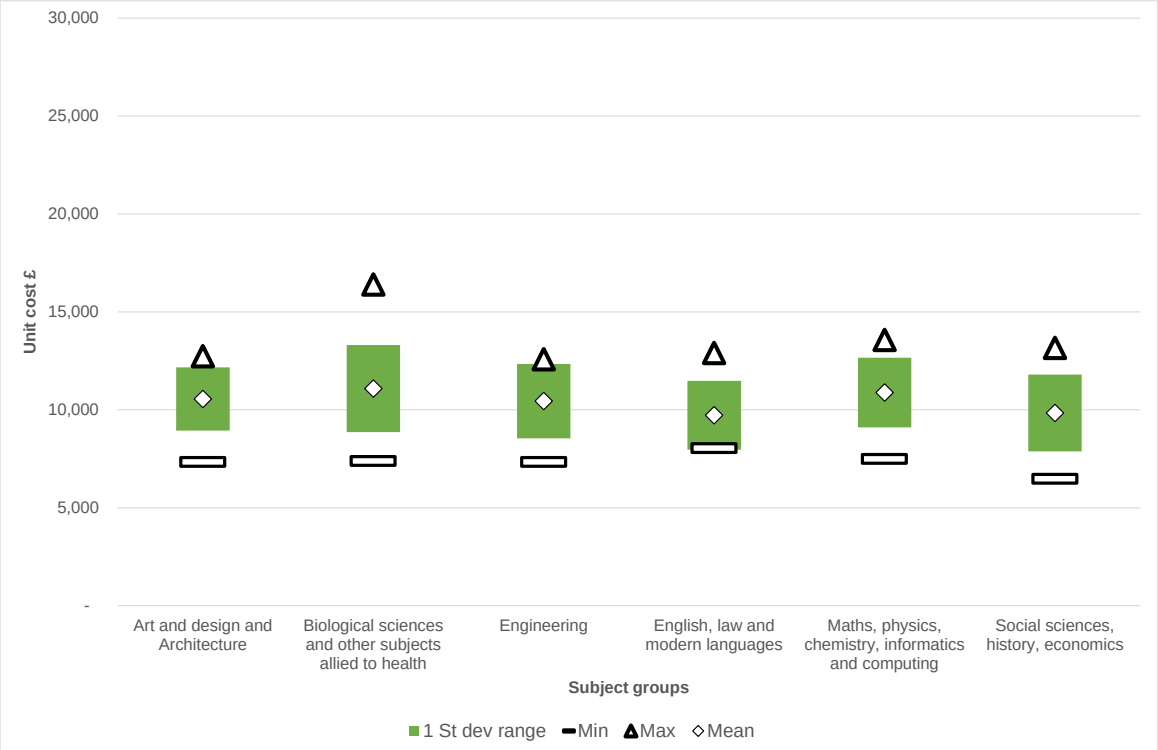


Chart 35 - Weighted average unit cost by cost category for the part-time subject groups

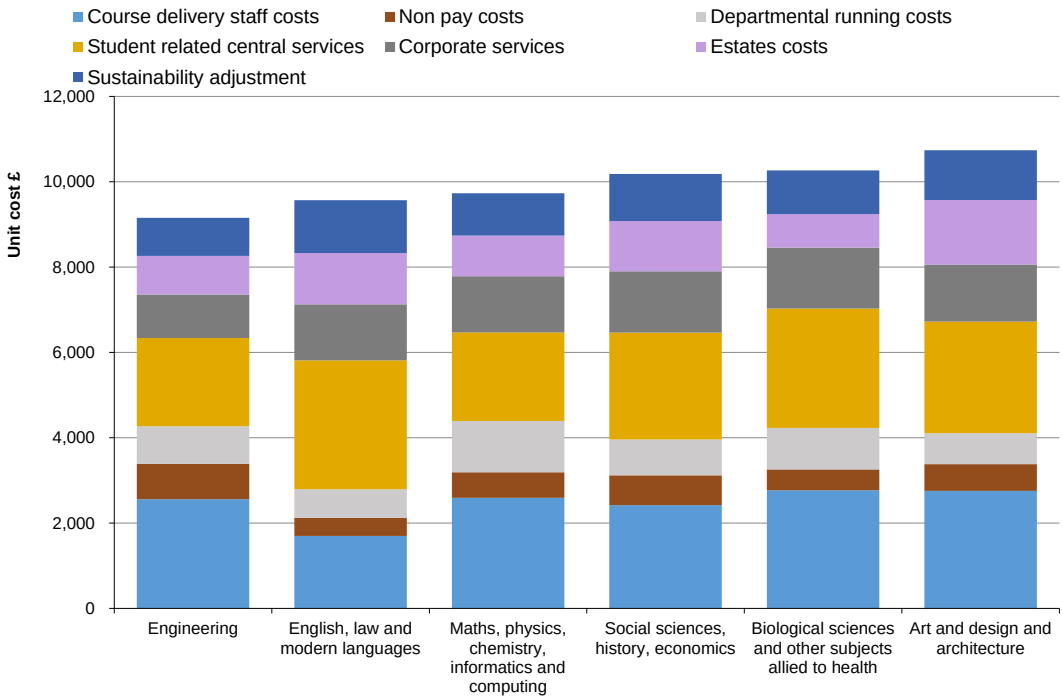
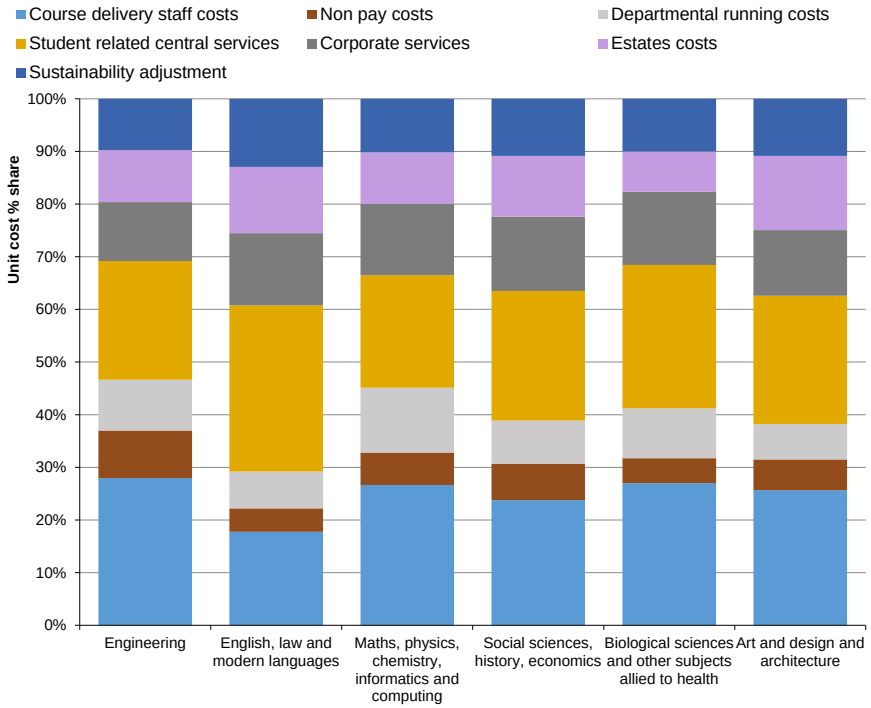


Chart 36 - Weighted average unit cost proportions by cost category for part-time provision and subject groups



The figures for these charts is given in Table 28.

Table 28 – Part-time weighted average unit cost and cost proportions by cost category

Subject group	Course delivery staff costs £	Non pay costs £	Departmental running costs £	Student related central services £	Corporate services £	Estates costs £	Sustainability adjustment £	Total £
Art and design and architecture	2,756	625	725	2,617	1,338	1,513	1,164	10,737
Biological sciences and other subjects allied to health that are not in other categories	2,772	487	973	2,796	1,430	784	1,026	10,267
Engineering	2,561	828	881	2,066	1,023	902	895	9,156
English, law and modern languages	1,698	425	672	3,019	1,313	1,204	1,237	9,569
Maths, physics, chemistry, informatics and computing	2,592	599	1,201	2,078	1,318	951	991	9,729
Social sciences, history, economics	2,420	700	840	2,505	1,439	1,177	1,102	10,182
	as a %							
Art and design and architecture	26%	6%	7%	24%	12%	14%	11%	100%
Biological sciences and other subjects allied to health that are not in other categories	27%	5%	9%	27%	14%	8%	10%	100%
Engineering	28%	9%	10%	23%	11%	10%	10%	100%
English, law and modern languages	18%	4%	7%	32%	14%	13%	13%	100%
Maths, physics, chemistry, informatics and computing	27%	6%	12%	21%	14%	10%	10%	100%
Social sciences, history, economics	24%	7%	8%	25%	14%	12%	11%	100%

Annex K: Foundation unit cost provision

The scale of part-time provision (by cost and student FTEs) delivered by participating institutions was considerably lower than that for full-time provision (by a factor of 80), and as a result, far less reliable.

For foundation provision, the maximum number of returns from institutions for any one subject group was 7. As a result, the number of student FTEs submitted was also limited. As a further safeguard, a further threshold of 100 student FTEs has been applied to published results. Irrespective, these limited results should be interpreted with caution. For the foundation provision this Annex details:

- The variation of weighted unit costs by subject group (Chart 37);
- Weighted average unit cost by cost category and subject group (Chart 38) ; and the
- Weighted average cost proportions by cost category and subject group (Chart 39 and Table 29).

Subject group information is not provided in the tables where less than five submissions were provided.

Chart 37 - Variation of weighted unit costs by subject group for foundation provision

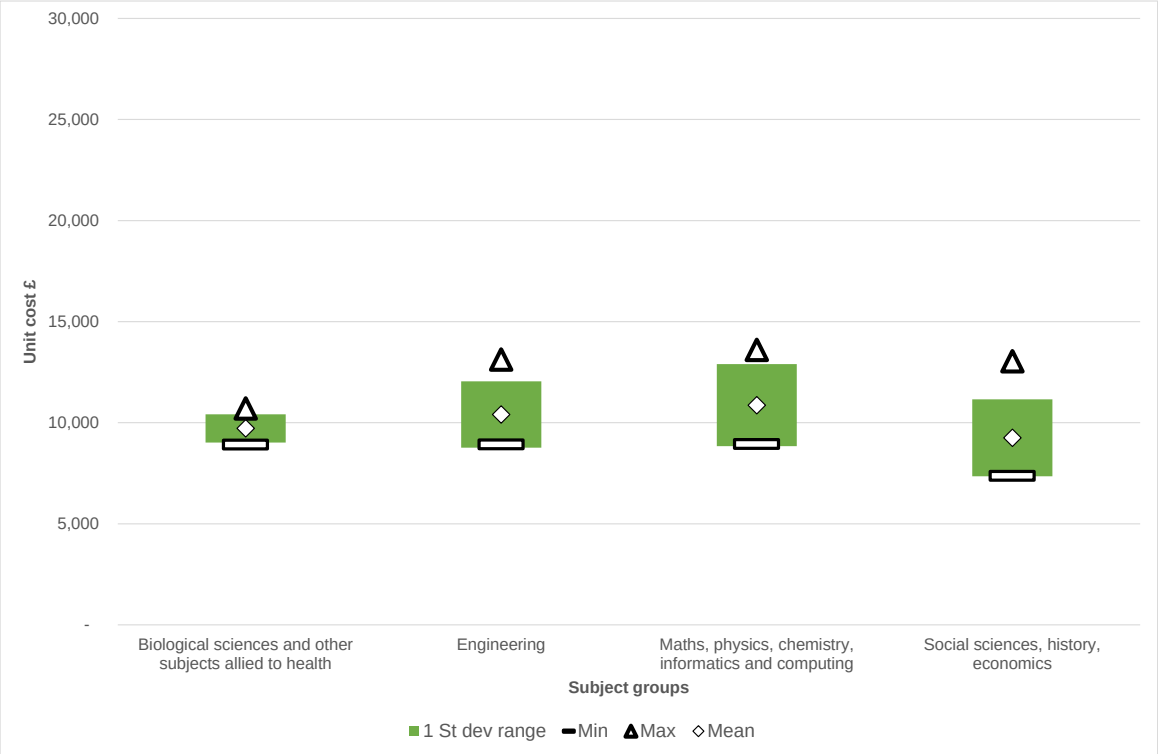


Chart 38 - Weighted average unit cost by cost category for the foundation subject groups

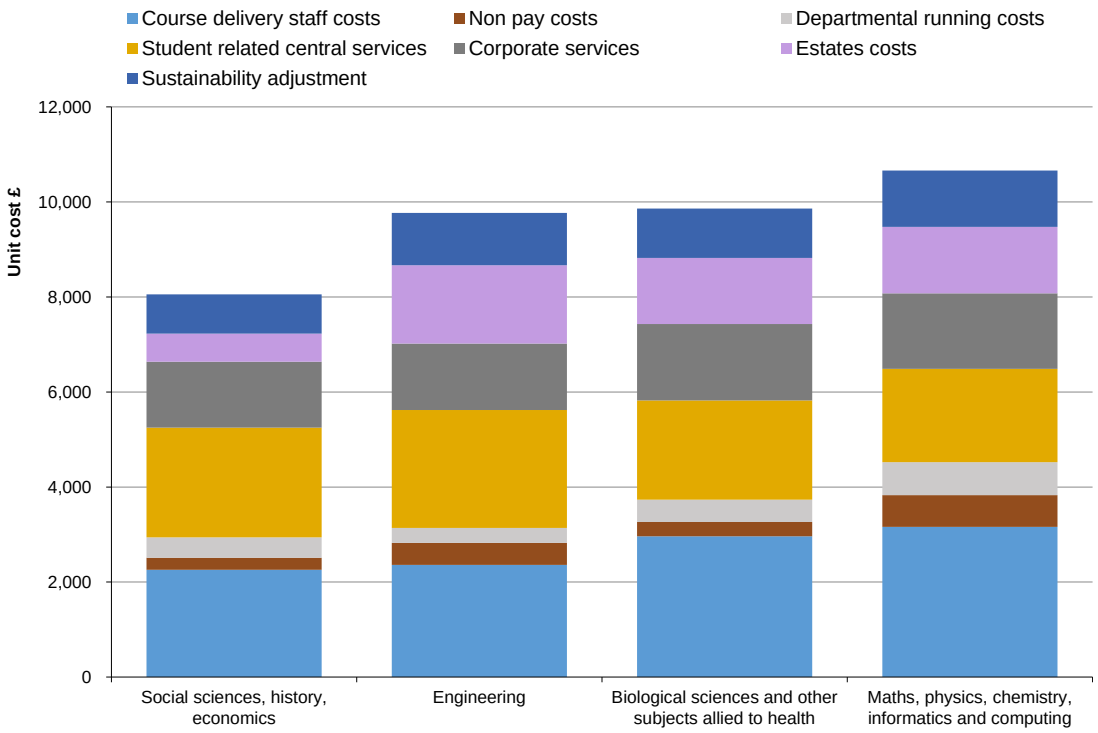
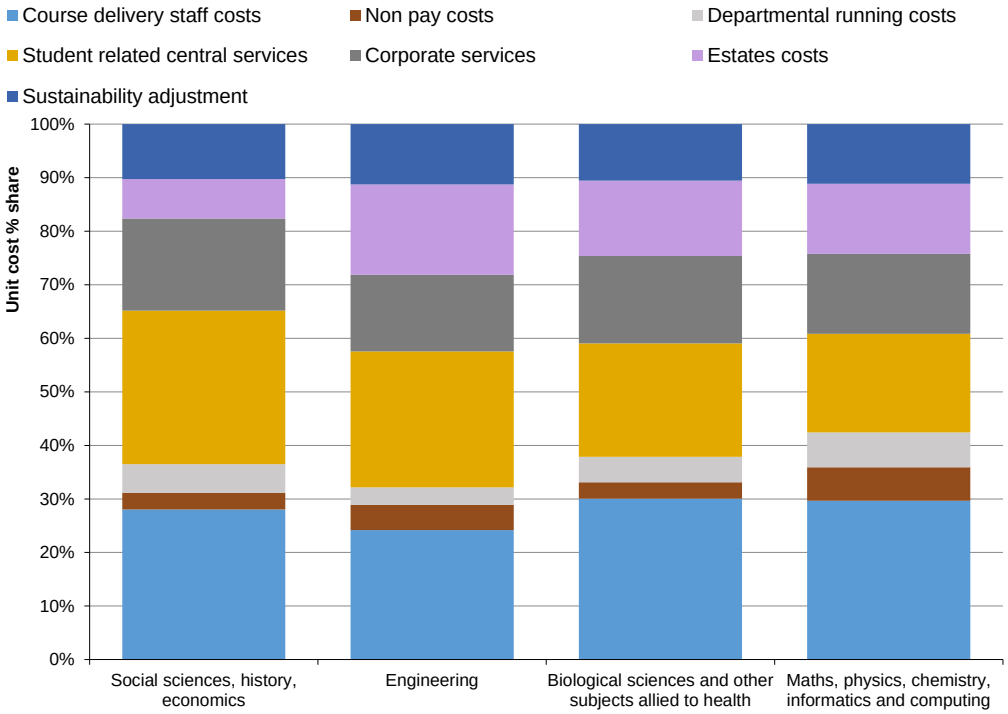


Chart 39 - Weighted average unit cost proportions by cost category for foundation provision and subject groups



The figures for these tables is given below.

Table 29 – Foundation weighted average unit cost and cost proportions by cost category

Subject group	Course delivery staff costs £	Non pay costs £	Departmental running costs £	Student related central services £	Corporate services £	Estates costs £	Sustainability adjustment £	Total £
Biological sciences and other subjects allied to health that are not in other categories	2,962	303	470	2,090	1,608	1,390	1,040	9,862
Engineering	2,363	460	318	2,482	1,398	1,646	1,101	9,768
Maths, physics, chemistry, informatics and computing	3,161	666	696	1,963	1,592	1,397	1,186	10,662
Social sciences, history, economics	2,259	251	431	2,310	1,387	593	825	8,056
	as a %							
Biological sciences and other subjects allied to health that are not in other categories	30%	3%	5%	21%	16%	14%	11%	100%
Engineering	24%	5%	3%	25%	14%	17%	11%	100%
Maths, physics, chemistry, informatics and computing	30%	6%	7%	18%	15%	13%	11%	100%
Social sciences, history, economics	28%	3%	5%	29%	17%	7%	10%	100%

Some institutions reported that an increasing number of newer students were enrolled on Foundation degrees. They found that these students required intensive support to help develop and access higher education.

Annex L: In-scope student FTE reconciliation

Introduction

This Annex describes the rationale for assessing in-scope FTEs, how the assessment was undertaken and the results.

Background

The data return comprised in-scope courses or programmes totalling 447,826 FTE students. Once adjusted for sandwich FTE (because of the definition used), these figures formed the basis of the weighted unit cost calculations and informed the out-of-scope deductions using an FTE basis. The sandwich FTE was adjusted for any placement over the period.

The data return relied on institutions completing the data return for the FTE figure in the scope of the study. Institutions provided student FTEs in their data return, important to the allocation of costs and to determining unit costs. To assess their accuracy and completeness, we compared each institution's submission to information collected from the HESA student record and made available to the study by the OfS.

This assessment contained a number of assumptions when comparing data from different sources. As part of this process, we contacted several institutions where differences arose and this led to a number of resubmissions.

Methodology

The methodology sought to align and compare FTEs by institution from the dataset provided as part of the study and the HESA dataset. The OfS provided HESA data with further detail to support the reconciliation. The dataset comprised:

- 2016-17 student FTEs, sourced from the 2016-17 HESA student record at the institution and HESA cost centre level.
- This data was based on HESA's session population[35].
- Student FTEs were rounded to the nearest multiple of 5, in accordance to HESA's rounding methodology. Values lower than 2.5 are rounded to 0. Therefore adding up rounded values leads to incorrect results, but necessary for the purposes of this reconciliation exercise.
- The mode of study was included and refers to the method by which a student is being taught their course. Full-time students included all students studying full-time (for more than or equal to 24 weeks in the academic year). Part-time students include those studying part-time, during the evenings only, or full-time for less than 24 weeks in the academic year.
- The level of study referred to the qualification that would be attained as a result of successful completion of studies. This helped provide distinction between undergraduate and foundation degrees.
- The dataset also included a flag to identify students that study via distance learning.

[35] For further information on HESA's session population, please click here.

- Non-continuation data following their year of entry. For full-time students, this was based on the HESA student record of UK domiciled full-time undergraduate entrants for 2015/16 (UKPIs Table T3)[36] and for 2014/15 (UKPIs Table T3e)[37]. The dataset was limited to first degree students of all ages and English institutions.

The total student FTE from this dataset totalled 470,165. This figure is the total FTEs from the HESA dataset when a match of both institution and HESA cost centre is found between the HESA dataset and the data returns.

Adjustments were made to the HESA data to reflect the population of institutions in the study and a number of assumptions. The key assumptions were that:

- A comparison of FTEs at the institution level was possible by aggregating all the FTEs across the different types of provision;
- Aggregating rounded FTEs from the HESA dataset had no material impact – this was a condition of the data received;
- Deductions for non-continuation rates would be uniform across subject groups within an institution. Whilst this is unlikely to be the case at the aggregate level of comparison this was deemed a reasonable adjustment to make.
- Using the available data the non- continuation rates were applied to first degrees and to home and EU students, for both full-time and part-time students. Whilst sandwich students are likely to experience non- continuation, this was not estimated. This is a reasonable assumption given any continuation rate applied would have had a small impact to the overall numbers. Sandwich students as a proportion of the HESA population (excluding post graduates and distance learners) was 12%.
- FTEs coded to HESA cost centre 999 were excluded. This was a very small number of FTEs, 0.03% of the HESA population (excluding postgraduates and distance learners).

Results

The aligned and aggregated FTEs were compared at a subject group and institution level.

In total across the 40 institutions, the FTEs from the data return was 10,637 FTEs higher than the adjusted HESA data. Institutions with a difference in both FTE and percentage terms greater than one standard deviation (900 FTE and 7.7%) were invited to review and verify their submission.

Table 30 - FTEs differences from comparing HESA data with study data by size of institutions

FTEs greater than	To FTEs less than or equal to	Frequency of institution	Total FTEs from data return	Total difference between datasets (FTEs and %s)
0	4,999	9	14,720	296 (2.0%)
5,000	9,999	7	57,549	-136 (-0.2%)

[36] For further information on UKPIs Table T3, please click here.
[37] For further information, please click here.

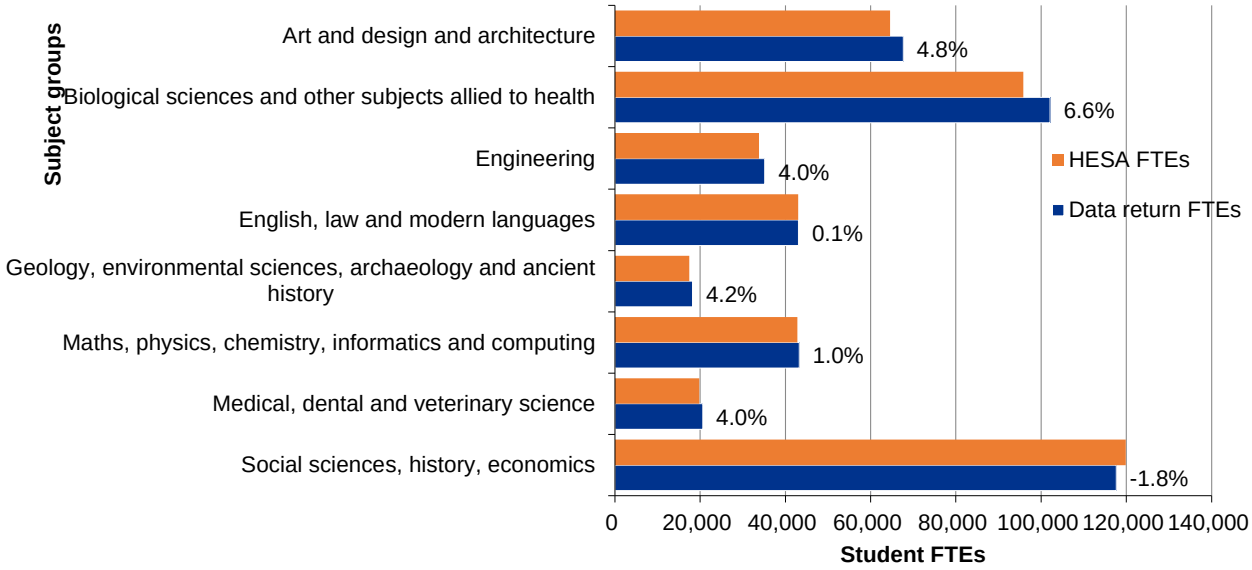
FTEs greater than	To FTEs less than or equal to	Frequency of institution	Total FTEs from data return	Total difference between datasets (FTEs and %s)
10,000	14,999	10	124,161	6,383 (5.1%)
15,000	19,999	12	205,876	2,903 (1.4%)
20,000	24,999	2	45,520	1,192 (2.6%)
Total		40	447,826	10,637 (2.4%)

Source: Analysis of data returns. Differences due to roundings.

Queries were also raised with institutions and this helped check the basis of student FTE figures provided.

The FTE differences by subject group are highlighted in the following chart. The largest difference of 6.6% is in the group for Biological sciences and other subjects allied to health. One institution suggested this group includes courses associated with training for nursing, midwifery and allied health professions, a group with known higher levels of non-continuation.

Chart 40 - FTEs differences from comparing HESA data to study data by subject group



The differences found can be explained by:

- Not applying a non-continuation rate to non-first time degrees, i.e. sandwich provision and overseas students (both around 60,000 students), this would have lowered the HESA data and reduced the overall differences;
- Variations in non-continuation rates year-on-year; and
- Adding up rounded values in the HESA data.

Conclusion

In conclusion, whilst a complete and accurate reconciliation between the HESA data and from the study could not be achieved, in aggregate, this assessment found broad alignment between these sets of FTEs. We also found broad agreement in the existence of the same provision between data returns and the HESA data at the HESA cost centre level.

Annex M: Out-of-scope postgraduate teaching student FTE reconciliation

Introduction

This Annex describes the rationale for assessing postgraduate teaching out-of-scope FTEs, how much it impacts on the in-scope costs and how the assessment was undertaken.

Background

Per the methodology, we relied on institutions to correctly exclude the cost of out-of-scope provision. We therefore compared submissions and performed a sensitivity analysis to inform our assessment on the resulting in-scope costs.

The data return relied on institutions completing the data return with FTE figures for provision that was included in the Teaching cost for TRAC but out-of-scope for the study. The postgraduate provision was the largest out-of-scope cost, totalling £971 million (or 16.7%) of the £5,670m cost of Teaching for TRAC once adjusted for relevant costs of overseas students. It was also the largest category within the out-of-scope, 81% of the total £1,206m.

The cost of postgraduate study with distance learning comprised 0.4% of the £5,825m cost of Teaching for TRAC once adjusted for relevant costs of overseas students, at £21.3m.

The data return detailed postgraduate FTEs (including PG distance learner FTEs) totalling 84,269 from 39 institutions.

Methodology

To reconcile the postgraduate FTE collected in the study to FTE data sourced from the 2016-17 HESA student record, we sought to:

1. Compare the proportions of postgraduate FTE in total; and
2. Assess the postgraduate FTEs across the institutions;

We then performed a sensitivity analysis to gauge the change in FTEs needed to make a material difference to the in-scope costs.

1. Total FTE comparison

The methodology sought to align and compare FTEs by institution from the dataset provided as part of the study and the student FTE data sourced from the 2016-17 HESA student record. The dataset provided by the OfS comprised the 2016-17 student FTEs, sourced from the 2016-17 HESA student record at the institution and HESA cost centre level. This data was based on HESA's session population. In this dataset:

- Student FTEs were rounded to the nearest multiple of 5, in accordance to HESA's rounding methodology. Values lower than 2.5 are rounded to 0. Therefore adding up rounded values can lead to incorrect total results.
- The mode of study was included and referred to the method by which a student is being taught their course. Full-time students included all students studying full-time (for more than or equal to 24 weeks in the academic year). Part-time students include those studying part-time, during the evenings only, or full-time for less than 24 weeks in the academic year.

- The level of study referred to the qualification that would be attained as a result of successful completion of studies; postgraduate taught research or postgraduate teaching. Postgraduate courses were those leading to higher degrees, diplomas and certificates including professional qualifications which usually require a first degree as an entry qualification (i.e. already qualified at level H).

The dataset also included a flag to identify students that studied via distance learning. This flag was used to identify postgraduate students with distance learning, a separate category in the out-of-scope calculation.

The key assumptions made in comparing the HESA dataset to the study's data were that:

- Student non-continuation rates were immaterial. For postgraduate study this was deemed a reasonable assumption given that most postgraduate taught degrees are one year;
- A comparison of FTEs at the institution level was possible by aggregating the FTEs across distance learning and on campus provision;
- Aggregating FTEs from the HESA dataset had no material impact overall; and
- FTEs coded to HESA cost centre 999 were excluded. This was a very small number of FTEs, 0.2% of the HESA population (for on campus and distance learners).

From the first comparative exercise we found that the proportion of postgraduate population in England for 2016-17 based on HESA data, was around 14.8% (excluding distance learning). The following table shows the comparable postgraduate FTE figures from the study (at 15.3%) and a difference of 0.53%.

Table 31 – Comparison of Postgraduate FTEs

	HESA data - all institutions	Data return - Study participants (39)
Postgraduates	212,235	84,269
Total FTEs	1,436,585	532,095
as a %	14.77%	15.33%
Study % less HESA %		1.06%

Therefore the proportion of postgraduate FTE figures collected in the study are similar to those proportions in the sector.

2. Comparisons across institutions

The aligned and aggregated FTEs were compared at the institution level between the two datasets. It was not possible to assess at the subject group level as this was not collected as part of the data return.

As part of this process, we contacted several institutions where differences arose and this led to a number of resubmissions. The results shown here are after those queries have been resolved.

In total, across the 39 institutions, the FTEs from the data return for this study was 2,894 FTEs higher than the HESA data, 3.4% of the total HESA FTEs. One institution had a difference in both FTE and percentage terms greater than one standard deviation (422 FTE and 28%).

Table 32 - Impact of out-of-scope change of 3.4% on in-scope costs

Step in the calculation		£
Postgraduate cost (including distance learning) £	a	992,360,225
Increase by	b	3.43%
To £	c = a * (1 + b)	1,026,398,181
A £ change of	d = c - a	34,037,956
In-scope cost from the Teaching Cost TRAC Adjusted	e	4,464,019,850
Difference of £	e + d	4,498,057,806
A % increase of	(d / e) - 1	0.76%

In summary the difference in student FTEs were not material to the study. Increasing the postgraduate cost reported in the study by 3.43% would lead to a minimum increase in the Teaching Cost TRAC Adjusted costs of 0.76%, with all other things being equal. The increase would need to be much higher in order to take into account the division of costs between in-scope and out-of-scope costs through the methodology.

Sensitivity analysis

Given the subjectivity in how some of the postgraduate results have been gathered, we performed a sensitivity analysis to identify the increase in postgraduate cost necessary to have a material effect on the Teaching Cost TRAC Adjusted costs for the study. We considered the difference in postgraduate costs needed to create a 10% impact on the Teaching Cost TRAC Adjusted costs. The table below illustrates the results.

Table 33 - Increase in out-of-scope costs required to achieve a 10% increase in the total in-scope costs

Step in the calculation		£
In-scope cost from the Teaching Cost TRAC Adjusted	a	4,464,019,850
An % increase of	b	10.00%
A difference of	c = a * (1 + b)	446,401,985
Postgraduate cost (including PG / distance learning)	d	992,360,225
Deduct £ of	c	446,401,985
To	e = d - c	545,958,240
A difference of	c / d	44.98%

In order for the Teaching Cost TRAC Adjusted to be 10% higher, the postgraduate cost would need to decrease by over 40%. This was deemed extremely unlikely.

Conclusion

In conclusion, the postgraduate FTEs from the data return appear closely aligned to figures provided for the 2016-17 HESA student record. We tested the sensitivity of out-of-scope costs to a change in Teaching Cost TRAC Adjusted costs. We found that to create a 10% increase in Teaching Cost TRAC Adjusted costs would require a decrease in reported spend of over 40% on postgraduate and distance learning costs. This was deemed extremely unlikely given

the proximity in total between the two postgraduate datasets. This assessment however, does not take into account any variation that may occur at the institution or subject group level.

Annex N: Analysis of postgraduate unit costs

This Annex details three analyses across the postgraduate out-of-scope provision, the largest share of the out-of-scope provision. It contains:

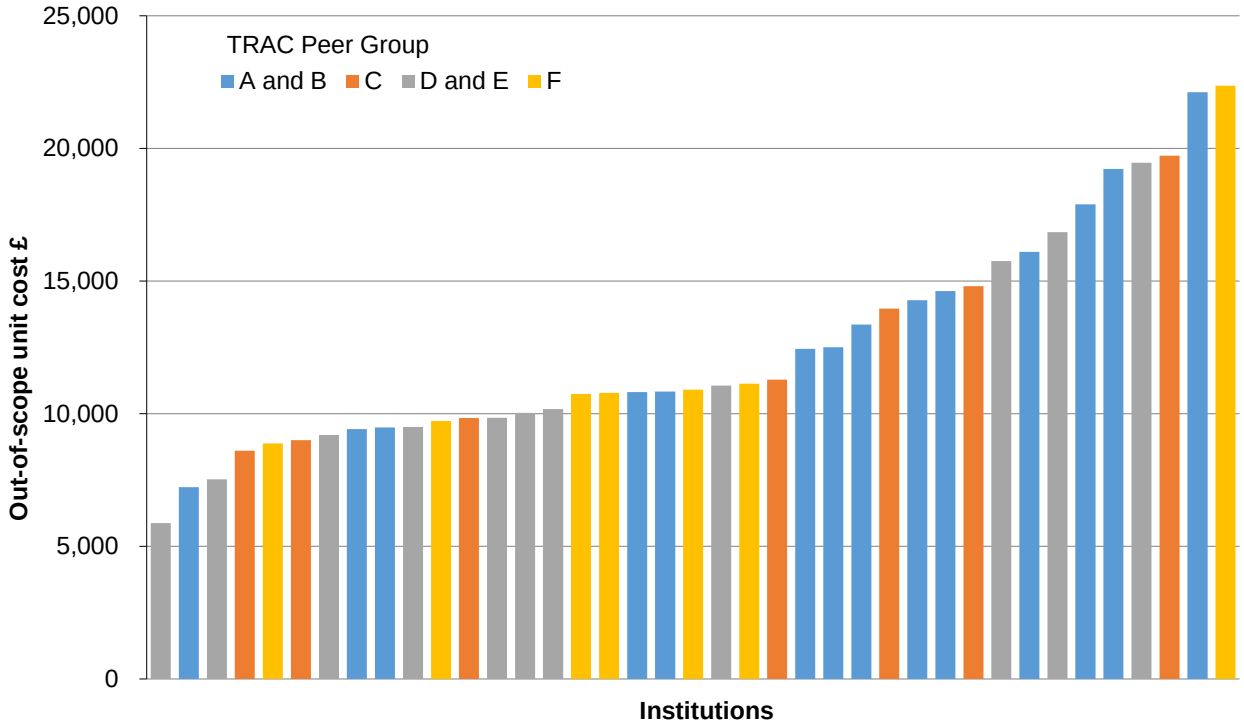
- A comparative analysis of postgraduate unit costs; and
- An analysis of postgraduate out-of-scope costs compared to in-scope costs.

In summary, these procedures helped validate the out-of-scope costs contained within the costing approach and found reasons why postgraduate unit costs varied among institutions and could be higher, or lower, than undergraduate unit costs.

Comparative analysis of postgraduate unit costs

In comparing out-of-scope postgraduate unit costs in more detail, we identified a range of unit costs. The following chart provides an overview of the 39 institutions with postgraduate provision highlighting the TRAC Peer Group.

Chart 41 - Weighted average unit cost for the postgraduate out-of-scope category



Source: Analysis of data returns

The chart highlights a variation in out-of-scope unit costs across institutions. The TRAC Peer group did not seem to provide strong support for either higher or lower unit costs. Further information was sought from institutions reporting unit costs at either end of the range. They explained that their results:

- Broadly agreed with their own prior work. This was an explanation from institutions with values at either end of the y-axis;
- Was not untypical for London institutions with high postgraduate costs identified from work completed outside of this study;

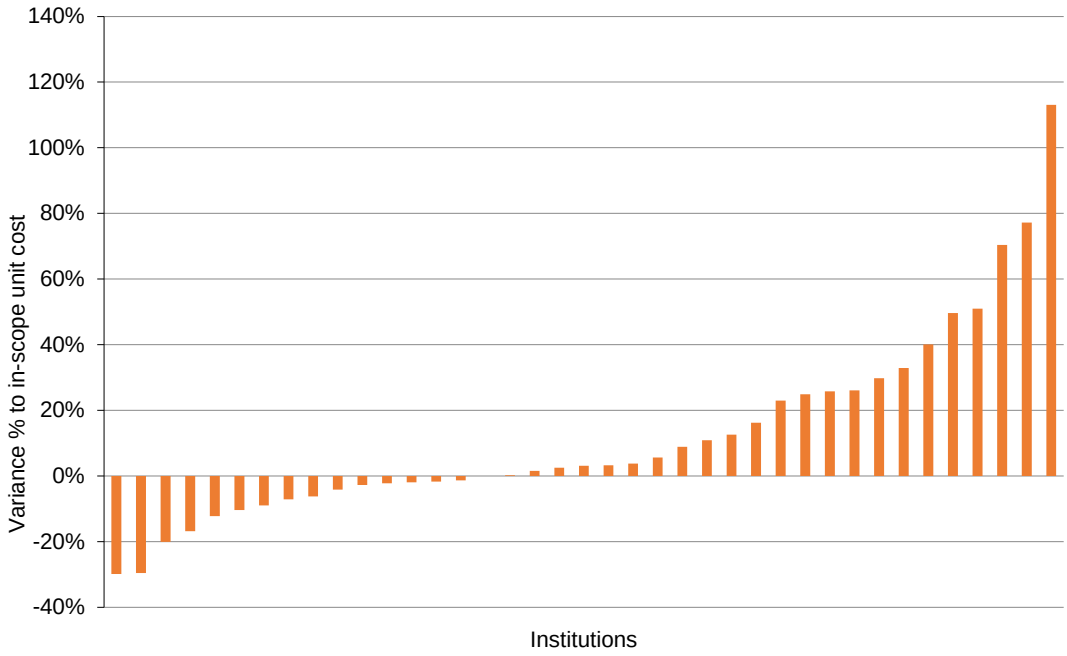
- Included Continuing Professional Development student FTEs in their postgraduate numbers – rather than separately through the 'other' category. Whilst including non-postgraduate student FTEs distorts this postgraduate unit cost analysis it does not fundamentally alter the cost that needed to be excluded in this study (the costs involved was deemed immaterial); and
- Had low student numbers on each postgraduate programme. They also commented that these costs were in line with expectations at the time and with work undertaken over the last two years (2017-18 and the current year) to rationalise the provision.

In conclusion, whilst we found a wide variation of out-of-scope unit costs, this appeared indicative of the underlying provision. We were provided with reasonable explanations in the majority of cases. Further analysis was undertaken to assess the sensitivity of the approach to determining the out-of-scope costs, see below.

Analysis of postgraduate out-of-scope costs compared to in-scope costs

We also reviewed postgraduate unit costs against the weighted average unit cost of the institution's in-scope provision. The following chart shows the result for the 39 institutions.

Chart 42 - Postgraduate out-of-scope unit costs versus in-scope unit costs



Source: Analysis of data returns

From other studies on postgraduate provision, we would expect to find that postgraduate costs higher than similar undergraduate provision.

Of the 39 institutions reporting postgraduate provision, 15 institutions had an out-of-scope unit cost less than their weighted average unit cost for their in-scope provision (the negative bars to the left in the chart). Of those institutions with a cost difference greater than 10% less than their in-scope unit cost, all institutions were outside of London and five of the six were post-92 institutions, in TRAC Peer Group C and D, a finding similar to the previous analysis shown in earlier Chart 13. On average (unweighted for student FTEs) the 15 institutions had a unit cost 10% lower.

One institution with an out-of-scope unit cost less than their weighted average unit cost for their in-scope provision explained that whilst PGT courses generally involved a greater number of credits per year than UG courses, PGT were counterbalanced by a dissertation which required a much lower intensity of input resources. Another explained that their fewer teaching hours were based on their assessment that the provision was more student-led learning resulting in a lower unit cost than the undergraduate provision.

Twenty-four institutions had an out-of-scope unit cost greater or equal to their weighted average unit cost for their in-scope provision (the right-hand side of the chart above). On average (unweighted) these were 26% higher. Those institutions with a cost difference greater than 10% more than their in-scope unit cost totalled 15. It was expected prior to this study, that the postgraduate unit cost would be higher than the undergraduate provision. Six of the 15 are in TRAC Peer Group A or B and six in London.

From our discussions and queries with institutions, we learnt of some further characteristics to explain the higher comparative postgraduate unit costs:

- Much lower postgraduate numbers than undergraduate FTEs and hence higher shares of fixed overhead costs compared to undergraduate provision;
- Typically lower number of students in the staff to student ratios for postgraduate provision, shown from a previous costing exercise performed; and
- Postgraduate students tend to study over a longer academic year than their undergraduate counterparts.

Funding and marketing were also factors cited by some institutions to explain this unit cost range, both higher and lower.

In summary the broad findings from this analysis are that postgraduate unit costs were higher than undergraduate costs but exceptions existed. Higher postgraduate costs align with findings of an earlier study[38] published in December 2014.

[38] A Review of the Cost of Postgraduate Taught Provision, a report to the Higher Education Funding Council of England, December 2014, please click here to access the archived webpage.

Annex O: Subject group weighted average full economic unit cost

Based on the returns received, we calculated an average full economic unit cost for each subject group using two measures:

- A weighted average unit cost per student FTE by dividing the total cost from all submissions for the courses by the corresponding total of student FTEs; and
- The median value from the institutions' unit costs for each subject group (once the weighted average unit cost is calculated by dividing the total cost from each institution by their corresponding total number of student FTEs).

The unit cost calculation uses the subject group level to perform a weighted average unit cost calculation. This is summarised in the following equation.

$$Unit\ cost = \frac{\sum total\ costs}{\sum number\ of\ students\ (FTEs)}$$

The number of students included both home and overseas students. The total costs included the relevant teaching costs for both these types of students and institutions confirmed that they did not treat differently the delivery of teaching to these students.

Where we calculated a weighted average unit cost for a subject group across more than one institution, all the relevant costs across all institutions are divided by all the relevant students for the same institutions.

We also calculated the confidence interval that the resulting weighted average unit costs provided for each subject group.

The following tables detail the average full economic unit cost and the frequency of responses against each subject group. The figures do not include responses where the number of institutions is less than five.

Table 34 - Subject group cost per student FTE for full-time provision

Subject group	Total cost £	Total FTEs	1) Weighted average unit cost £	2) Median Unit Cost £	# of institutions
Art and design and architecture	720,926,829	64,974	11,096	10,734	37
Biological sciences and other subjects allied to health that are not in other categories	991,994,273	97,258	10,200	10,106	32
Engineering	362,092,066	31,778	11,394	11,498	31
English, law and modern languages	365,710,422	41,552	8,801	8,874	30
Geology, environmental sciences, archaeology and ancient history	183,094,066	16,991	10,776	10,370	26

Subject group	Total cost £	Total FTEs	1) Weighted average unit cost £	2) Median Unit Cost £	# of institutions
Maths, physics, chemistry, informatics and computing	420,510,140	40,050	10,500	10,410	31
Medical, dental and veterinary science	370,459,669	20,591	17,991	17,480	14
Social sciences, history, economics	971,678,193	109,727	8,855	8,953	34
Full-time total	4,386,465,658	422,921	10,372		

Table 35 - Subject group cost per student FTE for part-time provision

Subject group	Total cost £	Total FTEs	1) Weighted average unit cost £	2) Median Unit Cost £	# of institutions
Art and design and architecture	12,059,289	1,123	10,737	10,041	14
Biological sciences and other subjects allied to health that are not in other categories	18,435,173	1,796	10,267	10,807	17
Engineering	7,605,378	831	9,156	11,432	9
English, law and modern languages	4,656,859	487	9,569	8,797	11
Geology, environmental sciences, archaeology and ancient history	892,752	63	14,062	9,241	5
Maths, physics, chemistry, informatics and computing	1,478,741	152	9,729	11,007	11
Social sciences, history, economics	10,790,055	1,060	10,182	9,481	16
Part-time total	55,918,247	5,512	10,145		

Table 36 - Subject group cost per student FTE for foundation provision

Subject group	Total cost £	Total FTEs	1) Weighted average unit cost £	2) Median Unit Cost £	# of institutions

Biological sciences and other subjects allied to health that are not in other categories	6,242,252	633	9,862	9,693	7
Engineering	2,082,668	213	9,768	10,081	5
Maths, physics, chemistry, informatics and computing	3,610,329	339	10,662	10,437	5
Social sciences, history, economics	4,647,939	577	8,056	8,693	7
Foundation total	16,583,188	1,762	9,412		

The following subject groups are omitted from this summary:

- Medical, dental and veterinary science from the part-time provision where the number of respondents was less than five; and.
- From foundation courses:
    - Medical, dental and veterinary science where no course was provided; and
    - Art and design and architecture; English, law and modern languages; and Geology, environmental sciences, archaeology and ancient history where the number of respondents was less than five.

For the full-time provision where there were many data points, the fairly close median and mean indicate a symmetric or even distribution.

Annex P: Full-time subject group unit costs by cost category and institution

For the full-time provision, this Annex details by each subject group and institution (where five or more submissions were received):

- A chart showing the unit costs for each cost category; and
- A chart showing the relative proportions of each cost category.

Institutions on each chart are shown left to right in order of increasing unit cost. The colours in each chart are consistent and explained here for ease of access.

Cost category	Colour key
A – Course delivery staff costs	
B – Non-pay costs	
C - Departmental running costs	
D - Student related central services	
E - Corporate services	
F - Estates costs	
G - Sustainability adjustment	

Among the differences across institutions, it should also be noted that:

- The way in which institutions completed the data return for this study appears to be influenced by their organisational and financial structure, see 7.7.2. As a result of our work, there may be instances in the charts where:
  - Direct non-pay was treated as a departmental running cost;
  - Departmental running costs were treated as central costs, and vice-versa; and
  - Direct other staff costs were classified as a departmental running cost.
- Some cost categories were omitted by institutions, either entirely or in the detail within a cost category. One institution explained that it could not meaningfully allocate non-pay costs to its courses and therefore it included all of these costs into departmental running costs. Institutions reported that in the main these omissions were due to time pressures in completing the data return and not from an unwillingness to participate as fully as possible in the study.
- Each institution has a given sustainability adjustment, the Margin for Sustainability and Investment (MSI). Further details on this is provided in Annex G.
- Both the relative and absolute unit cost charts should be interpreted together for any one subject group.

Overall we ensured that the total costs submitted were complete and in line with our agreed upon validation procedures.

Chart 43 - Full-time Art and design and architecture unit costs by cost category

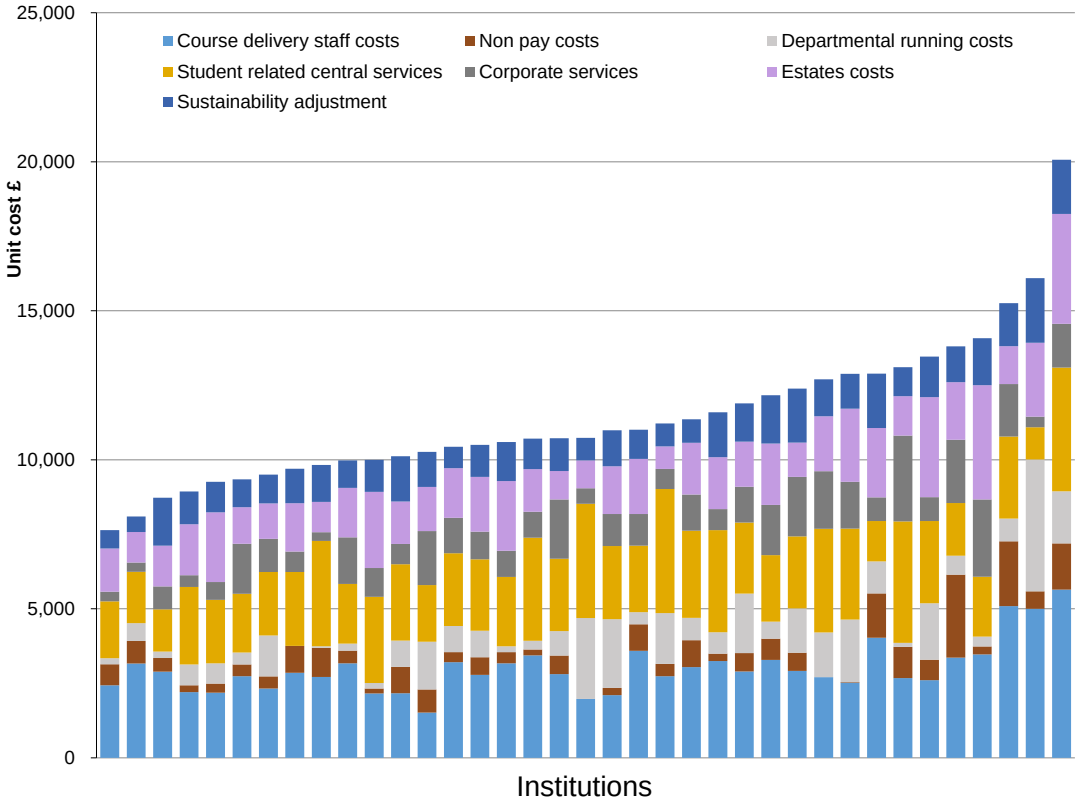


Chart 44 - Full-time Art and design and architecture unit cost proportions by cost category

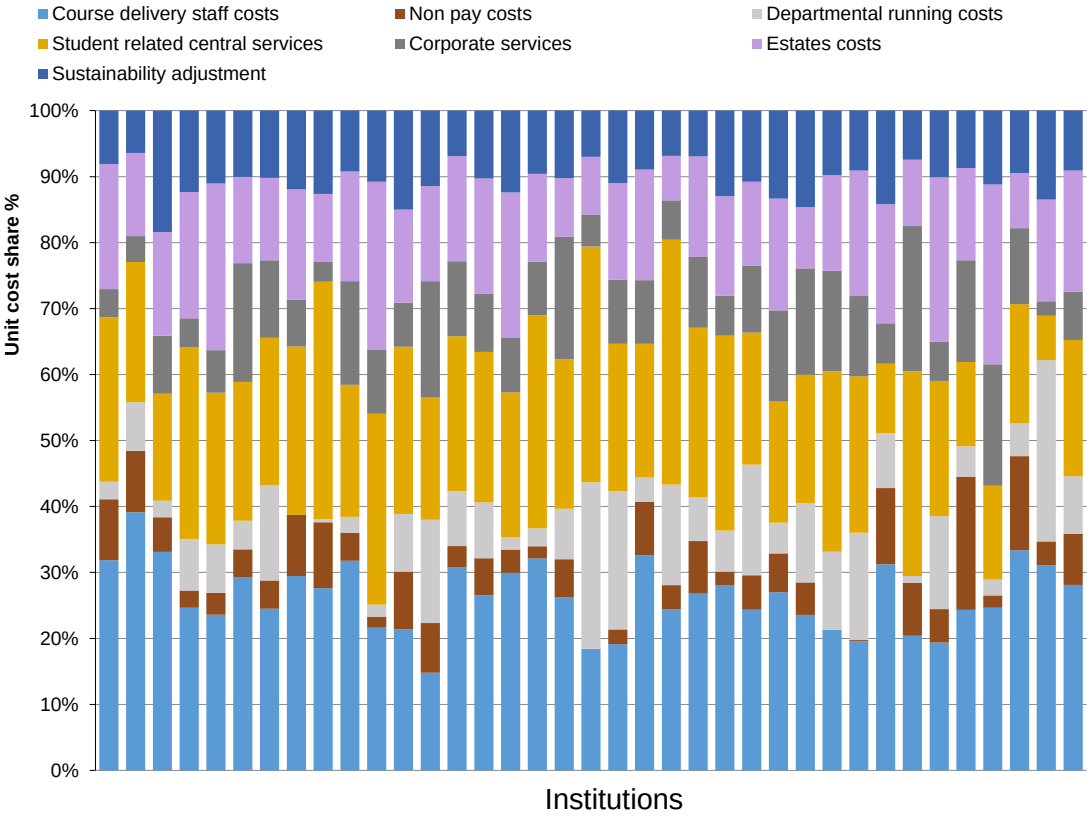


Chart 45 - Full-time Biological sciences and other subjects allied to health

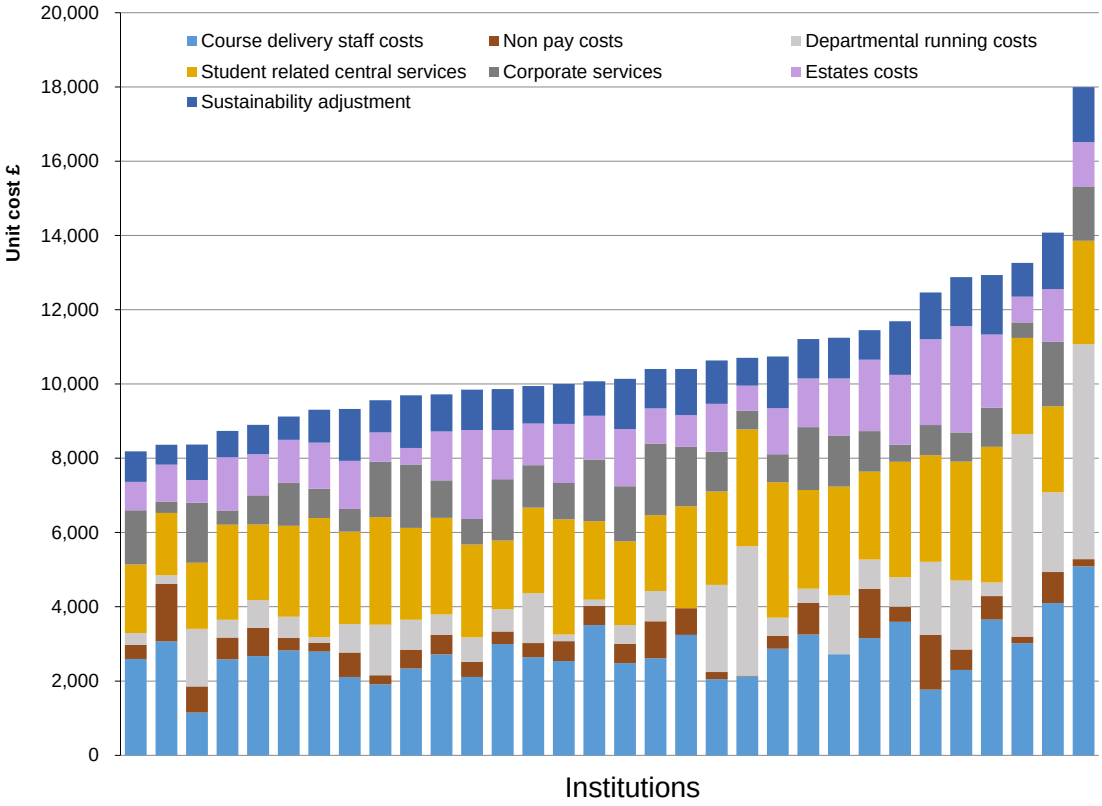


Chart 46 - Full-time Biological sciences and other subjects allied to health unit cost proportions by cost category

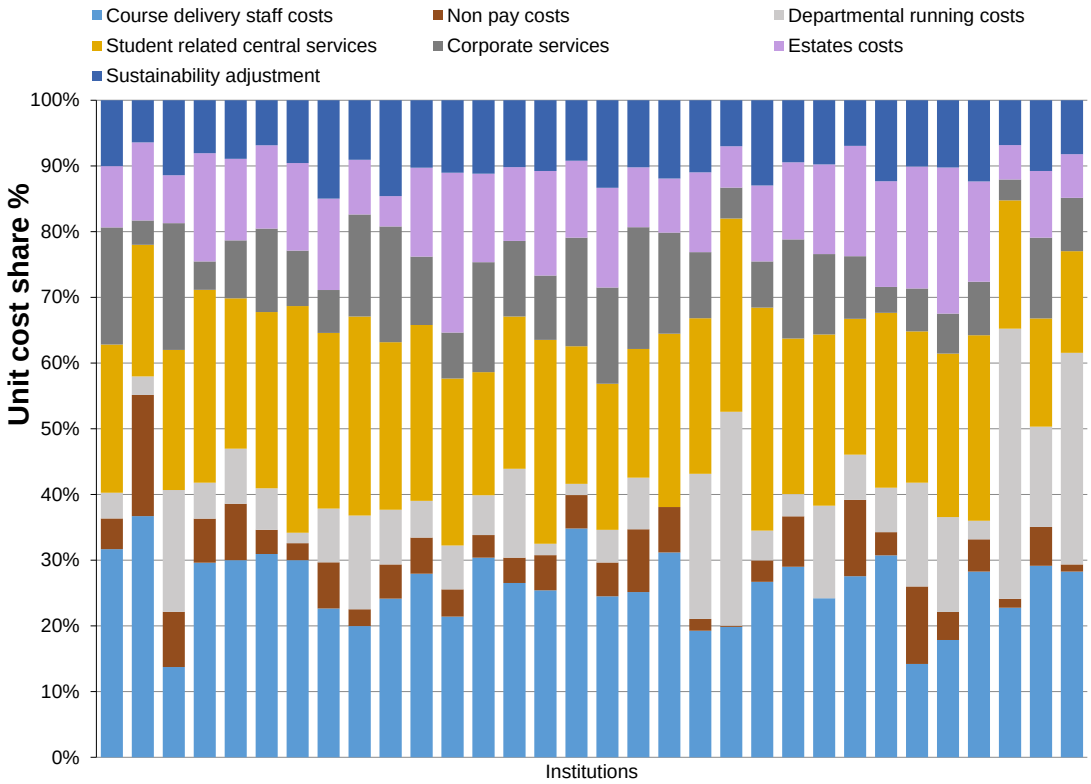


Chart 47 - Full-time Engineering unit costs by cost category

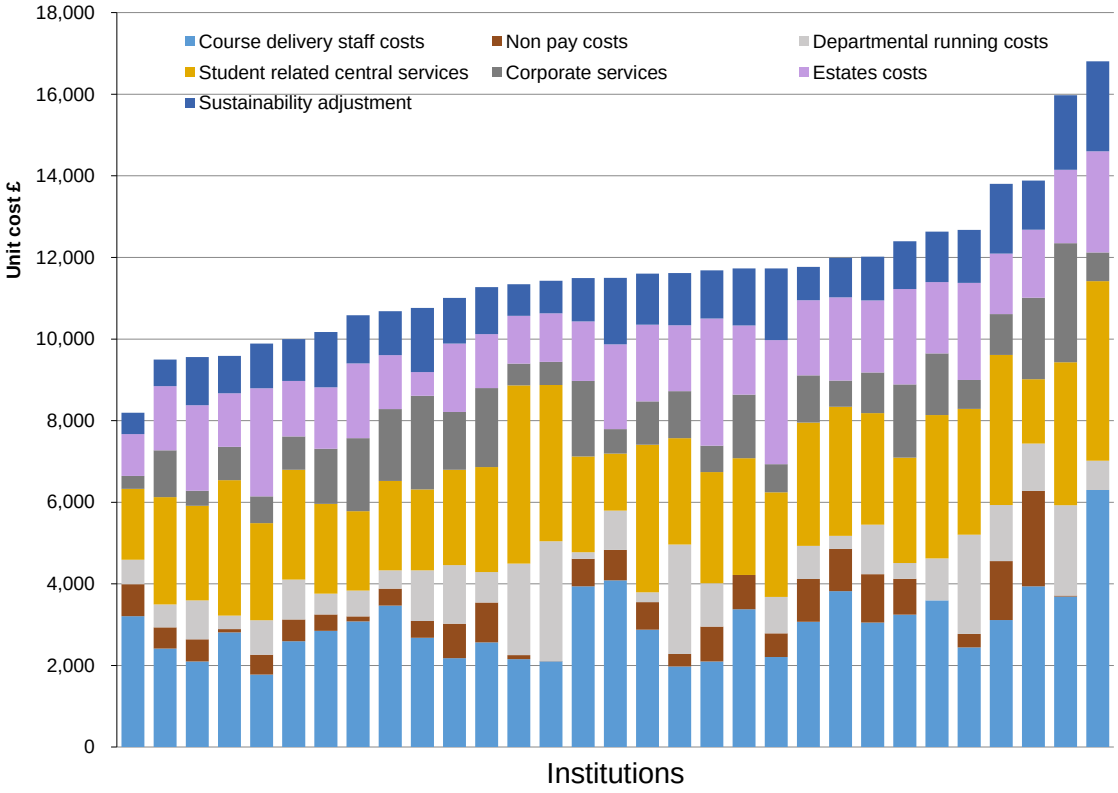


Chart 48 - Full-time Engineering unit cost proportions by cost category

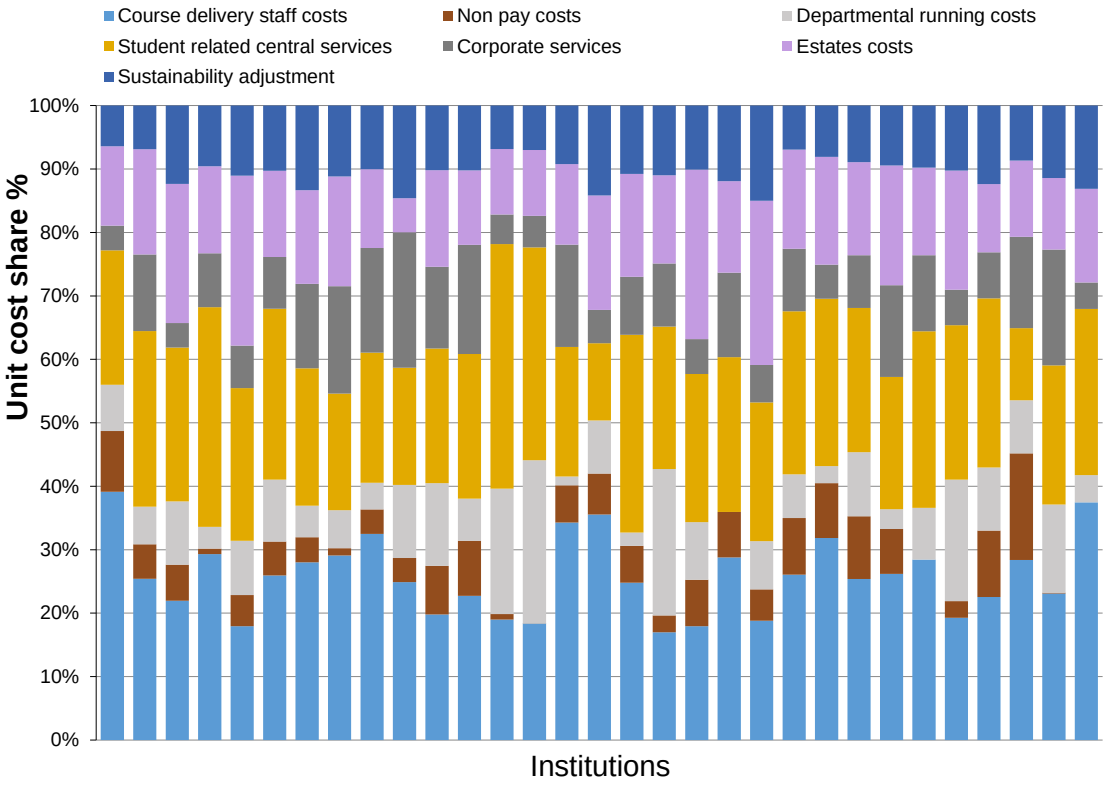


Chart 49 - Full-time English, law and modern languages unit costs by cost category

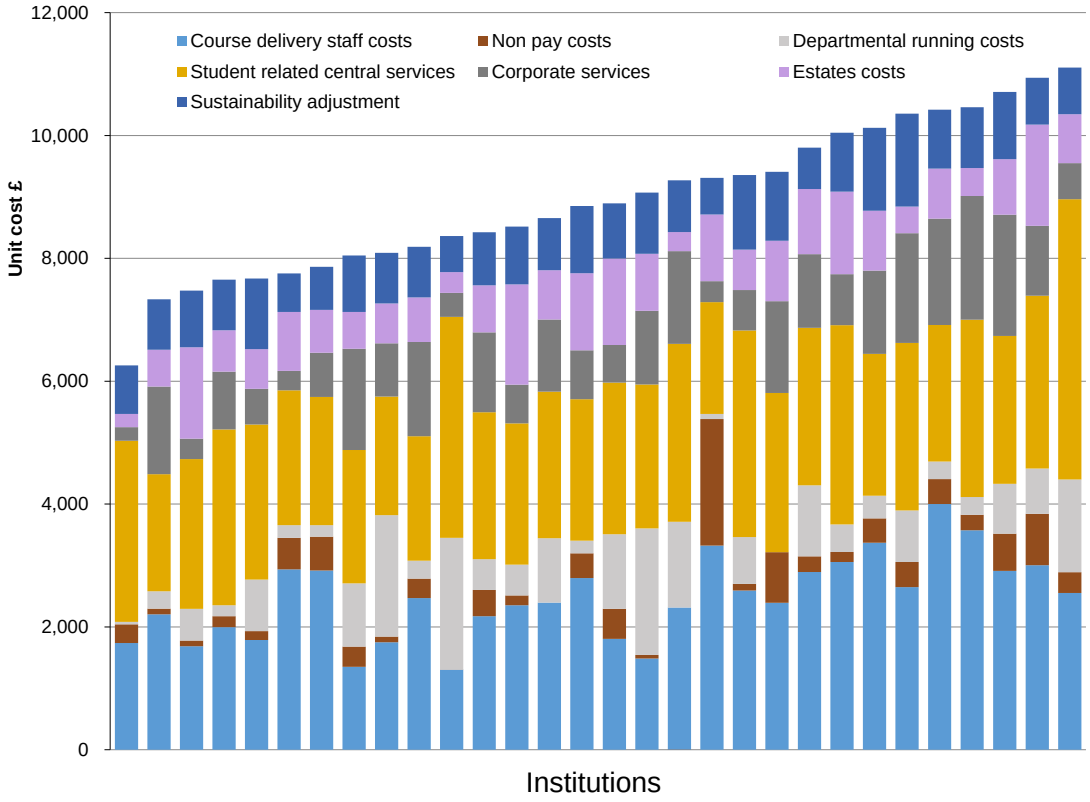


Chart 50 - Full-time English, law and modern languages unit cost proportions by cost category

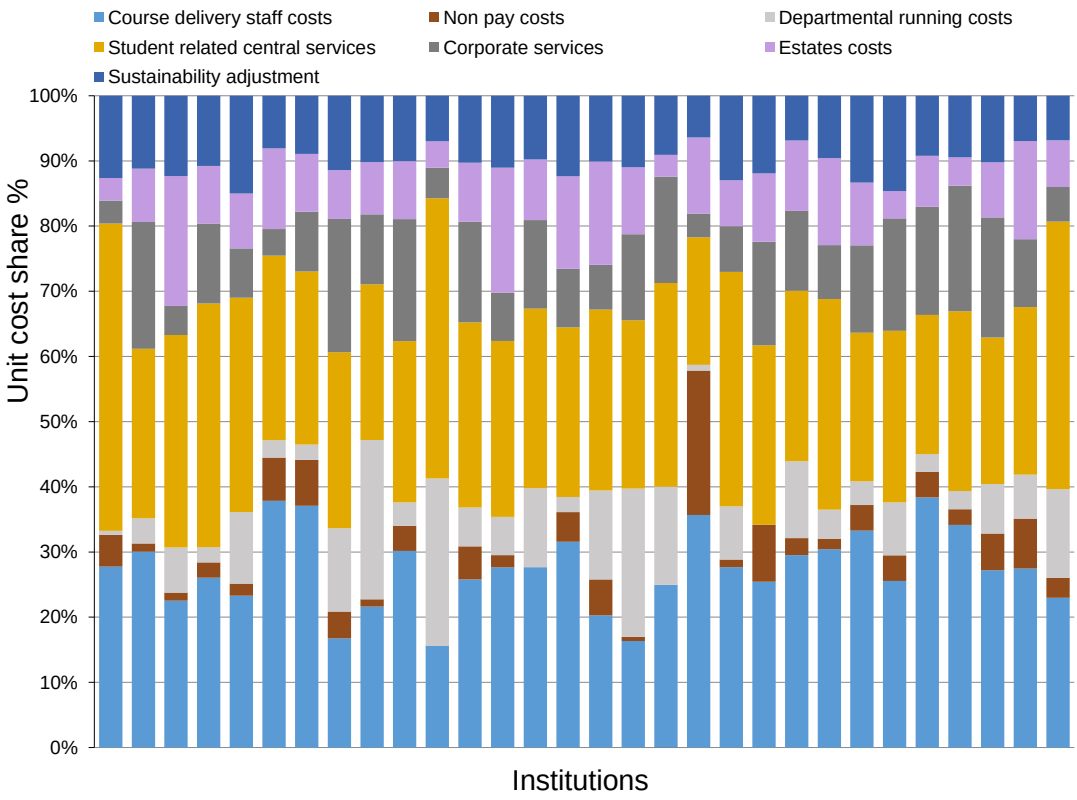


Chart 51 - Full-time Geology, environmental sciences, archaeology and ancient history unit costs by cost category

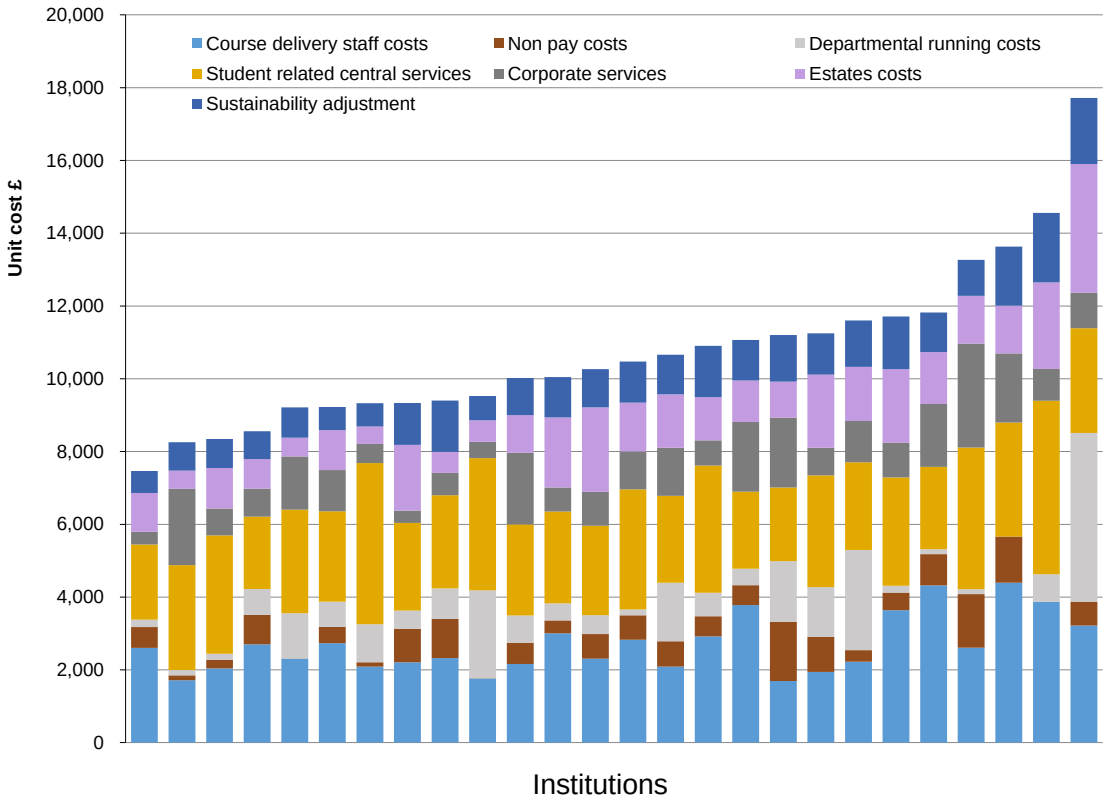


Chart 52 - Full-time Geology, environmental sciences, archaeology and ancient history unit cost proportions by cost category

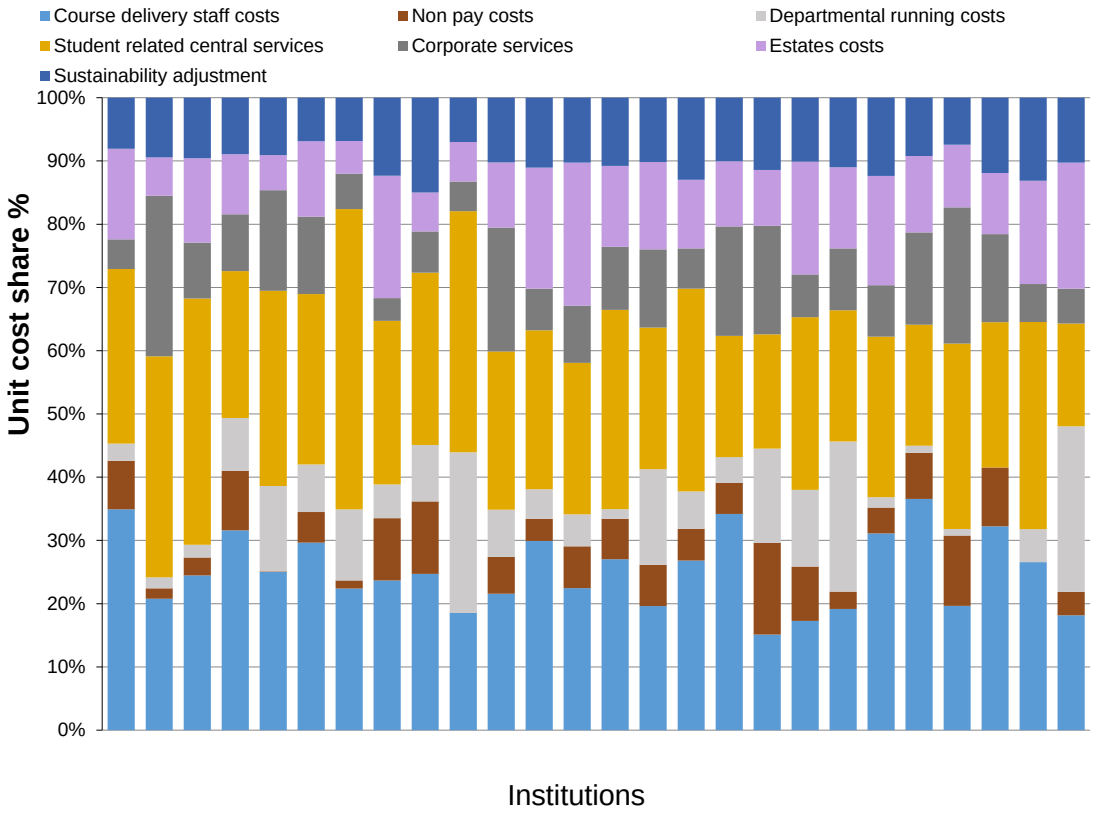


Chart 53 - Full-time Maths, physics, chemistry, informatics and computing unit costs by cost category

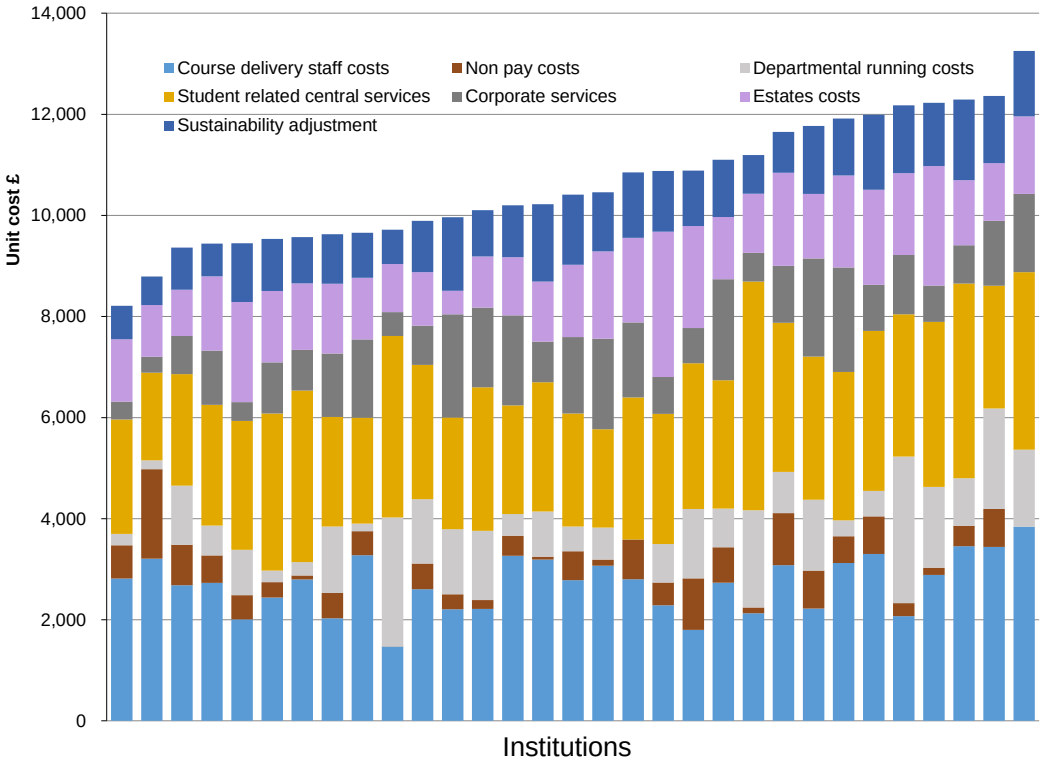


Chart 54 - Full-time Maths, physics, chemistry, informatics and computing unit cost proportions by cost category

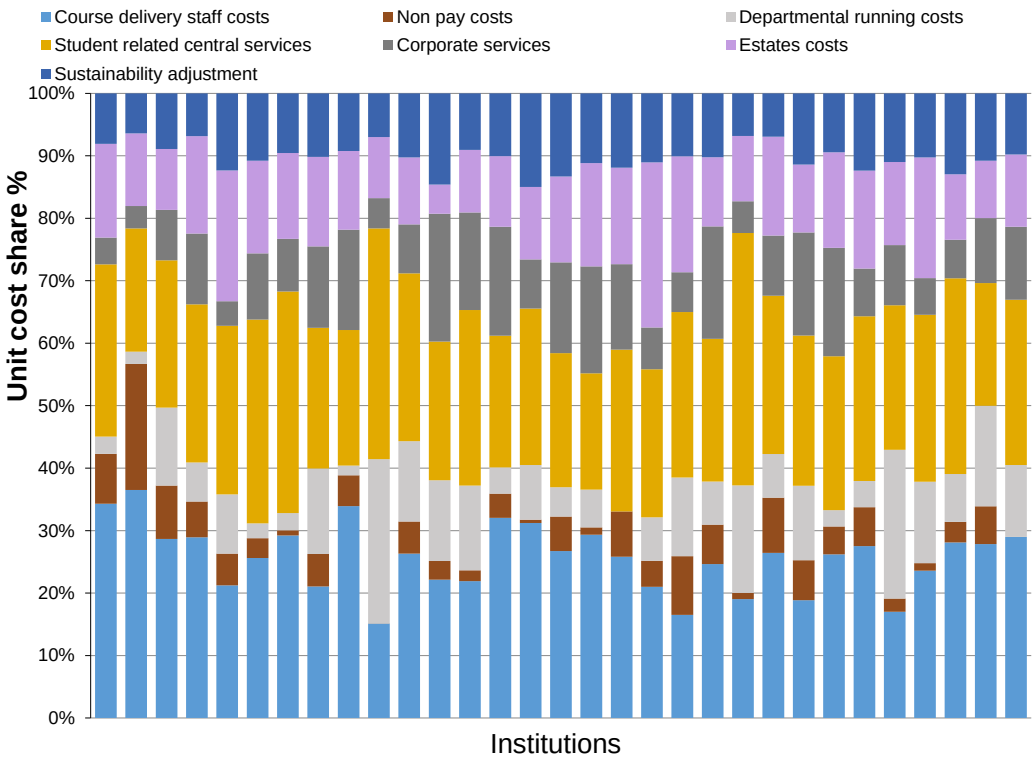


Chart 55 - Full-time Medical, dental and veterinary science unit costs by cost category

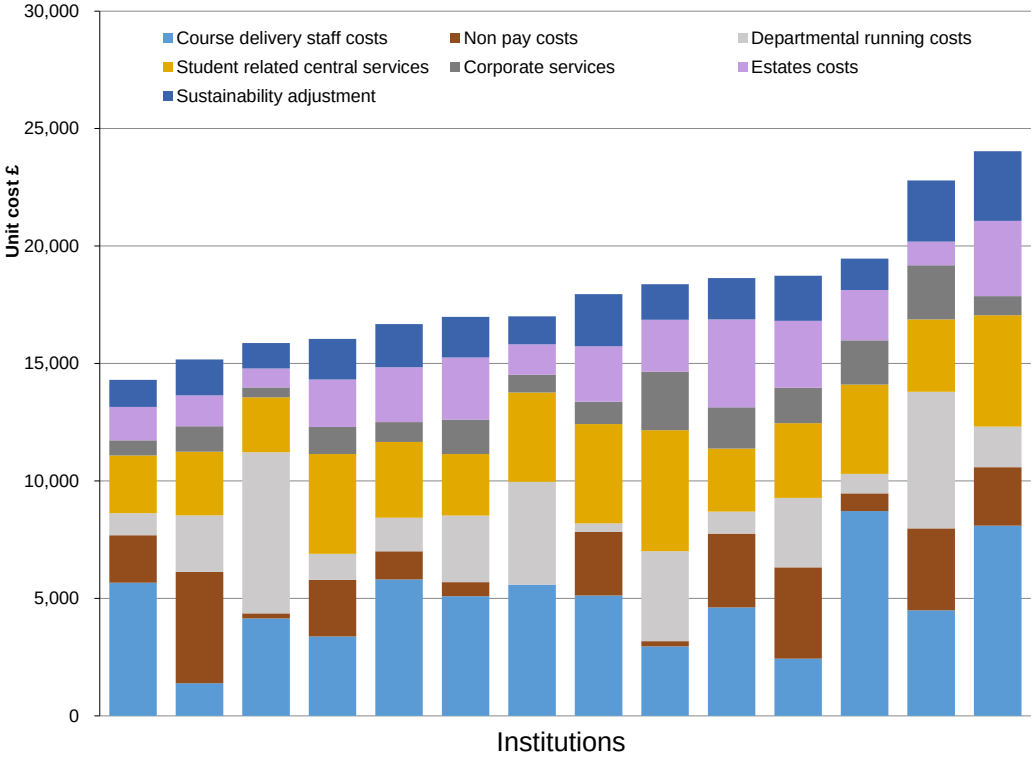
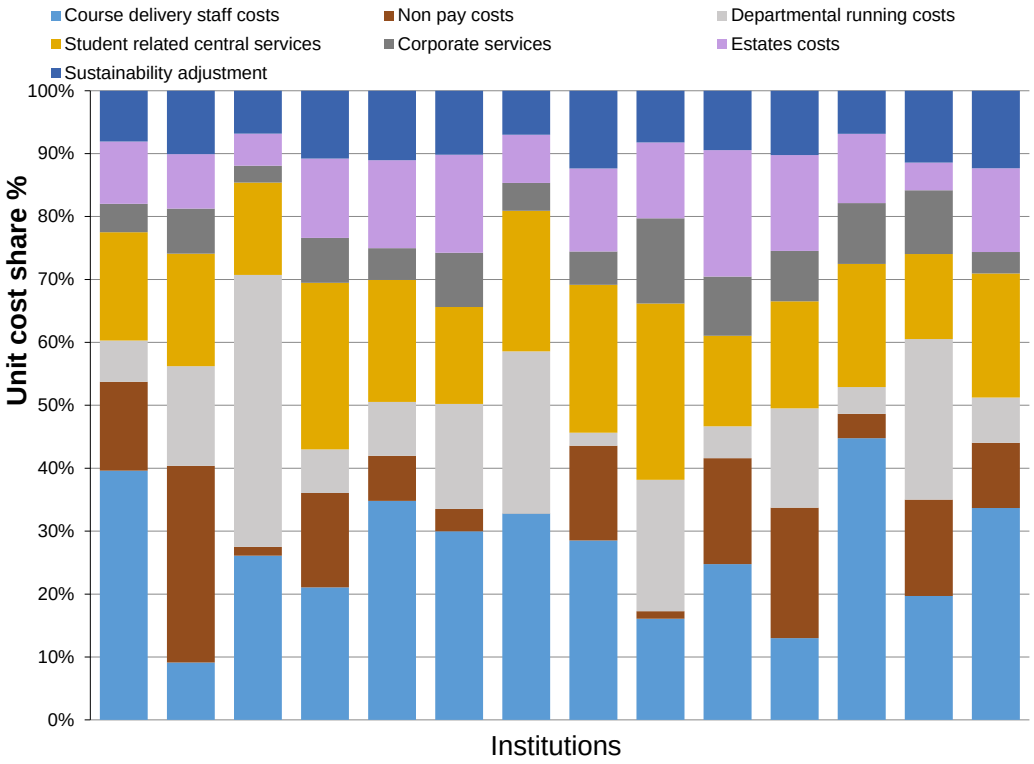


Chart 56 - Full-time Medical, dental and veterinary science unit cost proportions by cost category



The institution with a high non-pay unit cost (second bar from the left) had a contract with another provider which it treated in the general ledger as non-pay.

Chart 57 - Full-time Social sciences, history, economics unit costs by cost category

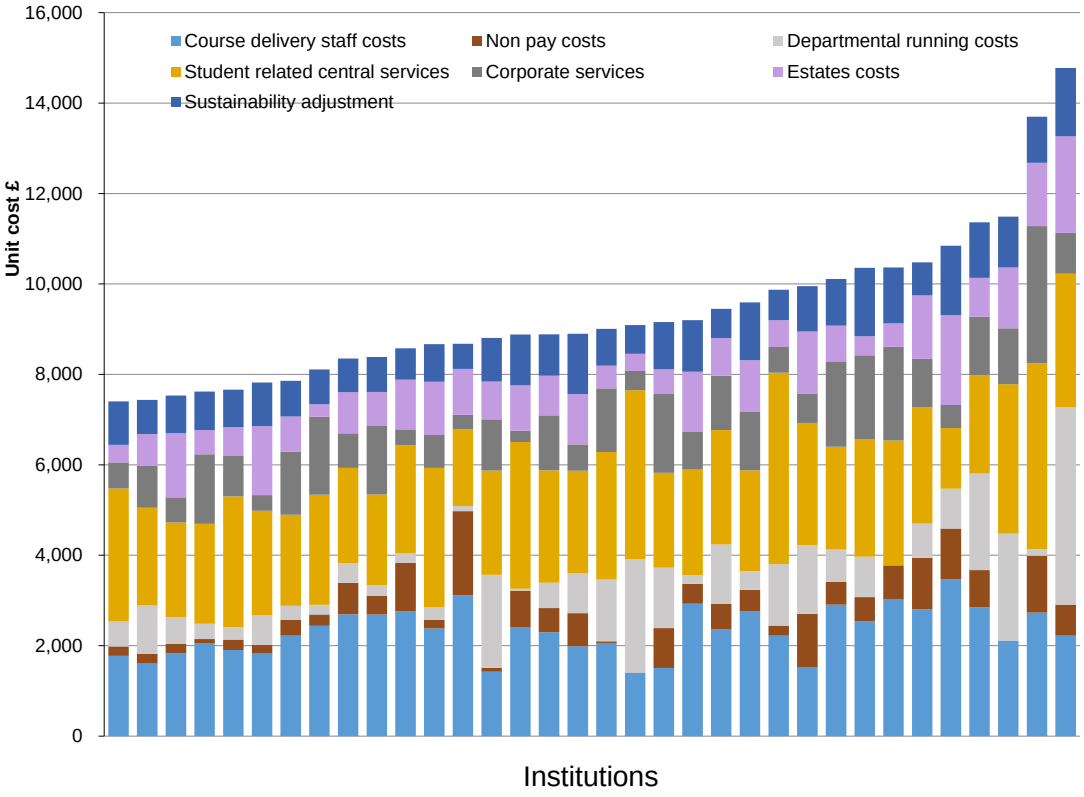
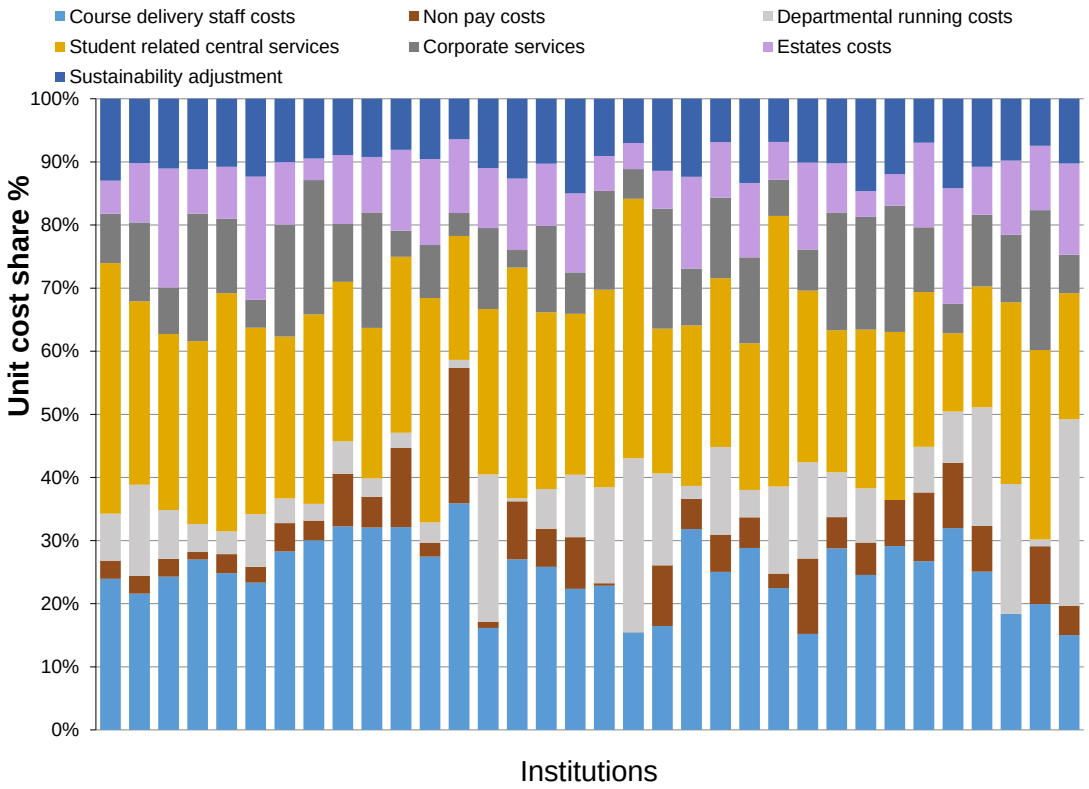


Chart 58 - Full-time Social sciences, history, economics unit cost proportions by cost category



Annex Q: Part-time subject group unit costs by cost category and institution

For the part-time provision, this Annex details by each subject group and institution (where more than four submissions were received):

- A chart showing the unit costs for each cost category; and
- A chart showing the relative proportions of each cost category.

The low institution submissions and student FTE numbers for this provision mean that interpretation requires added caution.

Both charts should be interpreted together for any one subject group. Institutions on each chart are shown left to right in order of increasing unit cost. The colours in each chart are consistent and given here for ease of access.

Cost category	Colour key
A – Course delivery staff costs	
B – Non-pay costs	
C - Departmental running costs	
D - Student related central services	
E - Corporate services	
F - Estates costs	
G - Sustainability adjustment	

Among the differences across institutions, it should also be noted that:

- The way in which institutions completed the data return for this study appears to be influenced by their organisational and financial structure, see 7.7.2. As a result of our work, there may be instances in the charts where:
  - Direct non-pay was treated as a departmental running cost;
  - Departmental running costs were treated as central costs, and vice-versa; and
  - Direct other staff costs were classified as a departmental running cost.
- Some cost categories were omitted by institutions, either entirely or in the detail within a cost category. One institution explained that it could not meaningfully allocate non-pay costs to its courses and therefore it included all of these costs into departmental running costs. Institutions reported that in the main these omissions were due to time pressures in completing the data return and not from an unwillingness to participate as fully as possible in the study.
- Each institution has a given sustainability adjustment, the Margin for Sustainability and Investment (MSI). Further details on this is provided in Annex H.
- Both the relative and absolute unit cost charts should be interpreted together for any one subject group.

Overall we ensured that the total costs submitted were complete and in line with our agreed upon validation procedures.

Chart 59 - Part-time Art and design and architecture unit costs by cost category

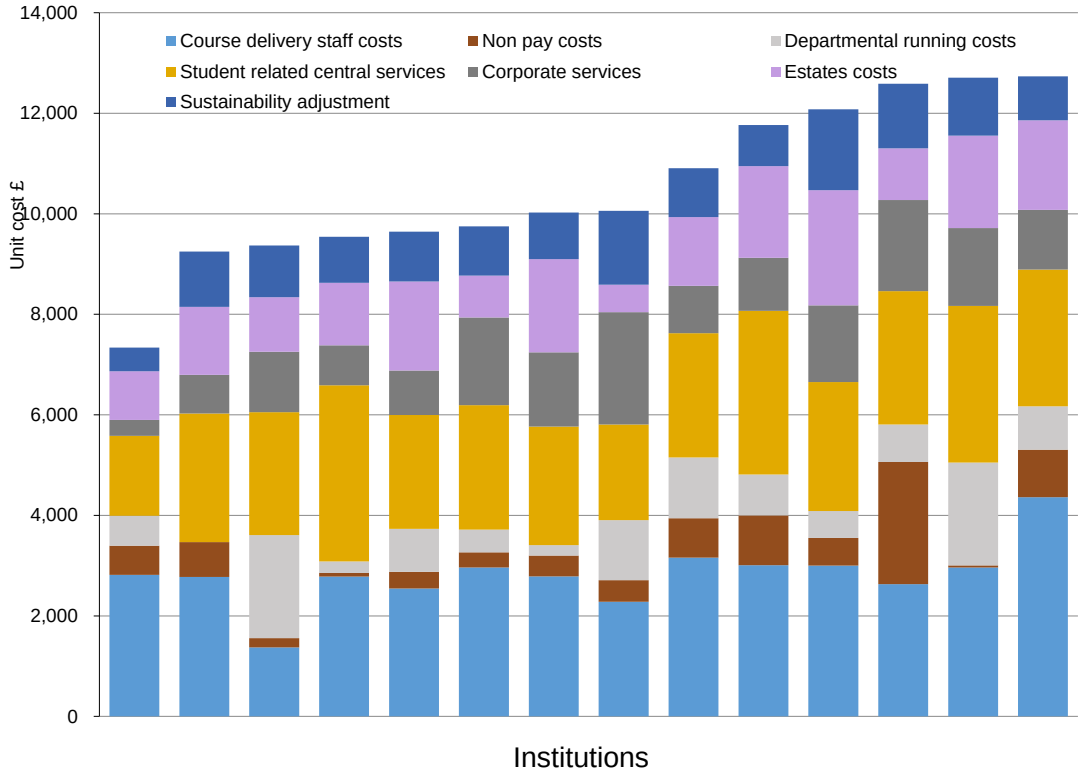


Chart 60 - Part-time Art and design and architecture unit cost proportions by cost category

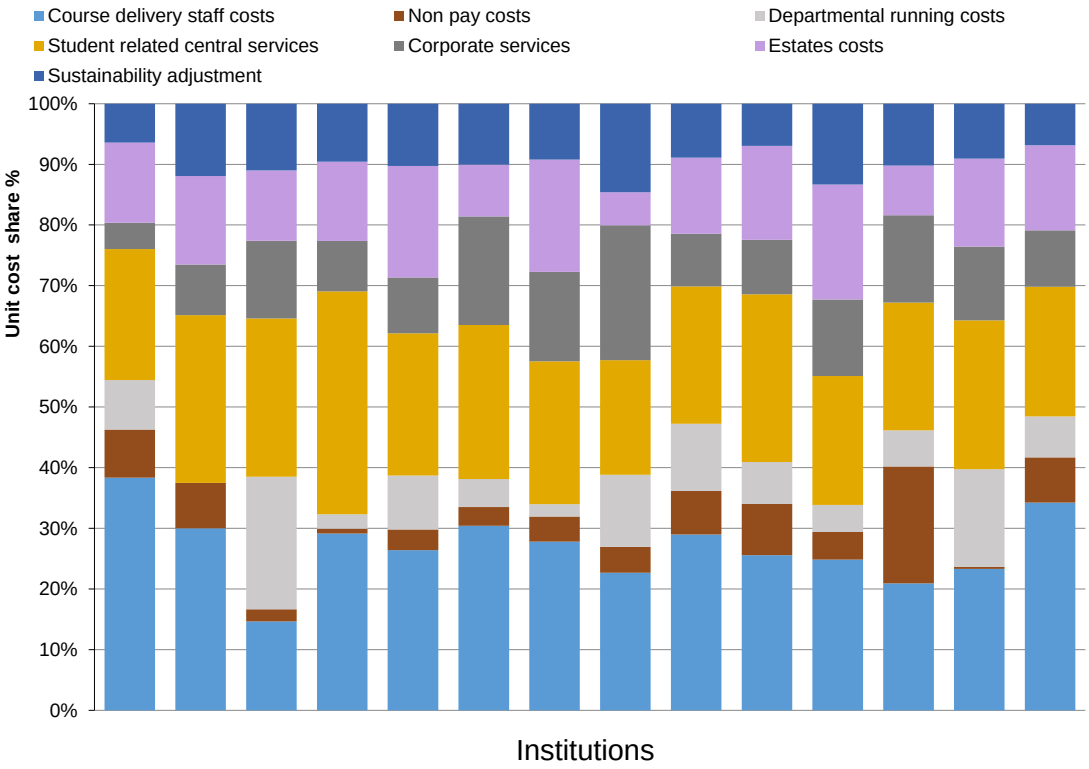


Chart 61 - Part-time Biological sciences and other subjects allied to health unit costs by cost category

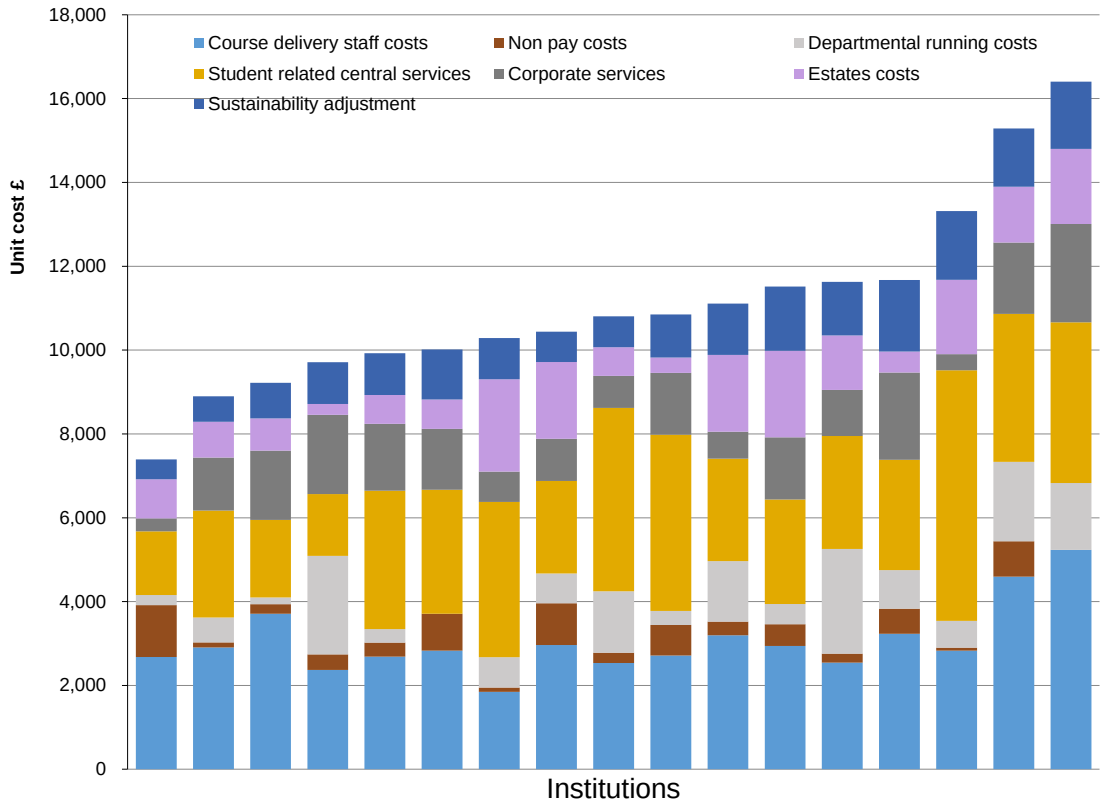


Chart 62 - Part-time Biological sciences and other subjects allied to health unit cost proportions by cost category

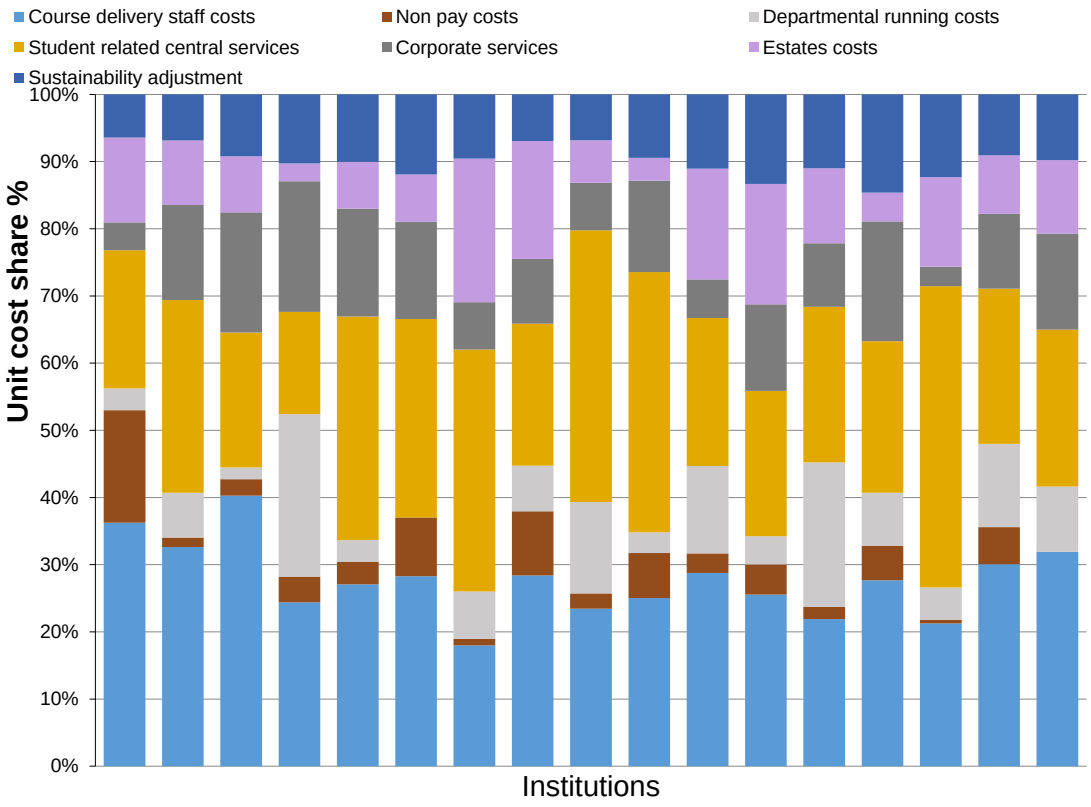


Chart 63 - Part-time Engineering unit costs by cost category

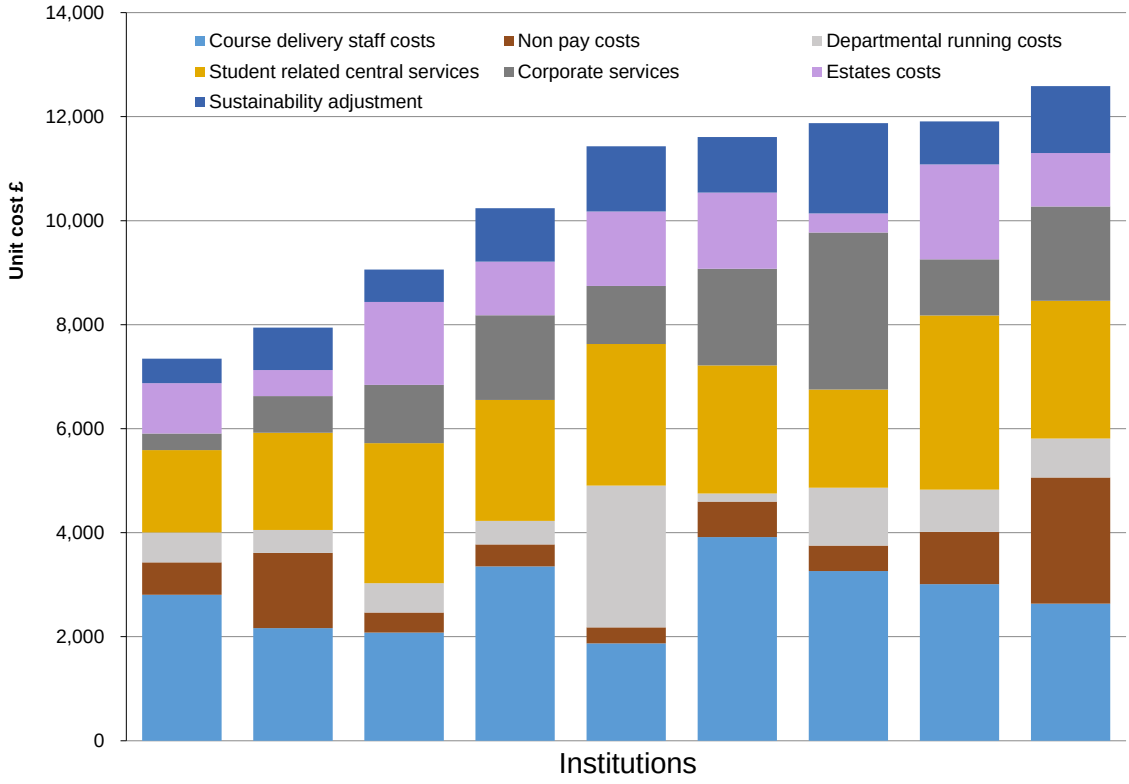


Chart 64 - Part-time Engineering unit cost proportions by cost category

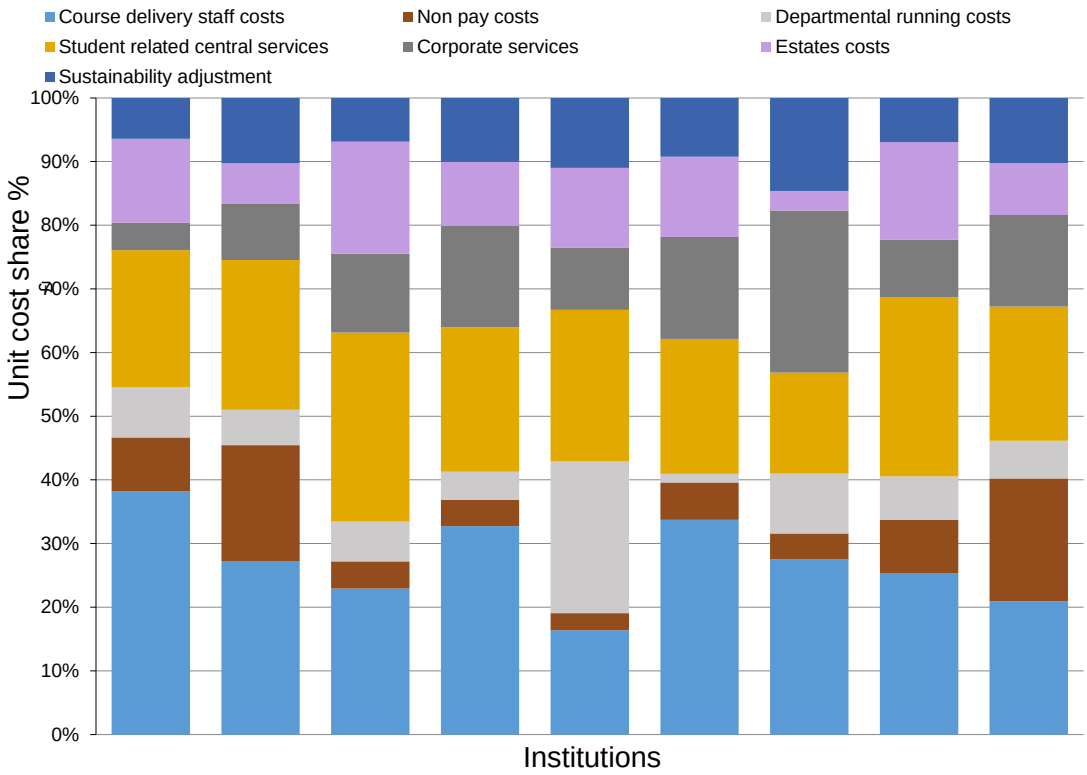


Chart 65 - Part-time English, law and modern languages unit costs by cost category

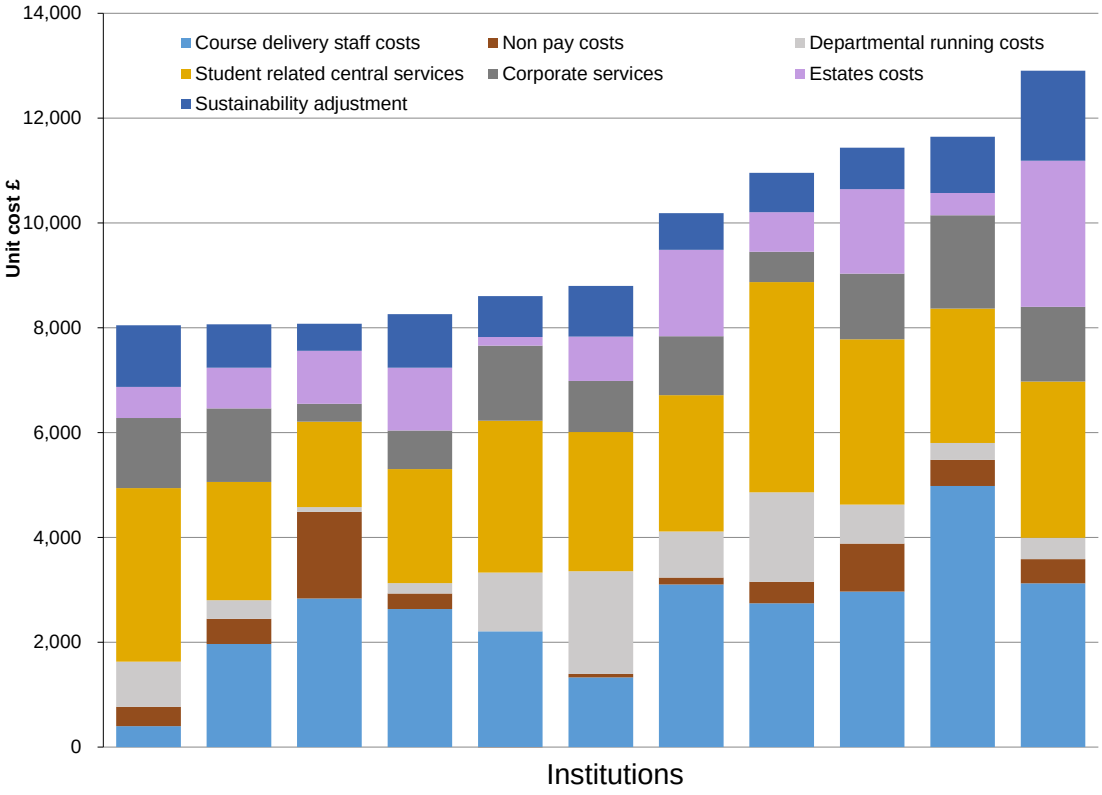


Chart 66 - Part-time English, law and modern languages unit cost proportions by cost category

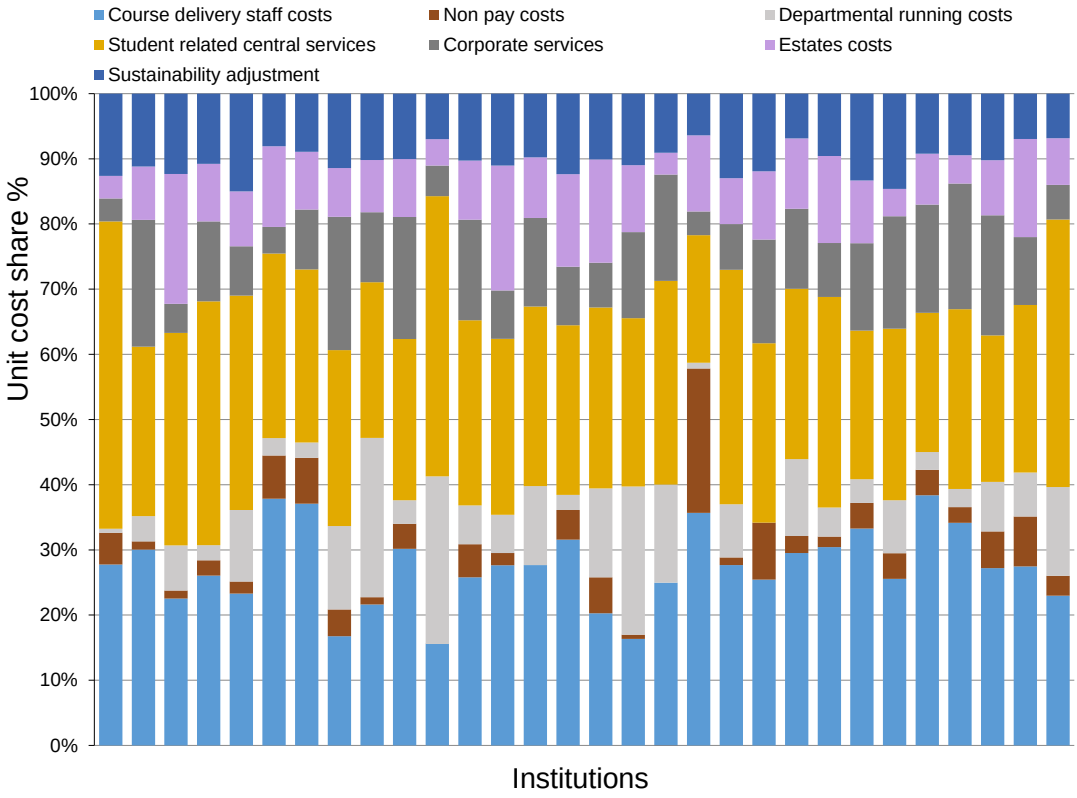


Chart 67 - Part-time Maths, physics, chemistry, informatics and computing unit costs by cost category

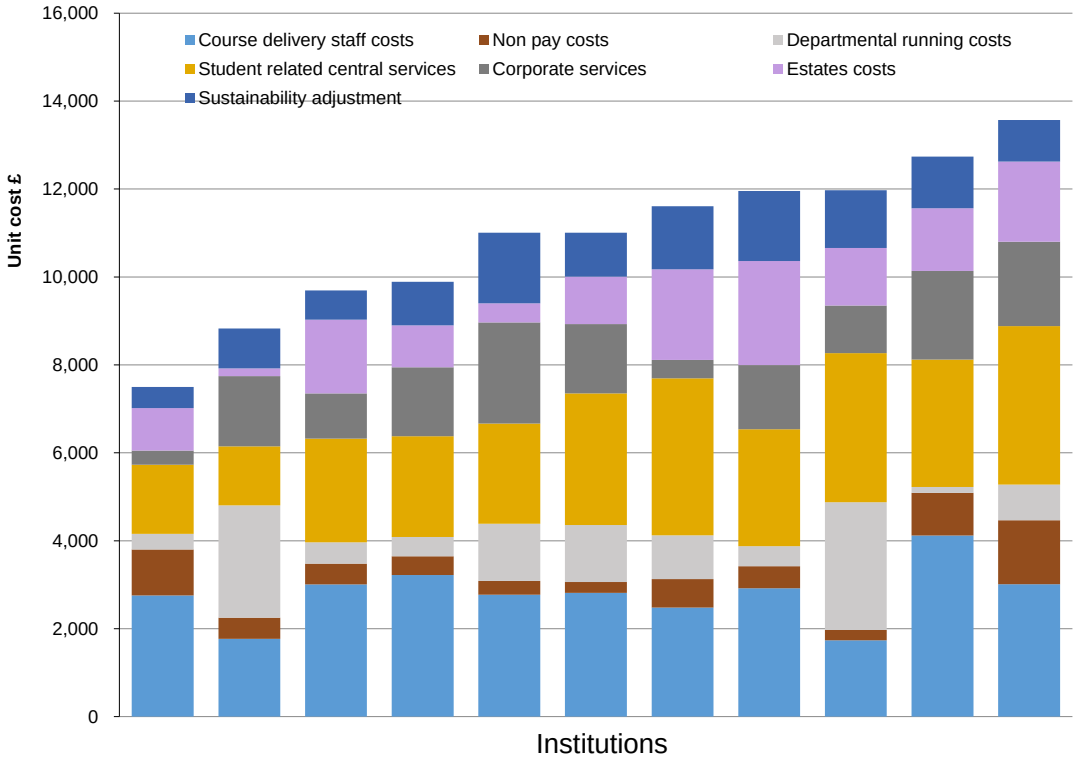


Chart 68 - Part-time Maths, physics, chemistry, informatics and computing unit cost proportions by cost category

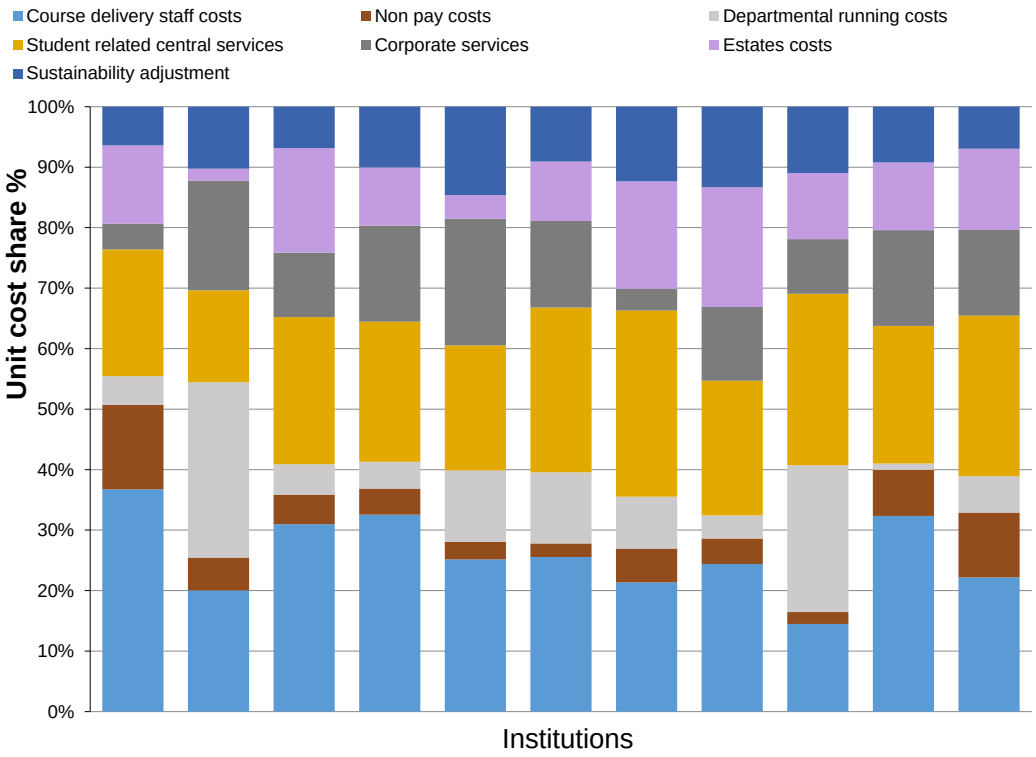


Chart 69 - Part-time Social sciences, history, economics unit costs by cost category

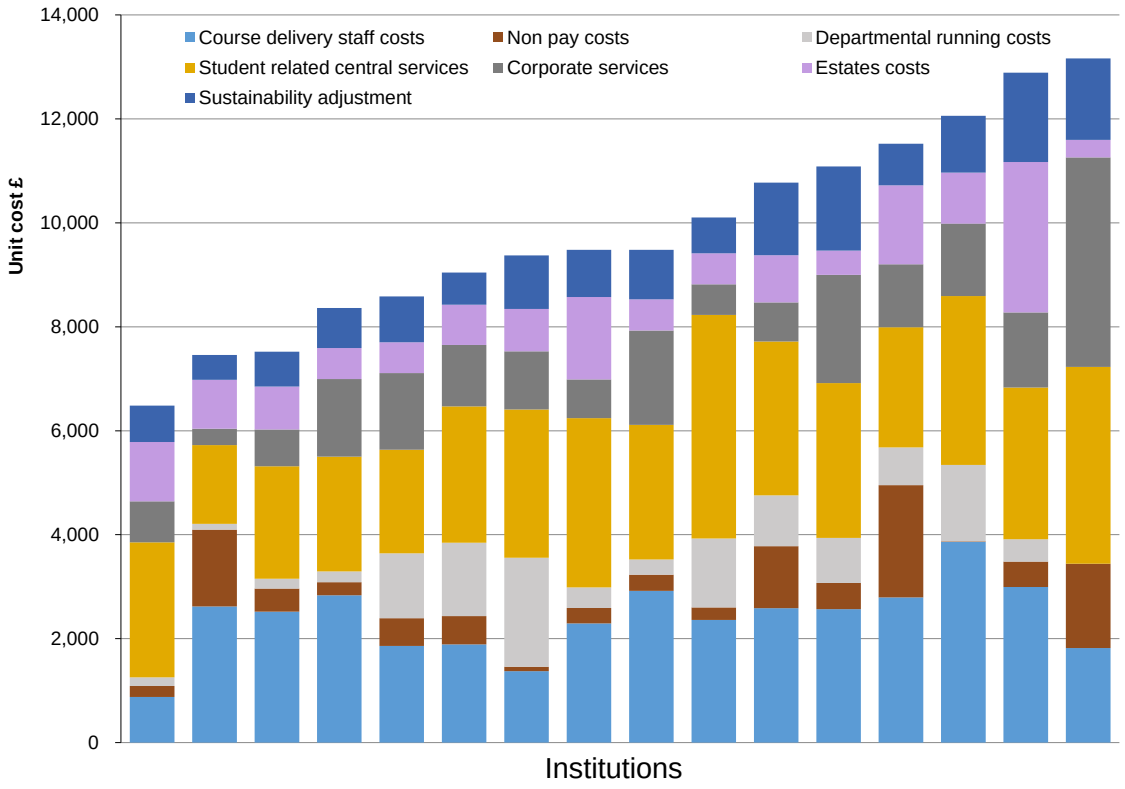
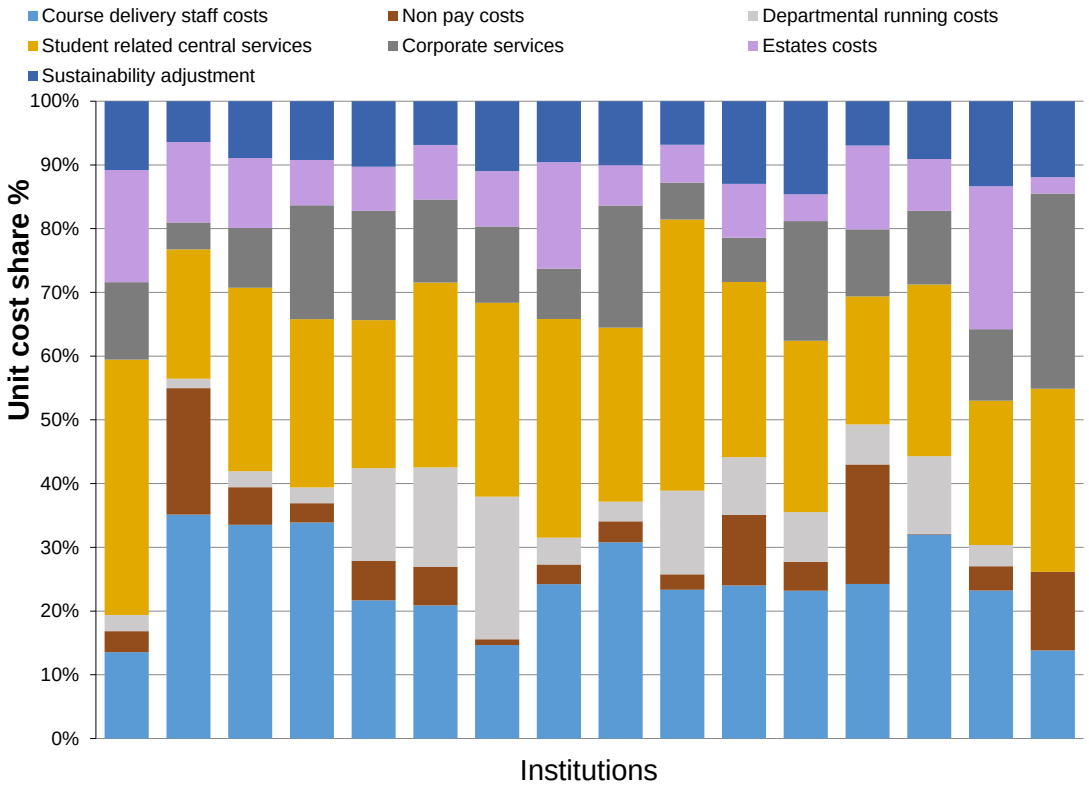


Chart 70 - Part-time Social sciences, history, economics unit cost proportions by cost category



Annex R: Foundation subject group unit costs by cost category and institution

For the foundation provision, this Annex details by each subject group and institution (where more than four submissions were received):

- A chart showing the unit costs for each cost category; and
- A chart showing the relative proportions of each cost category.

The low institution submissions and student FTE numbers for this provision mean that interpretation requires added caution.

Both charts should be interpreted together for any one subject group. Institutions on each chart are shown left to right in order of increasing unit cost. The colours in each chart are consistent and given here for ease of access.

Cost category	Colour key
A – Course delivery staff costs	
B – Non-pay costs	
C - Departmental running costs	
D - Student related central services	
E - Corporate services	
F - Estates costs	
G - Sustainability adjustment	

Among the differences across institutions, it should also be noted that:

- The way in which institutions completed the data return for this study appears to be influenced by their organisational and financial structure, see 7.7.2. As a result of our work, there may be instances in the charts where:
  - Direct non-pay was treated as a departmental running cost;
  - Departmental running costs were treated as central costs, and vice-versa; and
  - Direct other staff costs were classified as a departmental running cost.
- Some cost categories were omitted by institutions, either entirely or in the detail within a cost category. One institution explained that it could not meaningfully allocate non-pay costs to its courses and therefore it included all of these costs into departmental running costs. Institutions reported that in the main these omissions were due to time pressures in completing the data return and not from an unwillingness to participate as fully as possible in the study.
- Each institution has a given sustainability adjustment, the Margin for Sustainability and Investment (MSI). Further details on this is provided in Annex H.
- Both the relative and absolute unit cost charts should be interpreted together for any one subject group.

Overall we ensured that the total costs submitted were complete and in line with our agreed upon validation procedures.

Chart 71 - Foundation Biological sciences and other subjects allied to health that are not in other categories unit costs by cost category

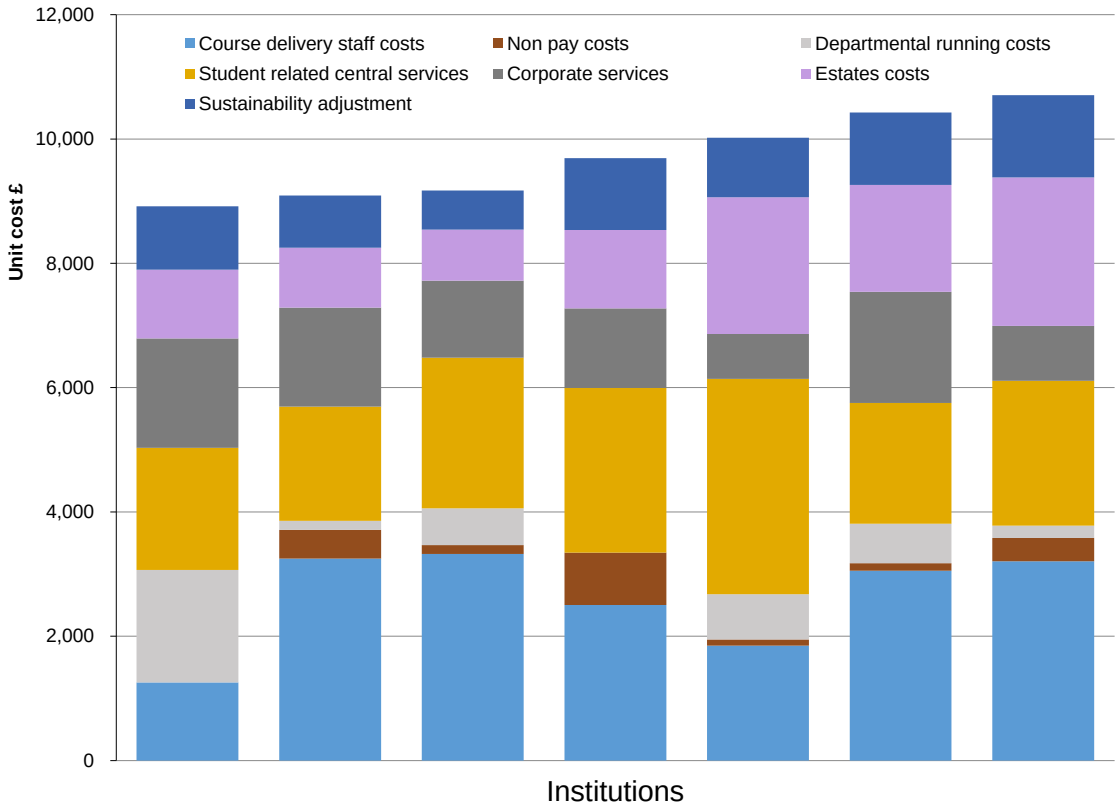


Chart 72 - Foundation Biological sciences and other subjects allied to health unit cost proportions by cost category

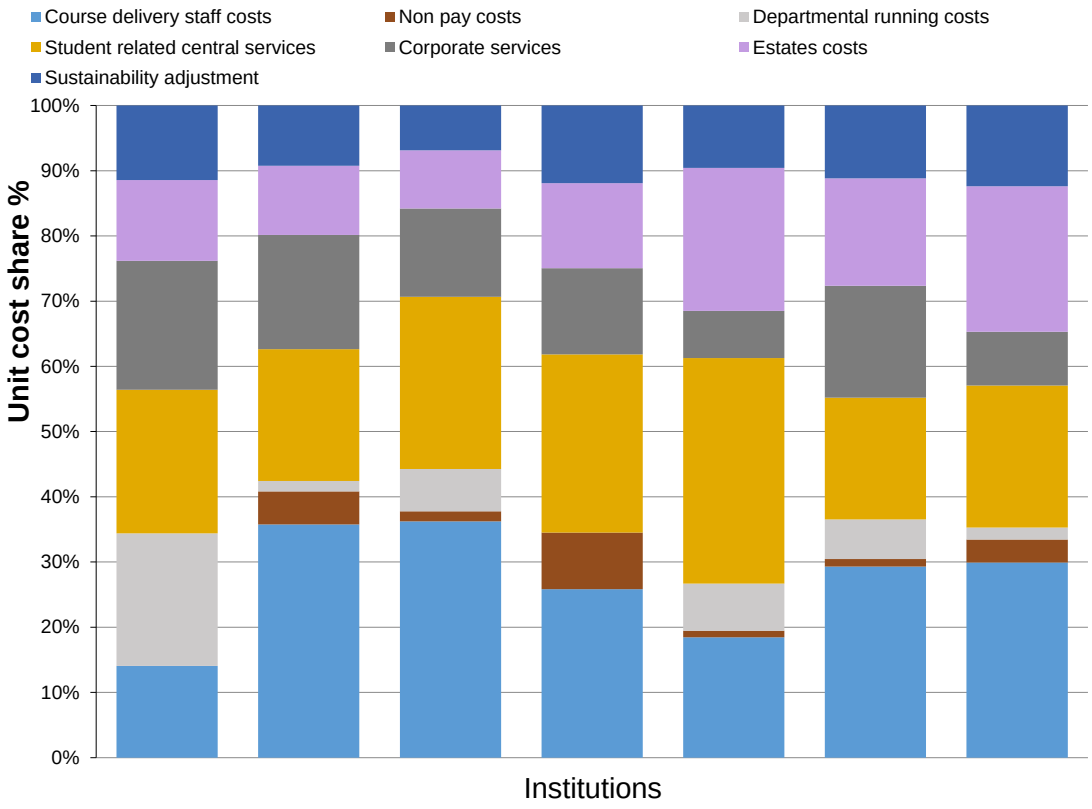


Chart 73 - Foundation Engineering unit costs by cost category

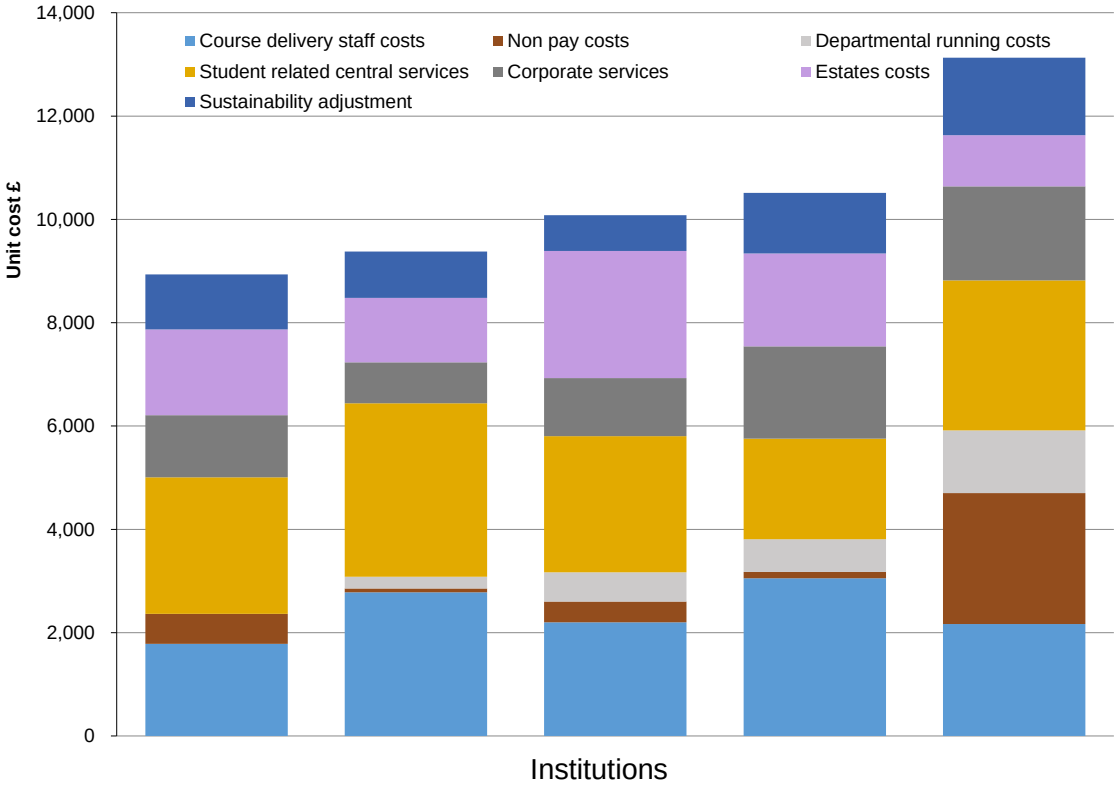


Chart 74 - Foundation Engineering unit cost proportions by cost category

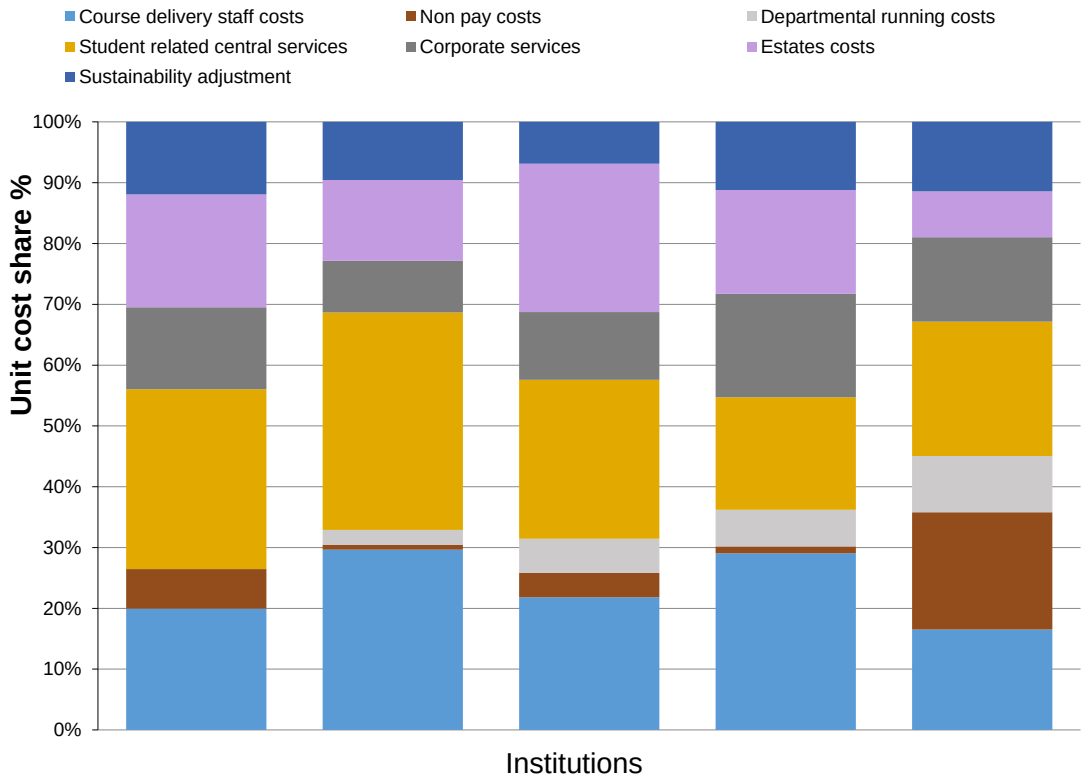


Chart 75 - Foundation Maths, physics, chemistry, informatics and computing unit costs by cost category

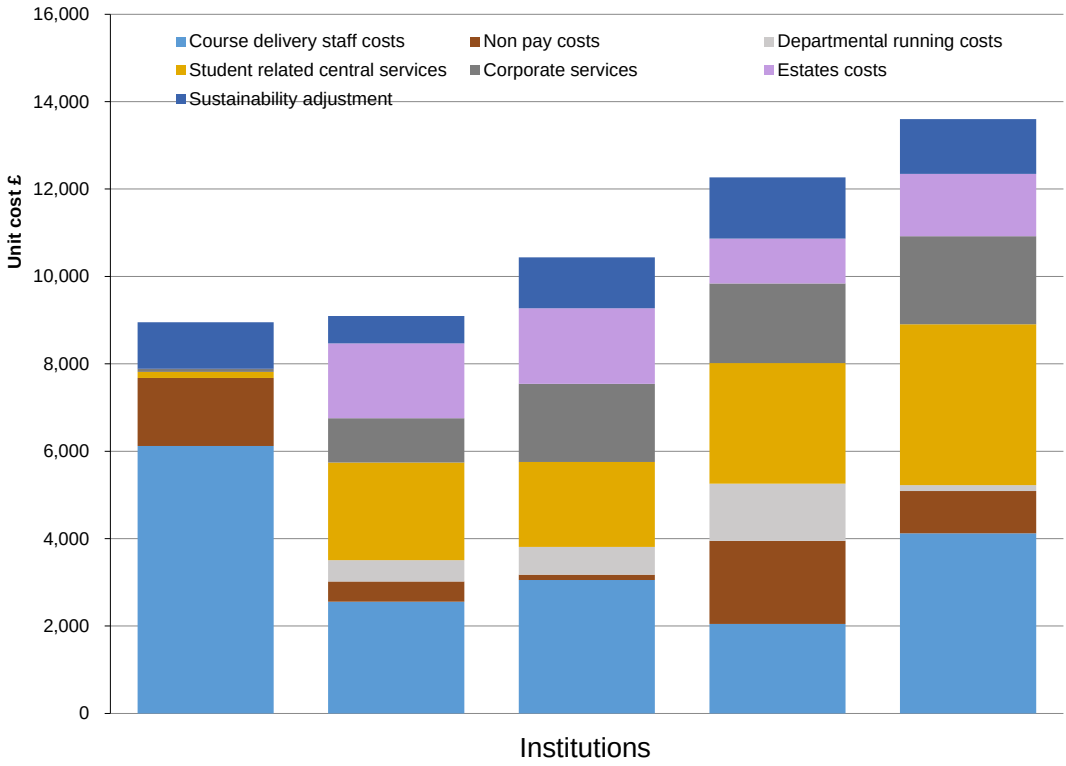


Chart 76 - Foundation Maths, physics, chemistry, informatics and computing unit cost proportions by cost category

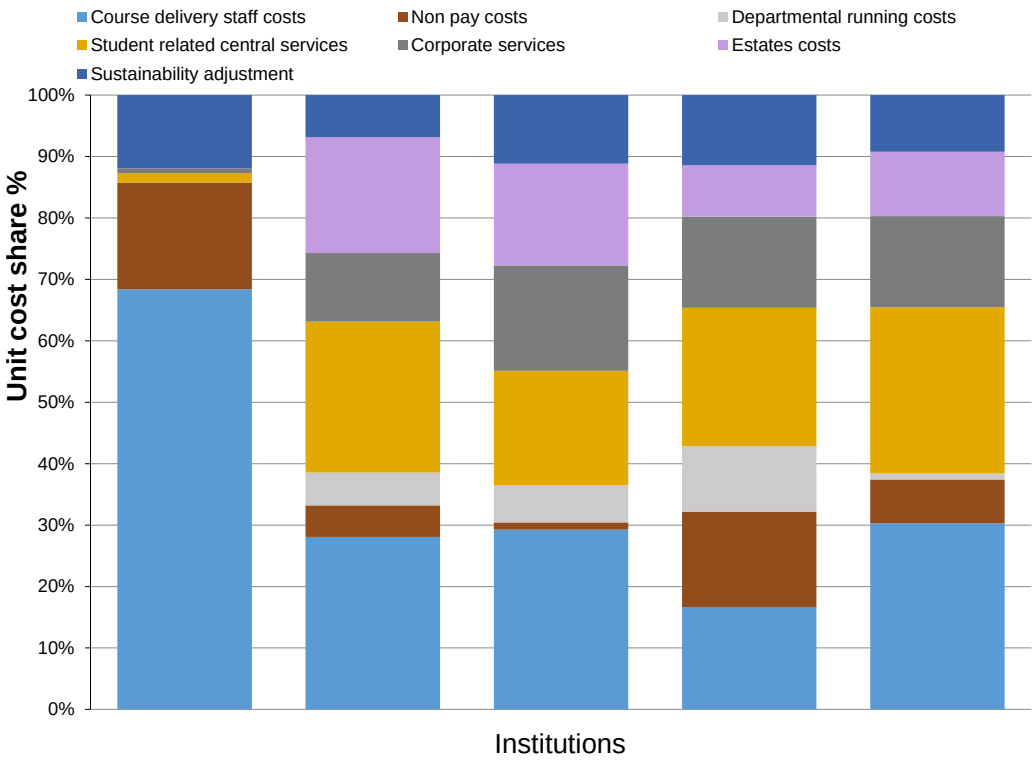


Chart 77 - Foundation Social sciences, history, economics unit costs by cost category

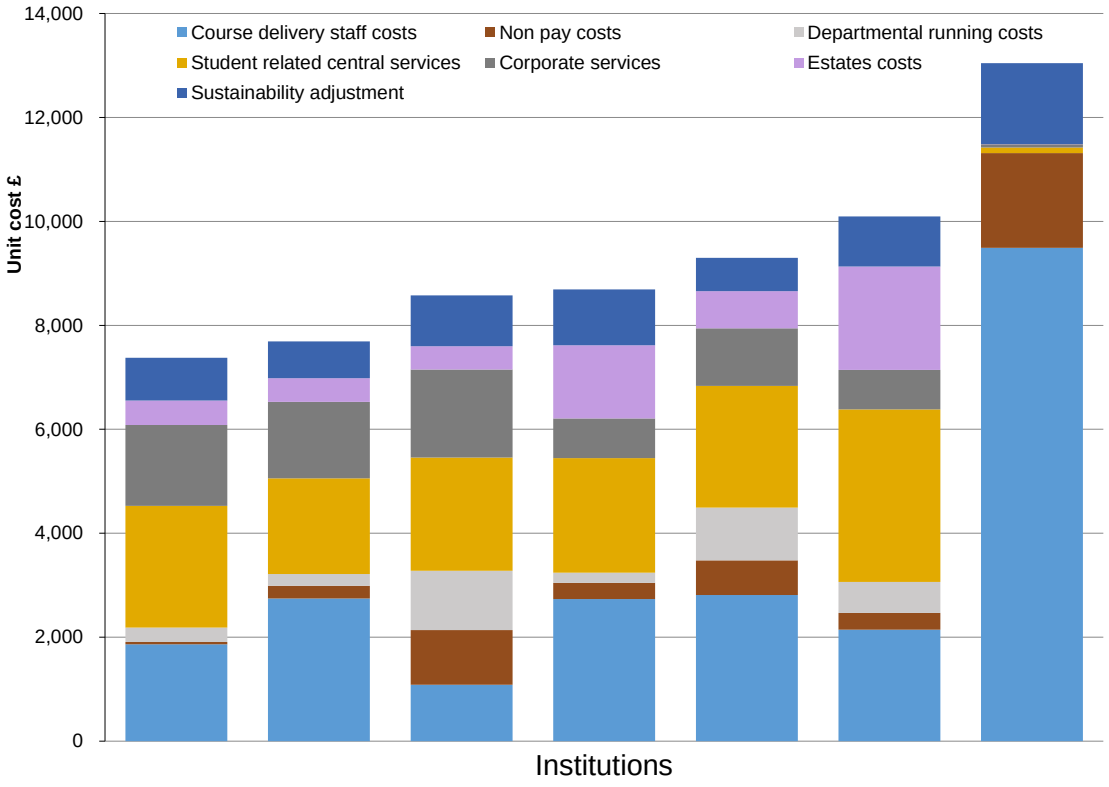
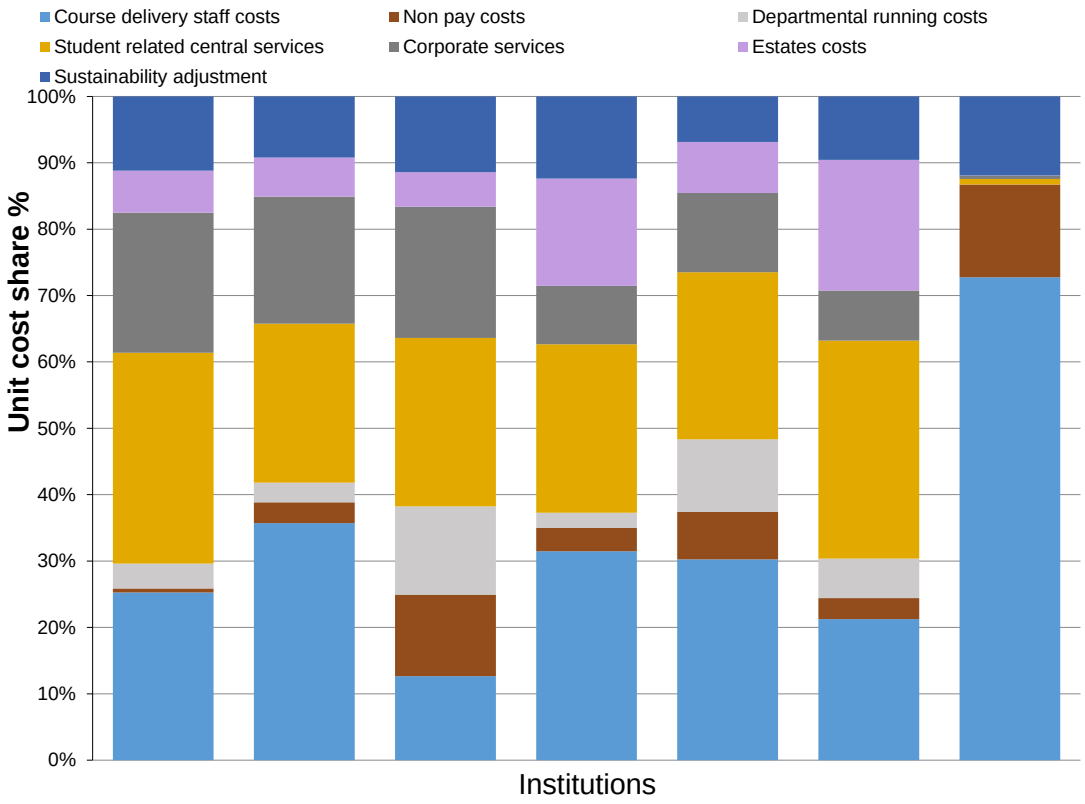


Chart 78 - Foundation Social sciences, history, economics unit cost proportions by cost category



Annex S: Aggregated Peer Group unit costs of provision by cost category and institution

We summarise here the institution unit costs (for all their subject group costs) within their TRAC Peer Group. We provide both the absolute unit cost by cost category component and the relative share these have.

This Annex highlights the variation that exists among TRAC Peer Groups, particularly group A and B.

Chart 79 – Full-time Peer Group A and B unit costs (1) and proportions (2) by cost category

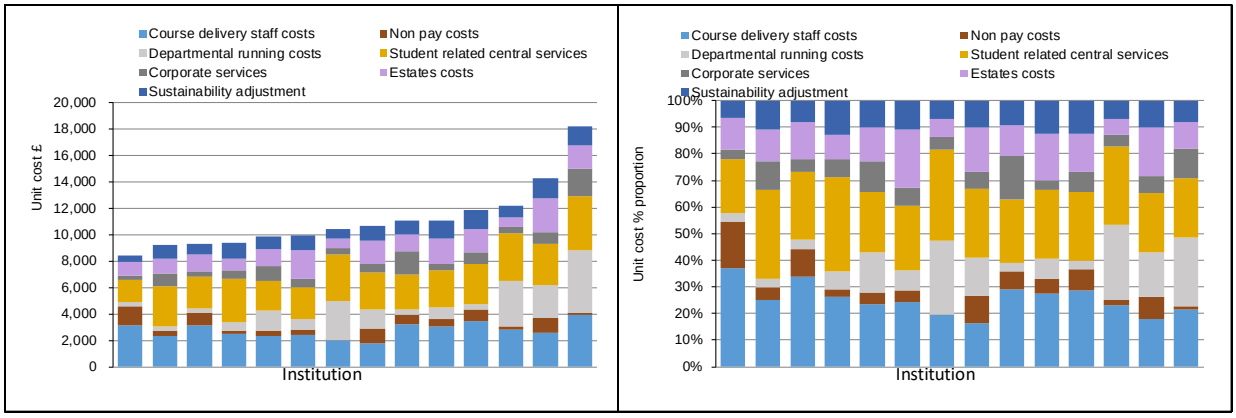


Chart 80 – Full-time Peer Group C unit costs (1) and proportions (2) by cost category

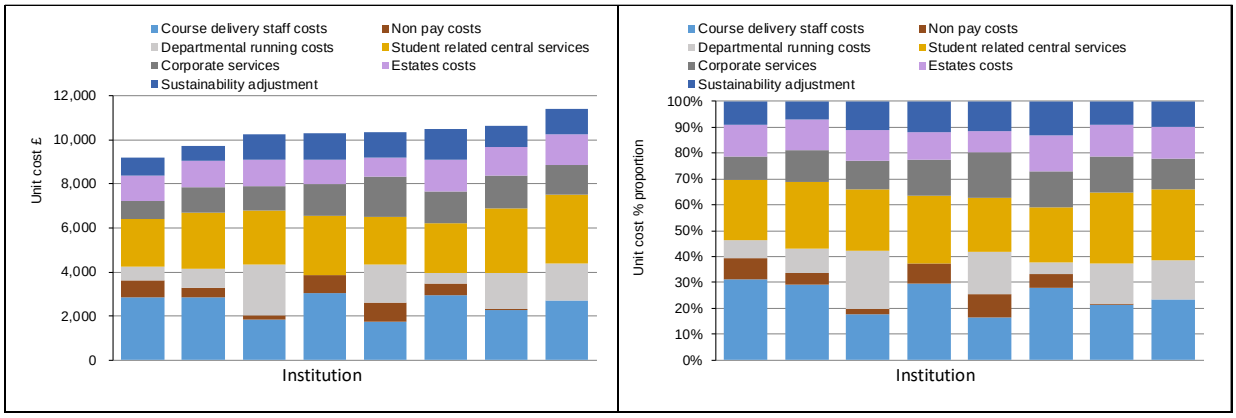


Chart 81 – Full-time Peer Group D and E unit costs (1) and proportions (2) by cost category

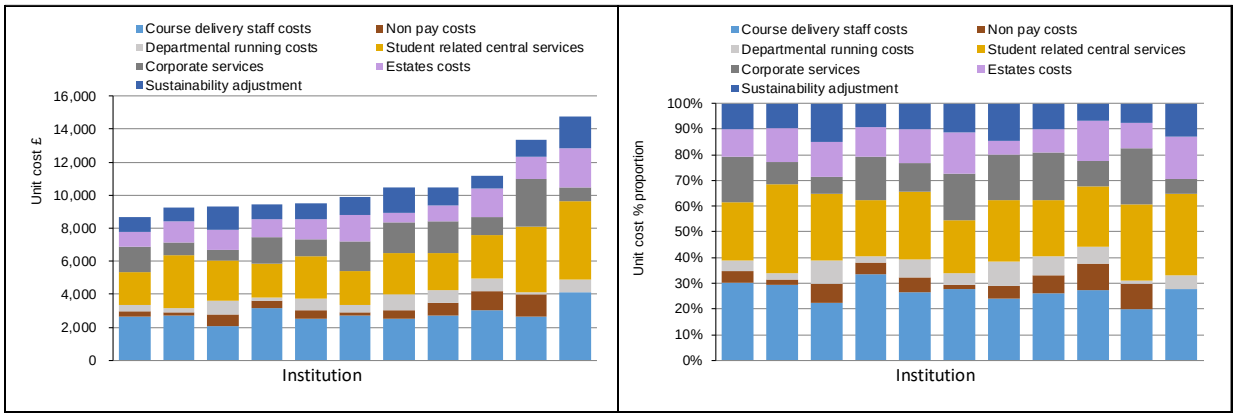
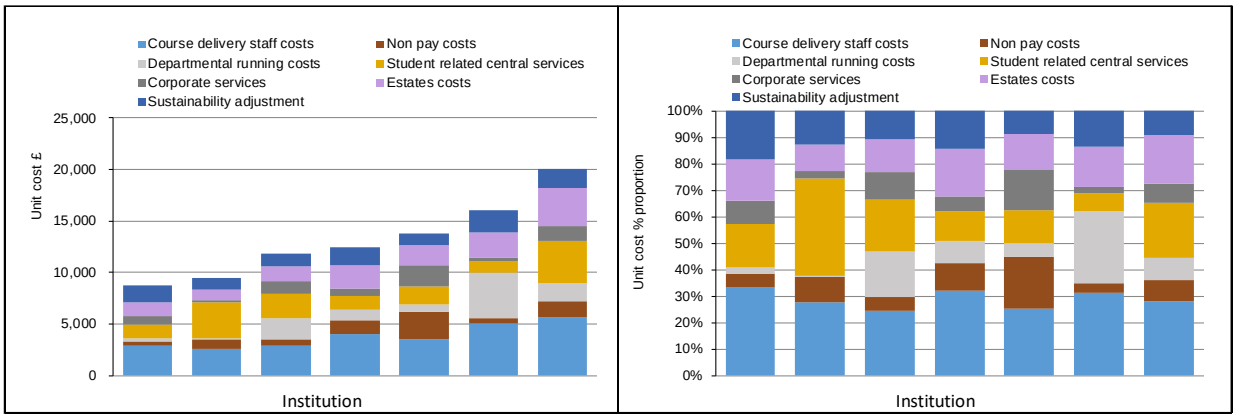


Chart 82 – Full-time Peer Group F unit costs (1) and proportions (2) by cost category



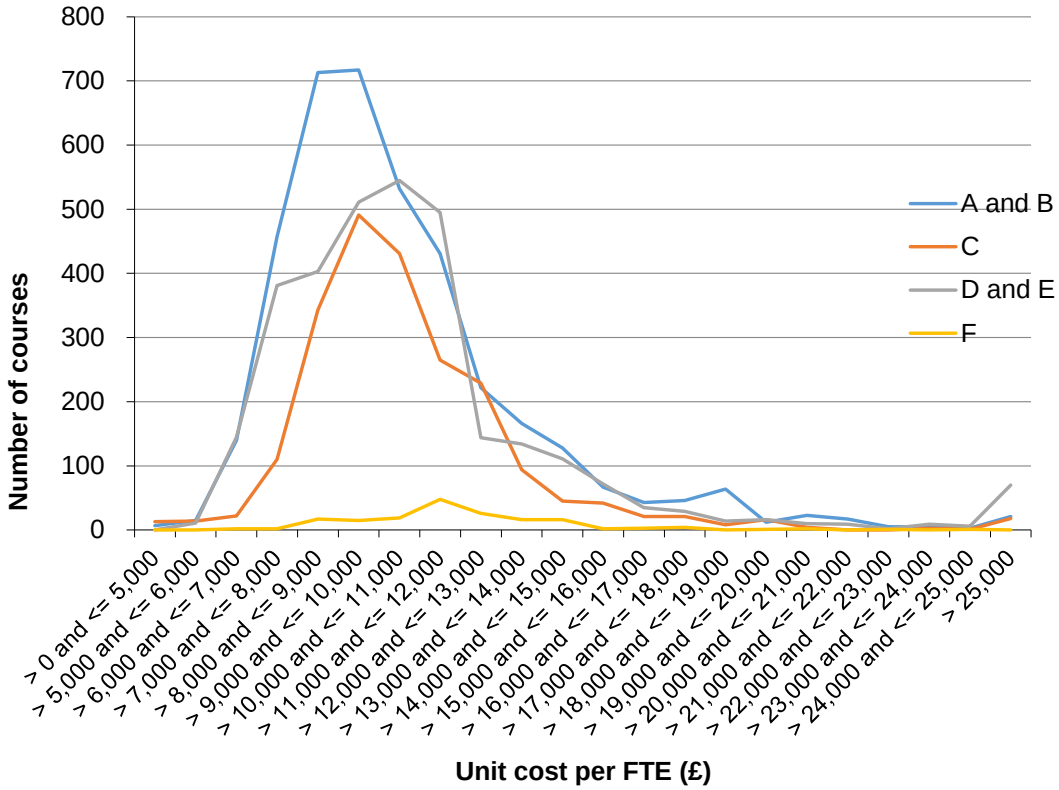
Annex T: Course costs, student FTE profile and validation

To assess the reasonableness of the course cost information provided we undertook a number of procedures to understand the variation and the reasons for any outliers. We first explored the variation across courses and institutions.

We collected costs and student FTEs from over 9,000 courses or programmes of study (full-time, part-time and foundation). This Annex details the analysis of course level costs and student FTEs, which ultimately led to the identification of a small number of courses which did not follow the methodology and ultimately their exclusion from the study.

From the course total costs and FTEs, a unit cost for each course was calculated and a frequency distribution chart produced, see Chart 83.

Chart 83 – Frequency distribution of course unit costs by TRAC Peer Group



All the Peer Group categories showed a normal distribution skewed to the right.

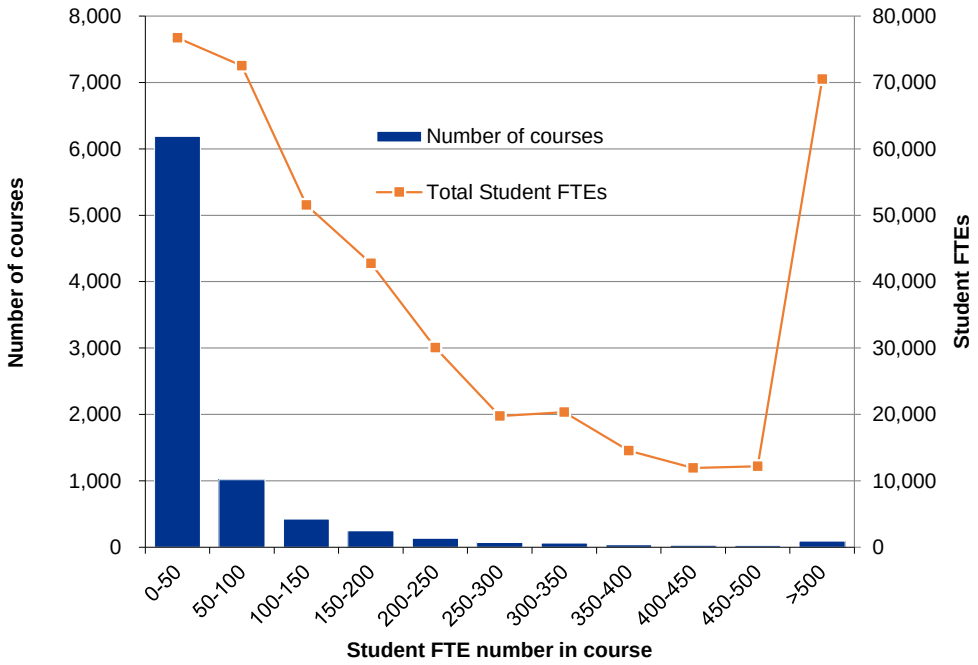
The right hand tail of the distribution tails off after the unit cost exceeds ~£22,000. A total of 109 courses were over the £25,000 threshold, of which 43 courses had a unit cost of more than £40,000. Further scrutiny of these courses did not raise concerns or sufficient reasons to exclude them on the basis that the methodology had not been followed. For example, one institution explained that the course was being wound down, with significantly fewer students but that its teaching input had not diminished by the same proportion, thus driving up unit cost.

The distribution peaks were mostly around the £9,000-£10,000 unit cost interval. For the D and E Peer Group, the distribution peaked around the £10,000-£11,000 unit cost interval,

while for the C Peer Group, it was around £9,000-£10,000. For the A and B Peer Group, the distribution peaked around the wider unit cost interval of £8,000-£10,000.

We further noted that 98% of the data collected on student FTE was for full-time undergraduate provision. This produced the following frequency chart for student FTEs and number of institutions, see Chart 84.

Chart 84 – Frequency distribution of full-time courses and student FTEs



In interpreting this chart it is important to note that in completing the data return, institutions needed to make assumptions when allocating module information to courses.

The distribution of student FTEs per course is positively skewed with a long right-hand tail. Over seven in every ten courses has up to 50 student FTEs. The tail also had 94 courses with over 500 FTE students each. We received confirmations from a number of institutions with high student numbers on courses.

The total number of student FTEs across course group sizes is variable, from a category of 0 to 50 FTEs to courses with over 500 student FTEs.

For all subject groups, we also plotted total cost courses against student FTEs. As expected, there was a high amount of correlation between student FTEs and total cost at 0.93. The mean, maximum and minimum course costs, student FTEs and unit costs were identified and summarised in the table below.

Table 37 – Total course costs and FTEs for full-time provision

	Total cost £	Student FTE
Total	4,463,977,478	430,691
Mean	477,336	46
Median	120,726	12

We sought to understand the student FTE variation across different types of institutions. We aggregated and compared course sizes using student FTEs across the TRAC Peer Groups.

Our analysis showed that TRAC Peer Group A and B institutions had the most student FTEs in the study and that they had a broader variation of course sizes than the other Peer Groups. As expected, Peer Group F contributed the fewest FTEs, and it also appeared to have the most uniform and lower course sizes.

Course validation procedures

To minimise the impact of significant cost outliers on the unit cost calculation at a higher aggregation, i.e. subject group, HESA cost centre and institution level, a set of criteria was developed. Whilst seeking to maximise the number of courses in the study, the criteria was developed on:

- Courses with a low student FTE; and
- Courses with a high total cost.

The parameters for each of the criteria were determined using a range of judgements informed by discussions with institutions on the reasons for their high and low course costs and the analysis of results undertaken above, including a review of the standard deviation and variances at the course level plus a more detailed student FTE frequency distribution review for courses with less than 10 student FTEs and their total costs.

The application of this criteria identified 21 courses with a total course cost of more than £4.5 million. All the courses came from one institution and represented 3.0% of their total cost submission, and 0.10% of the total cost of all submissions. From discussions with the institution, it was clear that whilst they had followed the methodology, they had deviated in many areas, for example in their treatment to deduct out-of-scope costs. This institution was reviewed in further detail and ultimately excluded.

We also reviewed courses for instances of low total cost and high student FTEs producing very low unit costs. Whilst we found a total of 178 courses with FTEs greater than 360 FTEs, only three unit costs were less than £6,000 and none were less than £4,300 per 1.00 student FTE. In total, they costed over £1.1 billion and represented 106,000 student FTEs. As a result we did not identify any material errors and it was not deemed appropriate to exclude any of these courses.

Conclusions

In reviewing the detailed course costs and FTEs we identified one institution with a number of courses with a low student FTE and high cost. As these could potentially distort subsequent unit cost calculations and there were further deviations to the methodology from this one institution, its submission was not included in the study.

In reviewing course sizes, we also identified a broader range of student FTEs within TRAC Peer Group A and B and a more uniform, smaller class size for Group F. We also found that lower course sizes seemed more prevalent across all TRAC Peer Groups.

Annex U: Discrete costs of teaching overseas domiciled students

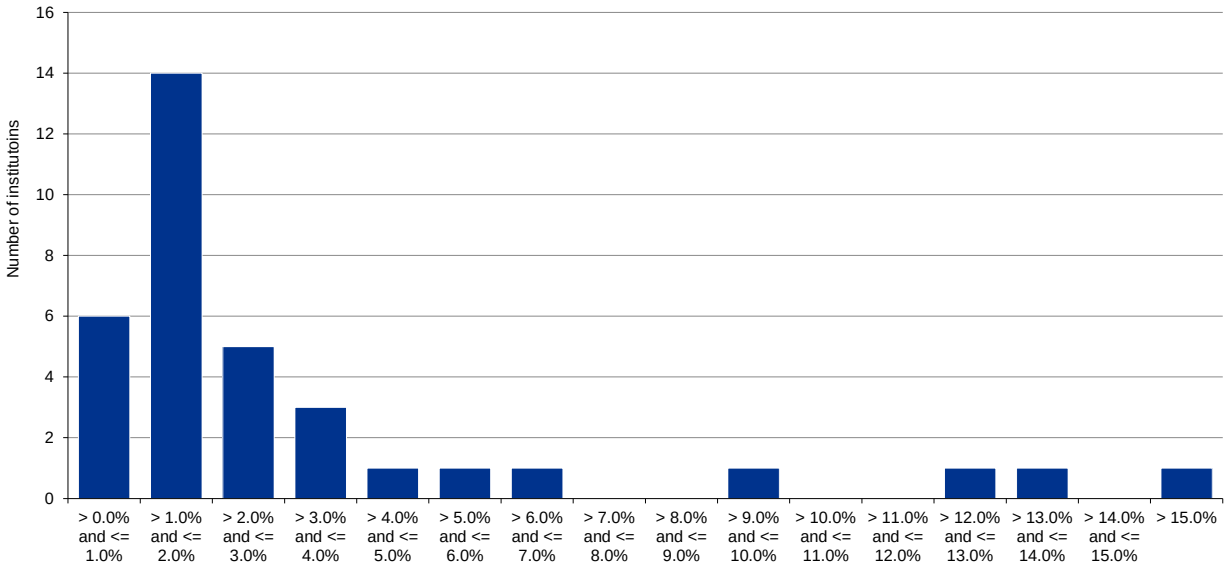
Institutions adjusted their opening cost figure for this study (the cost of Teaching in Annual TRAC) for any discrete overseas costs, not related to teaching the students. The aim was to align the costs between teaching home and overseas students and keep the costs of both in the methodology. This is a different approach to TRAC where the publicly funded costs of teaching are separated. We assessed the reasonableness of the figures provided.

We collected costs of teaching overseas domiciled students totalling £314 million from 35 institutions (five nil returns). We sought confirmations where nil returns were received.

One institution reported its out-of-scope costs in this discrete cost category. After allowing for this error, the average cost per institution was £4.3 million.

The FTEs were not collected for this area and so an analysis of cost per FTE was not possible. The chart below shows the frequency distribution as a percentage of total TRAC teaching costs.

Chart 85 – Frequency distribution of overseas costs as a percentage of total teaching TRAC cost



Source: Analysis of data returns

This distribution showed a right skewed distribution of overseas cost, with a median in the category of between 1 and 2%. The right-hand institutions formed the basis of our further checking. Of the top three percentages:

- One institution had used a different approach to calculate their total cost of this study. We were satisfied that their basis did not merit their exclusion.
- One institution described a discrete joint venture operating as a pathway centre providing academic and English language preparation for international students prior to degree study. As a large facility this created a significant proportion; and
- One institution had an overseas population that was a significant proportion of its students and as a result a significant international team was in place.

Annex V: HESA cost centre coverage

From the 40 institutions that participated in this study, we received a total of 732 individual course level returns which spanned all 45 HESA cost centre codes. For the coverage assessment, we used FTEs where the institution and HESA cost centre matched between the data returns for this study and the dataset based on the 2016-17 HESA student record. As a result for example, where Institution A delivers HESA cost centre courses for Chemistry and the Institution A reported 100 students in the HESA dataset, 100 students is counted towards the coverage analysis for Chemistry.

The table below summarises the coverage achieved.

Table 38 - Frequency of HESA cost centres by participating institutions

HESA cost centre number	HESA cost centre	Responses matched	Out of a possible number of matches (for all in-scope institutions)	Institution responses as a % of total population matched	Student FTE coverage as a % of total population matched
101	Clinical medicine	13	31	42%	52%
102	Clinical dentistry	6	14	43%	56%
103	Nursing and allied health professions	24	67	36%	39%
104	Psychology and behavioural sciences	28	92	30%	38%
105	Health and community studies	10	56	18%	12%
106	Anatomy and physiology	10	33	30%	43%
107	Pharmacy and pharmacology	6	34	18%	22%
108	Sports science and leisure studies	11	62	18%	32%
109	Veterinary science	4	11	36%	52%
110	Agriculture, forestry and food science	5	23	22%	53%
111	Earth, marine and environmental sciences	17	51	33%	46%
112	Biosciences	30	89	34%	43%
113	Chemistry	17	53	32%	36%
114	Physics	13	40	33%	37%
115	General engineering	8	35	23%	20%
116	Chemical engineering	6	20	30%	40%
117	Mineral, metallurgy and materials engineering	4	18	22%	35%
118	Civil engineering	14	36	39%	45%
119	Electrical, electronic and computer engineering	27	63	43%	44%
120	Mechanical, aero and production engineering	22	50	44%	46%

HESA cost centre number	HESA cost centre	Responses matched	Out of a possible number of matches (for all in-scope institutions)	Institution responses as a % of total population matched	Student FTE coverage as a % of total population matched
121	Information technology, systems sciences and computer software engineering	29	88	33%	40%
122	Mathematics	21	64	33%	40%
123	Architecture, built environment and planning	20	53	38%	51%
124	Geography and environmental studies	17	56	30%	46%
125	Area studies	3	9	33%	36%
126	Archaeology	9	28	32%	41%
127	Anthropology and development studies	2	16	13%	18%
128	Politics and international studies	23	66	35%	40%
129	Economics and econometrics	17	50	34%	34%
130	Law	27	85	32%	39%
131	Social work and social policy	16	68	24%	29%
132	Sociology	27	79	34%	35%
133	Business and management studies	34	104	33%	41%
134	Catering and hospitality management	8	19	42%	35%
135	Education	20	80	25%	23%
136	Continuing education	2	15	13%	8%
137	Modern languages	23	65	35%	38%
138	English language and literature	29	89	33%	38%
139	History	23	79	29%	36%
140	Classics	7	19	37%	38%
141	Philosophy	15	43	35%	36%
142	Theology and religious studies	8	35	23%	19%
143	Art and design	21	81	26%	43%
144	Music, dance, drama and performing arts	33	99	33%	33%
145	Media studies	23	82	28%	32%
Total		732	2,350	31%	

Source: Analysis of data returns

Annex W: TRAC peer group coverage

Using TRAC, each higher education institution can be categorised into one of six peer groups depending on their nature and research income. The Peer Groups are a useful proxy for segregating the different types and size of institutions in the sector. Further details are provided in Annex B.

The table below summarises the frequency made by the 40 institutions across the following groupings:

- A and B – both having higher levels of research income; and
- D and E – both are likely to be smaller research institutions.

This mechanism has been used in previous studies where there are fewer than five instances. The table below summarises the frequency made combining Peer Group A and B, and D and E.

Table 39 - Analysis of TRAC Peer Group coverage

TRAC Group	Frequency of submissions	Total number of institutions	Frequency as a % of the total population	Student FTEs from HESA	Total student FTEs	Student FTE coverage as a %
A and B	14	37	38%	199,235	492,930	40%
C	8	17	47%	107,610	222,685	48%
D and E	11	49	22%	140,420	468,795	30%
F	7	19	37%	22,900	39,835	57%
Total	40	122	33%	470,165	1,224,245	38%

Source: Analysis of data returns

Annex X: Approach to calculating the unit cost average ranking

This Annex provides more detail on the design of the ranking analysis used in this study to understand the relationship between the unit costs and six factors that may influence the unit costs: TRAC Peer Group; Region; Financial scale of the institution; Non-continuation rates; Number of HESA cost centres; and Staff to student ratio (SSR).

The figure below illustrates the methodological approach using cost data for six example institutions (labelled S to X) and three subject groups. Step 1 involved ranking the institution in order of increasing unit cost where 1 meant the institution had the lowest unit cost.

Step 2 weights the ranking to take into account the number of submissions made, for example for subject group 2 in this illustration, only three institutions provided unit costs. This meant that the second ranked institution needed to have a ranking of 3.5 (being the exact mid-way point between 1 and 6).

In step 3, the overall rankings are calculated from averaging each institution's subject group ranking. Any missing values are ignored (rather than treated as zero for instance). Finally in step 4, the rankings are then averaged for the factor, in this illustration being two TRAC groups, A and C.

Figure 5 - Example approach to determining unit costs rankings

Total submissions in example	6

Institution	Subject group 1) unit cost £	Subject group 2) unit cost £	Subject group 3) unit cost £
S	10,000		
T	9,000	10,500	11,000
U	11,000		
V	12,000	12,500	11,000
W	10,000		9,750
X	8,000	11,500	10,750

Institution	1. Ranking by institution			2. Weighted ranking			3. Overall ranking (averaged)	4. Average ranking score per TRAC Peer Group		
	(1 is the most costly)			Subject group 1) unit cost £	Subject group 2) unit cost £	Subject group 3) unit cost £		TRAC	TRAC	Score
	Subject group 1) unit cost £	Subject group 2) unit cost £	Subject group 3) unit cost £	(f) = ((ranking -1) * d) + 1			(g) = average of all f's	(h) = average of all g's for TRAC Peer Group		
S	3			3.0			3.0	A	A	**3.5**
T	2	1	3	2.0	1.0	4.3	2.4	A		
U	5			5.0			5.0	A		
V	6	3	3	6.0	6.0	4.3	5.4	C	C	**3.3**
W	3		1	3.0		1.0	2.0	C		
X	1	2	2	1.0	3.5	2.7	2.4	C		
workings										
max (a)	6	6	6							
entries (b)	6	3	4							
spaces (c) = b -1	5	2	3							
number of steps (d) = (a-1) / c	1	2.5	1.67							

Average (unweighted) rankings for institutions and subject groups were also calculated. A measure of variation was calculated using the normal standard deviation approach.

Annex Y: Unit cost average rankings by subject group

Annex X details how the unit cost information and institution characteristics were used to determine the ranking of unit costs. This Annex summarises the findings from that approach in Table 40 for each subject group.

Where insufficient instances were collected a note is included, either nil entries meaning that no institution provided that data, or too few meaning that four or less institutions provided that data.

The table below comprises the average rankings. For example, for the first row regarding the TRAC Peer Groups, for Art and Design, peer group A and B ranked 16 (1 being the lowest unit cost) compared to the C, D and E groups which ranked 21, and the F group which was 26, the highest unit cost. To help highlight the findings this analysis raises we have darkened the cells for the lowest and highest rankings (light grey for 15 or below and darker grey for 30 or above).

Table 40 – Summary of detailed unit cost average rankings

	Art and design and architecture	Biological sciences and other subjects allied to health that are not in other categories	Engineering	English, law and modern languages	Geology, environmental sciences, archaeology and ancient history	Maths, physics, chemistry, informatics and computing	Medical, dental and veterinary science	Social sciences, history, economics
TRAC Peer Group								
A and B	15.6	24.6	19.2	18.4	18.4	19.2	16.8	15.0
C	20.9	15.5	22.6	21.0	18.8	21.1	Too few	23.7
D and E	20.3	14.5	17.1	22.8	22.6	17.8	Nil entries	20.6
F	26.0	Too few	Too few	Too few	Nil entries	Too few	Nil entries	Too few
Region								
Midlands	Too few	Too few	Too few	Too few	Too few	Too few	Too few	Too few
London	31.6	27.8	22.8	22.6	18.5	28.0	19.6	27.1
North	14.1	15.1	16.4	19.1	Too few	13.0	Too few	18.4
South West and East	19.1	20.2	23.4	19.9	20.2	23.9	21.1	17.8
HESA Cost centres								
1-15	24.1	Too few	25.9	Too few	Too few	Too few	Too few	29.7
16-30	19.9	18.5	19.0	21.8	18.9	20.9	17.7	18.3
31-45	Too few	Too few	Too few	Too few	Too few	Too few	Too few	Too few
Size								
>£0 and <=£100m	24.1	19.4	22.8	22.1	17.1	22.2	Too few	21.2
>£100m and <=£200m	18.0	19.3	19.5	19.2	21.2	20.4	16.3	20.2

	Art and design and architecture	Biological sciences and other subjects allied to health that are not in other categories	Engineering	English, law and modern languages	Geology, environmental sciences, archaeology and ancient history	Maths, physics, chemistry, informatics and computing	Medical, dental and veterinary science	Social sciences, history, economics
>£200m	Too few	Too few	Too few	Too few	Too few	Too few	Too few	Too few
SSRs								
0-15	24.7	Too few	25.6	Too few	27.4	Too few	Too few	18.7
15-30	20.2	19.2	15.7	19.0	16.6	19.7	26.1	18.3
30-45	18.9	24.0	23.0	26.6	Too few	23.0	Too few	28.0
>45	12.8	11.0	15.3	14.5	Too few	16.3	Too few	13.4

Source: Analysis of data returns

In summary, although limited by fewer data instances, a few indications emerge from this analysis:

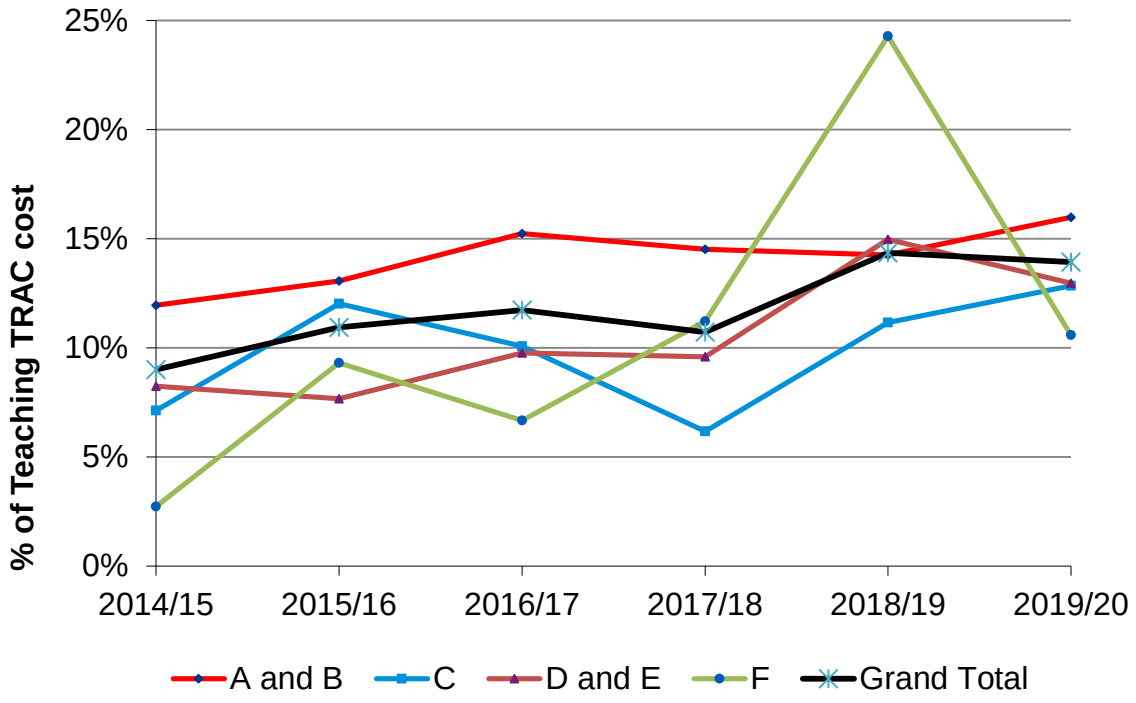
- London institutions have a higher unit cost in 5 of 8 subject groups and by a margin of more than 7 for Art and design and architecture, Biological sciences and other subjects allied to health, and Social sciences, history, economics.
- Institutions in the North are almost always those with a lower unit cost;
- Institutions with 1 to 15 HESA cost centres of provision have a higher cost for each of the three subject groups reported in this analysis (where five or more institutions provided that data); and
- Institutions with a higher number of students in the staff to student ratio are consistently lower cost.

Annex Z: Capital expenditure

The data return collected information from 35 institutions regarding their capital expenditure on teaching from 2014-15 to 2019-20 to purchase new or replacement land, building/s and equipment.

The chart below summarises the capital expenditure as a percentage of the total Teaching cost from TRAC for each year by each TRAC peer group (aggregated).

Chart 86 – Total capital expenditure as a percentage of Teaching TRAC cost from 2014 to 2019-20 by TRAC peer group



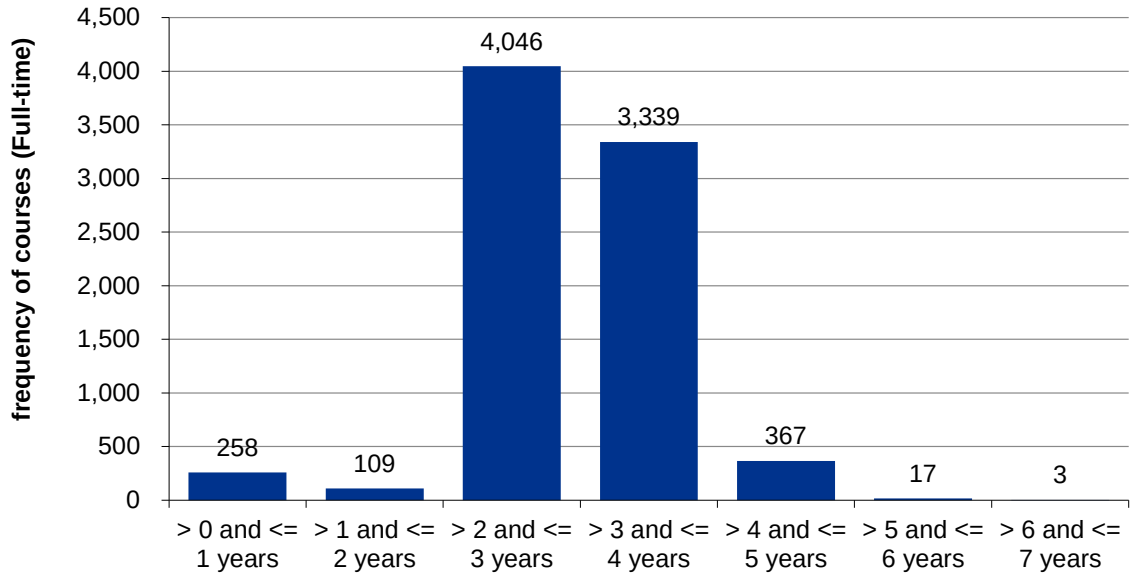
Source: Analysis of data returns

When comparing levels in 2016-17 to 2019/20, all the institutions in each TRAC peer group plan for a higher level of spend in the future, as a proportion of Teaching cost. To meet these plans institutions will need to generate cash internally and / or borrow. Irrespective of the method to finance the capital spend, institutions will need to cover higher levels of future depreciation, assuming no other changes.

Annex AA: Course length

Based on the data collected, the lengths of each course were summarised. The following chart shows this frequency distribution for full-time provision.

Chart 87 - Frequency distribution of course length for full-time provision



Source: Analysis of data returns

The vast proportion of course information collected were either three or four years in duration. The lower length courses included those ending or starting in 2016-17. Some undergraduate courses were the primary course before a further course, for example a BA in architecture for three years before further professional studies.

Annex BB: Staff to student ratios

Institutions provided information regarding staff and student FTE. This data is used to calculate a staff to student (SSR) ratio. They also provided information on the staff FTE to indicate the underlying assumptions used to provide the staff FTE. From the 40 submissions, two institutions were discounted from any SSR analysis because insufficient information was provided. These did not materially affect the cost calculations.

From the 38 submissions with SSR data, we calculated the following SSRs per subject group.

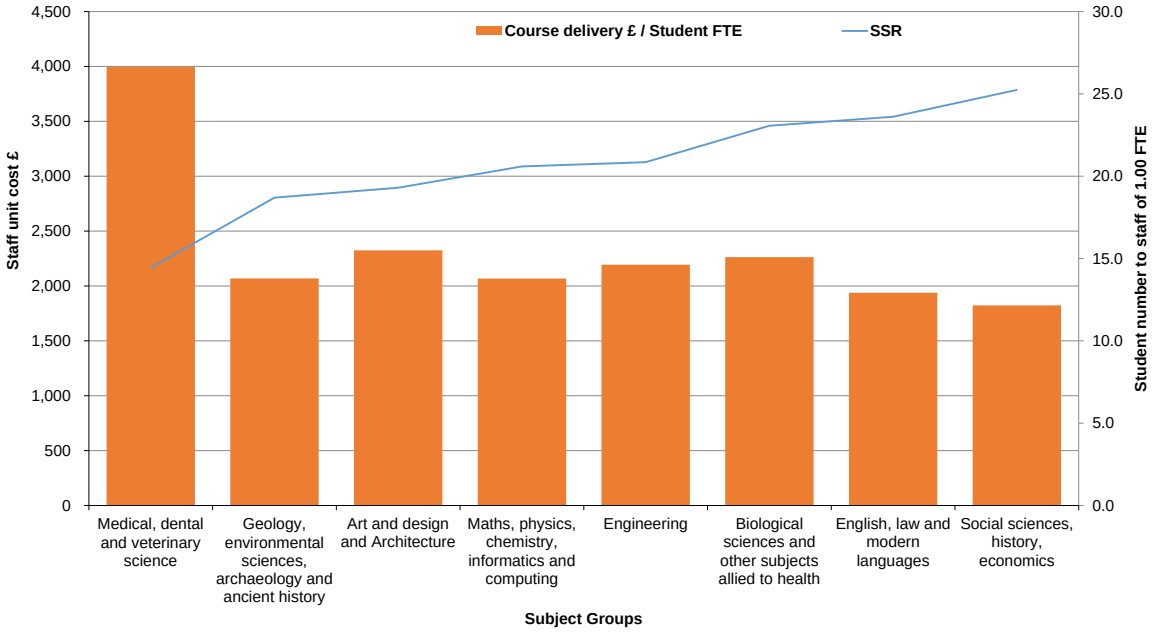
Table 41 – Staff to student ratios by Subject group

Subject Group	Staff to student ratio (1:)
Art and design and architecture	19.3
Biological sciences and other subjects allied to health	23.1
Engineering	20.9
English, law and modern languages	23.6
Geology, environmental sciences, archaeology and ancient history	18.7
Maths, physics, chemistry, informatics and computing	20.6
Medical, dental and veterinary science	14.4
Social sciences, history, economics	25.2
Total Average	21.7

Source: Analysis of data returns

As expected the Medical, dental and veterinary science showed the lowest number of students in the ratio (the blue line in the following chart). We also plotted the SSRs with the staff unit costs for each subject group, in Chart 88.

Chart 88 – SSRs and Course delivery staff unit cost for each Subject group



Source: Analysis of data returns

The chart shows a broad relationship between the two factors, being a lower course delivery staff unit cost being associated with higher numbers of students per member of staff and vice-

versa. The Medical subject group is accepted as containing provision with a higher amount of contact and senior teaching resource, thus giving a lower SSR and higher course delivery staff unit cost.

Annex CC: Corporate services and student related central service costs

The data return set out 10 cost headings within the central cost category plus the option to add any institution specific items of a significant nature (to a maximum of two entries). The total cost and their proportion of the total (against both the central cost category and the total) for all provision is shown in the following table.

It should be noted that institutions may incur further centrally incurred costs either as part of their research or other activity (scoped out of this study), or allocated a similar cost elsewhere in their return for this study (because an academic department has incurred this from within their own resources), or both.

Table 42 – Central cost summary for all provision from data returns

#	Cost item	Total £	as a % of the total for the category	as a % of total teaching costs for the study
1	Corporate services - Finance	91,710,064	5.8%	2.1%
2	Corporate services - HR	53,322,611	3.3%	1.2%
3	Corporate services - IT	219,371,418	13.8%	4.9%
4	Corporate services - Legal	13,640,090	0.9%	0.3%
5	Corporate services - Marketing and Admissions	202,400,159	12.7%	4.5%
6	Financial support to students	174,908,068	11.0%	3.9%
7	Libraries and museums	198,093,870	12.4%	4.4%
8	Other central indirect costs	140,680,371	8.8%	3.2%
9	Outreach activity	59,999,498	3.8%	1.3%
10	Student facilities	269,198,849	16.9%	6.0%
11	Institution specific	168,986,880	10.6%	3.8%
	Total	**1,592,311,877**	**100.0%**	**35.7%**

Source: Analysis of data returns, note rounding differences may apply

To help analyse these costs further each cost item was allocated to either 'Corporate services' or 'Student related central services'. From discussions with the DfE and the Steering Group, it was agreed that marketing and admissions services would be assigned to Student related central services. Whilst containing a mix of services, it was reasoned that many directly affected the student's broader experience, either through the student's application to the institution via the admissions service or via the marketed reputation of institution as a whole and in some instances via the profile of individual academic departments. We also discussed the classification with a selection of institutions and they agreed that in many cases these were 'front line services' to students.

Within 'Corporate services', the 'Other central indirect costs' were reclassified to 'Miscellaneous central costs' to better reflect the information received on the nature of these costs.

Before undertaking this analysis, the institution specific costs of £169.0 million were also allocated to one of three more suitable categories where possible, using further information

gathered from institutions. The table below provides a summary of this analysis and highlights the three categories allocated to in three different shades.

Table 43 - Institution specified central costs

#	Institution specific item	Example cost/s included	Total cost £	Allocated to
1	Academic Services	Student services	24,287,824	Corporate Services - other
2	Corporate Services	Legal, central administration and registry services, governance and alumni services	63,869,305	Corporate Services - other
3	Fees and Charges	Insurance and interest charges	5,880,028	Miscellaneous central costs
4	Other	Unspecified items and a mix of items that could be allocated to other categories but were not quantified in sufficient detail by institutions.	41,897,760	Miscellaneous central costs
5	Pension charges	Pension fund costs	14,262,586	Miscellaneous central costs
6	Student facilities	Facilities, student union	3,339,505	Student Facilities
7	Vice Chancellor	VC and PVC offices (and some registrar costs)	15,449,872	Corporate Services - other
	Total		168,986,880	

Source: Analysis of data returns

The following tables shows the results for each of the summarised cost categories of either 'Corporate services' or 'Student related central services'. It should be noted that institutions may have been able to further allocate 'Corporate Services – other' costs into one or more of the other categories had further time permitted.

Table 44 - Corporate services cost summary

#	Corporate services cost item	Total £	as a % of total costs
1	Corporate services - Finance	91,710,064	2.1%
2	Corporate services - HR	53,322,611	1.2%
3	Corporate services - Legal	13,640,090	0.3%
4	Corporate services - Other	103,607,001	2.3%
5	Miscellaneous central costs	202,720,745	4.5%
	Total	465,000,511	10.4%

Source: Analysis of data returns. Differences due to roundings.

Table 45 - Student related central services cost summary

#	Student related central services cost item	Total £	as a % of total costs
1	Corporate services - IT	219,371,418	4.9%
2	Corporate services - Marketing and Admissions	202,400,159	4.5%
3	Financial support to students	174,908,068	3.9%
4	Libraries and museums	198,093,870	4.4%
5	Outreach activity	59,999,498	1.3%
6	Student Facilities	272,538,354	6.1%
	Total	1,127,311,366	25.3%

Source: Analysis of data returns. Differences due to roundings.

The largest areas of central cost were student facilities and IT services. From our discussions many institutions referenced the increased investment in IT services for students (and staff and management of student teaching and more broadly) as part of strategies to support student learning and their well-being. For example, they reported investments to create and sustain more extensive wi-fi networks and hubs, mobile timetabling and support applications and into software development for online learning and support, plus management tools to help timetabling, resource scheduling and student tracking. Several cited future increases in IT services as being necessary to address future efficiencies as well as to continue to improve student experience and match expectations in an increasingly competitive market.

Analysing this further, we compared the unit costs and share of the central cost category across TRAC Peer Groups, see Chart 24.

TRAC Peer Group A and B appear to be able to share their corporate services costs across their research activities, and possibly able to benefit from greater economies of scale. Conversely, those institutions with less research spend and the smaller specialist institutions in Group F appear to have spent more on corporate service activities as a proportion of their total central services cost. This was a point made by institutions on several of our field visits.

Annex DD: Non-continuation rates

The data submitted by participants was based on 2016-17 data. For a course of three years duration this means that the student FTEs comprised entrants from 2014-15, 2015-16 and 2016-17. Similarly, a course of four years duration would include entrants from 2013-14.

From the HESA student record, we reviewed the rate of non-continuation following the year of entry. We reviewed the non-continuation rate distribution for full-time provision across 122 institutions. The source of the comparative data was UK domiciled full-time undergraduate entrants 2015/16 from Table T3 of the HESA student record and is available in full here. We used the percentage who continue or qualify at same institution as the basis for the calculation, i.e. non-continuation rates here denote the percentage of full-time students who do not continue at the same institution following their year of entry (two years in the case of part-time students). Non-continuation rates used in the study are based on 2015/16 data, one year earlier than the data return. The 2015/16 year was the most recent data at the time of producing the analysis.

In summary, the distribution of the participating institutions is close but slightly lower than that of the population as a whole. The following table summarises key aspects of the distribution.

Table 46 - Non-continuation rates analysis between data returns and the population across England

	In study (n = 40)	Total (n =122)
Mean	9.2%	9.9%
Median	8.2%	9.4%
1 Standard deviation	4.7%	4.7%
Maximum	21.6%	26.0%
Minimum	4.0%	1.5%

Source: HESA Student record of non-continuation following year of entry 2015/16 to 2016-17

From this analysis it appears reasonable to conclude that the non-continuation rate across the data return is broadly similar to that of the population. This therefore provides some comfort over the non-continuation rates used to compare student FTEs.

It should be noted that this is a snapshot of the non-continuation rates and that rates can change over time and are likely to be different for different subject areas.

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