

# Costs of training and supervising postgraduate research students

A report to HEFCE by JM Consulting Ltd

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# 1. SUMMARY

## Introduction

1. This study was carried out to identify the costs of training and supervising postgraduate research (PGR) students, defined as those registered for a research degree assessed by thesis.

2. It drew upon:

- case studies in four research-intensive institutions, where data was provided by 22 PGR supervisors (often heads of department) covering a range of programmes in the three HEFCE research cost bands<sup>1</sup>, and other staff;
- data provided by way of a survey of a further 33 supervisors from six other institutions, again covering three cost bands; and
- Transparency Review<sup>2</sup> data on indirect cost rates and estates charges, provided by 37 research-intensive institutions for benchmarking purposes, as part of implementation of the Transparent Approach to Costing (TRAC).

3. The study looked at the costs of training and supervising PGR students. Four main types of cost were identified and studied:

- the time spent by supervisors, examiners and lecturers on training and supervising PGR students – consisting of their salary costs and the indirect and estates costs associated with their time (making up 13% and 6% of total PGR costs respectively)<sup>3</sup>;
- consumables (31%);
- scholarship/bursaries/fees remission (9%);
- indirect costs and estates costs (40%). Indirect costs consist of central services (registry, finance, planning etc); the support time of academics; the cost of capital employed adjustment;<sup>4</sup> and support costs – staff and non-staff – in academic departments.

## Findings

4. If all costs are considered, then the percentage difference in costs from band C levels shown by the case study institutions are: 182% for band A; and 132% for band B. This is called the 'gross institutional cost' in the report. This best represents the real differential between the bands.

5. However, this includes three types of cost that are double-counted or should be

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<sup>1</sup> To calculate research funding allocations, HEFCE divides all subjects into three broad bands according to their relative costs. These are band A – high-cost laboratory and clinical cost subjects; band B – intermediate cost subjects (part-laboratory); band C: other, (library).

<sup>2</sup> The Transparency Review of Research (TRAC), JCPSG, 2000.

<sup>3</sup> The percentages given relate to the gross institutional costs of a Band A programme: see Table 1.

<sup>4</sup> Cost of capital employed or COCE is an adjustment required under TRAC.

excluded: consumables that are funded through research projects; the balance of the consumables used by students, which are also included in the indirect cost rate; and some indirect and estates costs for Year 4. By excluding these three items, a more realistic 'net institutional cost' is derived. The percentage differences in cost from band C levels calculated on net institutional costs in the case study institutions are: 167% for band A; and 132% for band B.

6. These differentials were broadly supported by a 'standardised cost' calculation, which drew in addition upon a larger sample of data available from the survey institutions, and the benchmarked indirect costs and estates data available from TRAC. This showed the following total costs, for a programme and for a year.

**Table 1: Net institutional costs**

£ per FTE student 2003/04	Band A	Band B	Band C
Total programme cost	87,317	71,446	52,383
Annual cost	29,106	23,815	17,461
As a percentage of band C	167%	136%	100%

The annual cost assumes a three-year programme for a full-time (FT) student, although the average elapsed length was 3.5 years.

7. These costs are 10% higher than the net institutional costs obtained from the case study institutions alone – both supervisors' hours in band A, and indirect and estates costs were higher, offset by lower consumables costs in band A.

8. There is considerable variability in the hours estimated for training and supervision within and across departments even in the same band. The main reasons for this include differences in supervisory style, the needs of each particular student, the type of project, and the sub-discipline.

9. Indirect costs and estates rates for PGRs were calculated according to TRAC principles, with the assumptions that a full-time equivalent (FTE) PGR's use of institutional facilities equates to 0.8 of that of an FTE academic or researcher for estates in laboratory disciplines, 0.5 for non-laboratory estates, and 0.2 for indirect costs.<sup>5</sup> This broadly equates to a sector PGR weighting of 0.3 overall.

10. A review in two years' time (by the end of 2006) will seek better evidence in this area, and the weighting may well increase. If the overall weighting was changed to 0.5, then the annual costs of a band A course would increase by about £5k and those for band C by about £6.5k (17% and 38%, respectively, of standardised costs).

<sup>5</sup> Total research costs for each of laboratory estates, non-laboratory estates and indirect costs, are divided by FTEs to arrive at a rate or charge per FTE. FTEs include research assistants (Ras), investigators, supervisors, and PGR students, who are using the facilities. RAs and investigators are weighted at 1.00. PGR students are weighted at 0.8 for laboratory estates, 0.5 for non-laboratory estates and 0.2 for indirect costs. These weightings were agreed at the TRAC Development SubGroup (on behalf of the JCPSG) in October 2004, but will be reviewed in two years' time.

## Comments on findings

11. This is the first time that PGR costs have been calculated on a systematic full economic cost basis. The level of cost that this study shows will probably be an unwelcome surprise to many in the sector. Current funding for each student varies considerably, but is well below the levels of cost, leading to significant levels of under-recovery of costs, almost without exception.

12. In the long-run, institutions and funders will have to take action to improve these levels of cost recovery, if PGR students are to become a financially sustainable part of UK higher education. However, institutions should not feel obliged to make any abrupt changes: the report is simply making explicit costs which have always been there; research funding is on a rising trajectory; and PGR students deliver significant non-financial benefits to institutions.

13. The benefits institutions gain from PGR students include the following:

- PGRs form the next generation of researchers in training - this is a prerequisite for institutions' ability to carry out research;
- they are an important stimulus and contribution to the research environment;
- they make up one of the volume measures in the current HEFCE research funding model;
- they are able to make a significant contribution to the numbers of papers that are produced by a department (with potential for submission under the Research Assessment Exercise, RAE);
- they provide an academic with a researcher who can often make a significant contribution to the academic's research that is funded by the institution itself, assisting them to investigate ideas in a less formal way than through a sponsored project;
- they are an important part of the research environment offered to top researchers. They offer benefits to their supervisors from conferring 'a mark of a good researcher'; and they can increase the opportunities for academic collaboration later in their careers.

14. It is important that these significant and mostly unquantifiable benefits, accruing from the training and supervision of PGR students, are weighed alongside the levels of costs incurred by institutions, and the under-recovery of these costs in current funding models.

15. Sponsors of research gain from the research contribution from the students (where they are working, formally or informally, as part of the research team on a sponsored project). PGRs provide significant added value to research funders.

16. In summary, this report has made explicit costs that have not previously been visible, as has also recently occurred with the costs of research projects. As with all their activities, institutions will need to consider the costs, funding and benefits associated with training and supervising PGR students in a strategic and informed manner. A further study should be done in two years' time when improvements in institutions' costing systems will enable the PGR weighting to be determined on a more robust basis.

# 1. BACKGROUND AND METHODOLOGY

## Terms of reference

### 1.1. The terms of reference for this review were:

to provide as accurate information as possible on the cost to institutions of training and supervising research students in a manner consistent with the standards in this area proposed by the UK HE funding bodies; and to advise how this work can be updated in future years.

### 1.2. The review team have also included some notes on benefits and funding, both to give context to the cost data, and to assist in understanding the implications of the review findings.

### Postgraduate study covered under this review

### 1.3. The definition of postgraduate research students used for this review is of a student registered for a research degree where the final assessment is examined by thesis. The degree conferred is generally a Doctor of Philosophy (PhD or DPhil). It was defined by one university as “higher degrees by research alone, leading to the production of a thesis which at PhD level is a work of original scholarship worthy of publication in a learned journal”.

### 1.4. The review did not include professional qualifications of equivalent status to a PhD (e.g. professional doctorates which combine taught postgraduate work and/or professional practice with research, such as EdD and ClinPsyD). It did not cover any PhD with integrated study (e.g. a structured programme of subject-specific course work). It also excludes masters degrees being examined by research, except where that masters degree (such as an MRes) forms an integral part of the PhD/DPhil programme. The focus in this study is on costing the three years of study for which the student is registered as a postgraduate research student, and in the case of integral MRes or equivalent programmes, this includes this first year of study.

### 1.5. One particular clarification needed to this definition is the “1+3” programme, such as that approved by the Economic and Social Research Council. For programmes observed under this format, only the “+3” element of the programme has been costed, the first year being a masters programme. This exclusion is consistent with other subject areas where masters degrees (taught or research) are increasingly an explicit entry requirement; or in the case of some science subjects, where a four-year undergraduate degree with a research component is the norm.

## Review methodology

- 1.6. A series of case study visits was undertaken, supported by a postal survey of other institutions. Sector-level data on indirect and estates costs was also developed and drawn upon.

### Case study visits

- 1.7. Four case studies were carried out – at Imperial College, University College London, Oxford University and Birmingham University. Each case study involved a two-day visit to talk to key personnel. It was the aim at the outset to talk to six academics in each location, plus a representative from senior academic management to discuss broader issues of postgraduate policy, plus the Transparency Review manager.
- 1.8. In practice, our range and number of interviews varied. We aimed in each location to talk to two academics in each of the three research cost bands (the bands being “A - High cost laboratory and clinical subjects”, “B – Intermediate cost subjects” and “C – Others”). Institutions actually put forward a different range of academics for interview from this 2:2:2 split, depending on their areas of expertise and volume of research undertaken. One institution provided academics in the ratio 4:1:1, and another in the ratio 3:1:2.
- 1.9. The member of senior academic managers involved in each institution varied, and was inevitably influenced by the management of postgraduate students at that institution. Some institutions have dedicated graduate schools, others allocate postgraduate responsibility within faculty or divisional structures. We therefore have variously talked to a pro vice- chancellor, a head of graduate school (institution wide), a school head of graduate studies, a head of academic division, and a faculty postgraduate tutor.
- 1.10. The Transparency Review manager at each institution was involved (together with support from planning colleagues or faculty accountants as appropriate) in order to allow us to understand the detail behind some of the previously derived indirect and support cost data. For example, in order to understand the detail at each institution, and to allow valid comparisons to be made, items such as the allocation of departmental non-staff costs were explored.
- 1.11. Our case study visits provided us with data for ten band A departments, five band B departments, and seven band C departments. Most of the data covered a range of programmes within each department, or covered a range of programmes under the supervision of one individual. Each dataset therefore represents an average cost incurred on a number of programmes within the discipline.

### Survey

- 1.12. At the outset it was expected that considerable variability would be found in the data –due both to the lack of records of time spent, and to the different levels of supervisors’ time and other resources required on individual programmes, let alone sub-disciplines. Therefore we added to the case study data through a survey.



- 1.13. After the first two case study visits we developed a questionnaire inviting information from a further eight institutions. Six academics in each institution, who supervised PGR students, were asked to provide details of the time required in their training and supervision, and of the level (and funding) of the consumables used by the students. A total of 33 responses were received. Again, each data set represented a number of different programmes.
- 1.14. A copy of the questionnaire is given in Annex A (see separate Excel file).

#### Sector-level benchmarking

- 1.15. In parallel with this study, an on-going TRAC implementation project has collected data on indirect cost and estates costs, across the sector. This is also being used to inform the rates that are to be used by the Research Councils in a current modelling exercise, being carried out to help inform the percentage of full economic costs that they will be able fund on research projects. Data from 37 institutions has been collected, and benchmarked. The quality of this data is continuing to improve but is not yet fully robust.
- 1.16. Both the indirect cost rate and the estates charges are applied to activities on a £ per FTE basis. They are calculated as follows: total relevant research costs divided by relevant FTEs. FTEs include principal investigators (PIs) and supervisors, research assistants (RAs)/post-doctoral researchers, and PGR students. As part of the work for this project, and for the TRAC implementation, proposals were made for the weighting that should be attached to the PGR student numbers in this calculation. A paper prepared for the TRAC Development Sub-Group (TDSG - a committee of the Joint Costing and Pricing Steering Group - JCPSG) is given in Annex C (separate file). This proposed a single common weighting of 0.3 for PGR students (PIs and RAs being 1.00).<sup>6</sup>
- 1.17. At the TDSG meeting in October 2004 it was agreed that the weightings should differ for each type of cost, so that they better reflected the cost of facilities used. The following weightings were agreed:
- laboratory estates 0.8
  - non-laboratory estates 0.5
  - indirect costs 0.2
- 1.18. For the 37 benchmarked institutions, the use of these differential weightings leads to an overall average weighting of 0.3; however this overall weighting would now vary by institution. The use of differential weightings, as opposed to a single common weighting, also means that PGR students in laboratory disciplines receive an increased level of costs, and those in non-laboratory disciplines receive a lower level of costs – increasing the differential between them.

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<sup>6</sup> This means that a PGR student would be allocated just under a third of the level of indirect costs and estates costs as for a principal investigator, supervisor, or research assistant. A single common weighting would mean that the same figure would be used in the calculation of both indirect and estates costs, and for both laboratory and generic disciplines.

## Costing method

1.19. We used TRAC principles, that include the following:

- establishing the full costs of all activities, not the marginal costs;
- full economic costs, including the two TRAC adjustments (infrastructure and cost of capital employed);
- using similar methods to those used for costing research projects,<sup>7</sup> in particular the application of the same weighting assumptions for PGR students when calculating and charging estates and indirect costs.

1.20. The costs are stated at 2003/04 levels.

1.21. We established a '**gross institutional cost**' for each programme studied in the case study institutions. This gives a good picture of the differential between bands.

1.22. The gross institutional cost includes all relevant costs, including all consumables used by a PGR student, and indirect costs/estates costs for Year 4 (often a half year spent in writing up). In practice both of these lead to 'double-charging', as the former would often include some consumables that are already being charged to a research project, or included in the indirect cost rates, and the indirect costs/estates costs for Year 4 have already been included in the indirect costs/estates costs for Years 1 to 3.<sup>8</sup>

1.23. We therefore excluded these two items of cost to arrive at a '**net institutional cost**' calculated for each programme. This second total could be used more fairly to inform funding levels.

1.24. We calculated **total programme costs**; and **an annual cost**. The FT programmes lasted an average of 3.5 years (an average also noted in a survey by the Research Councils), ending with the submission of a thesis. The costs included all supervision effort, irrespective of the year in which it was provided – and a significant amount is provided in Year 4 (including the final examination of the thesis). We show a total programme cost which took into account all costs, including those in Year 4, but the annual cost assumes a three-year FT programme (dividing total programme costs by 3, not by 3.5 years).

1.25. The following elements of cost were considered:

- academic staff time;
- academic staff salaries;

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<sup>7</sup> See the TRAC Guidance Manual Volume III February 2004, JCPSG.

<sup>8</sup> When establishing indirect cost and estates rates, total research costs are divided by relevant staff and student FTEs (the latter, weighted). The student FTEs are only those for registered students, recognised by HEFCE in its funding models. They cover only Years 1-3 (FT mode): the 'writing-up' Year 4 of students who were previously FT is not included. Therefore the Year 4 costs of an FT student's programme are already absorbed within the rates that are applied for those students in Years 1-3.

- travel and subsistence;
- consumables;
- bursaries and fees remission;
- equipment;
- estates;
- management and administration;
- indirect or support costs.

### Academic staff time

- 1.26. In assessing the cost of the postgraduate research programme we took costs incurred from entry into the department until completion of the award (when the thesis has been successfully assessed).
- 1.27. We included the direct time spent by all academics involved in the training, supervision and assessment of the student. Staff included lecturers, both principal and associate/second supervisors, and external and internal examiners (and any other academics directly involved in the assessments).
- 1.28. We excluded the input from research assistants (institutions consider post-doctoral staff to be co-workers, not as second or associate supervisors). Their input was mainly in the form of mentoring and training in research techniques, and in the use of specific equipment.
- 1.29. To help academics estimate relevant 'direct' time, we built up their input under a number of headings:
- induction;
  - individual 1:1 supervisions, including both structured meetings such as a fortnightly meeting or formal progress review meetings, and more informal e-mail or as-required drop-in contact;
  - lectures (including masters modules or courses), taking into account preparation time and assessment where relevant;
  - group seminars, including group supervision/action learning sets;
  - more informal group discussions, coffee group presentations, journal clubs;
  - reading of draft material;
  - assessment of student's work or presentation at the end of year one;
  - reading drafts of the thesis;
  - assessment of the thesis (by external and internal assessors) including their prior reading, and the oral examination.
- 1.30. A full description of each of these was prepared for the survey. This is included in Annex A (see separate Excel file). Activities such as recruitment, preparing applications for PGR funding, quality assurance, the role of postgraduate dean etc are not considered to be 'direct' costs of this activity under TRAC. In the same way, the costs of the head of department and the costs of any graduate school are also excluded from the direct academic staff cost. These are all support costs, included in the indirect cost rate, and discussed below.
- 1.31. There is the potential for a significant amount of variation on the academic time input between individual students (described in more detail in Annex B, see separate file). So in order to develop a profile, academics were asked to

consider their "typical" PGR student and describe their time input against each of the above headings.

- 1.32. Variations against this typical profile were then considered for factors which impacted on time being spent. For example, a typical 1:1 session might be 1½ hours per fortnight. A student working with new techniques might require more time input at, say, 2½ hours per fortnight.
- 1.33. In the first year of the doctorate programme, masters modules are taken on some programmes in some departments. Where lecture programmes were attended, a factor of two was applied to the contact time (for preparation), and this total time for delivery and preparation was divided by an assumed cohort size (generally 20 or 25 students). An estimate of the number of hours required for assessment was added, unless this had already been included in the supervisor's time estimate (or the course was not assessed).
- 1.34. An alternative approach was taken in some departments where the supervision of a PGR student was an integral part of supervising the research of a whole team of staff and students. Although the PGR student was not necessarily funded through the same research project as the RAs, they worked together on closely related research areas. In some of these cases, the supervisor estimated the total time that they worked on research in a typical non-vacation week ("research" including work funded by the institution, externally sponsored projects, project supervision, and the training and supervision of PGR students). This time was then divided by the number of people involved, weighted as appropriate. (For example, in one department, it was thought appropriate during discussion to give a weighting of 3 to the principal investigator/supervisor to reflect their own research; a weighting of 1 to each RA; and a weighting of 2 to each PGR student.) The number of hours required for the supervision of one PGR student could then be calculated.<sup>9</sup>
- 1.35. Supervisors estimated their time in hours. This was generally converted to a FTE by using a standard working year of 1650 hours (as used in TRAC).<sup>10</sup>

#### Academic staff salaries

- 1.36. The relevant academic salary was multiplied by the supervisor's FTE (see paragraph 1.35) to arrive at an academic staff cost figure. An academic cost per hour, incorporating salary and on-costs, was applied to this to arrive at the academic salary cost.

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<sup>9</sup> For example, an academic working 40-45 hours a week estimated that 3 days was spent on direct research activity i.e. 26 hours. This included his own research (both on institution-funded research and on two externally sponsored research projects involving 7 RAs); and the supervision of 7 PGRs. His research was weighted at 3, the RAs at 1 (multiplied by 7 RAs); and the PGRs at 2 (multiplied by 7 PGRs) – a total "activity count" of 24. Each "activity" therefore required 26/24 hours i.e. 1.08 hours. Each PGR student required 2 times 1.08 hours i.e. 2.2 hours a week. This multiplied by 45 weeks in a year gave 97 hours supervision. The time on taught modules, provided by a second supervisor, and spent by the two examiners was estimated in addition.

<sup>10</sup> Although this standard working year, being based on a 37.5 working week, does not reflect the additional hours usually worked; neither does it recognise time off for sickness, jury service, paternity, maternity, or private consultancy. Under the TRAC methodology, these two are assumed to balance each other out.

1.37. The cost per hour varies by institution, by department, and by grade. In order to allow comparison between our case studies we have used the same hourly rate for the same grade of staff across all institutions, but have weighted the rate in each department according to the grade mix. Where it has not been possible to determine grade mix (such as in a sub-speciality of a physics department, or where collegiate arrangements make the departmental budget difficult to interpret), the institutional average grade mix has been applied. One variation on this is the exclusion of departments of medicine in the average grade mix, as salaries here were seen in the case study institutions to vary from the observed normal range.

#### Transferable skills training

1.38. From the academic year 2003/04, PGR students are being given increased opportunities to attend transferable skills courses, through the provision of dedicated funding (the Roberts Science and Engineering Training, SET, skills funding). The costs currently incurred in this area (i.e. preparation and delivery time) have not been included as a direct academic staff cost but are included as an element of indirect cost. As provision of skills courses becomes more formalised, the time element to be included for this is likely to increase in the future. However, this has not been included.

#### Travel and subsistence

1.39. Travel and subsistence is not shown separately in the cost figures in this report. As well as travel for the purposes of research, many PGR students publish articles and conference papers in conjunction with their supervisors, which are co-presented at conferences.

1.40. In practice, except for a small amount (about £180 p.a.) for students in receipt of Research Council sponsorship, travel costs are met out of departmental funds as with any other departmental expense. The exception to this is where a separate application has been made for elements of field-work and included as part of a project grant.

1.41. Most travel and subsistence costs will have been included in the departmental costs and will form part of the indirect cost rate.

#### Consumable costs

1.42. Costs of consumables used by a PGR student (such as laboratory chemicals, reagents and disposables) are initially included at the full amount expended, howsoever funded. For some subjects the consumable cost involved is literally zero. For biomedical sciences involving animal experimentation the figure can be as high as £20k per annum.

1.43. One supervisor who identified a cost of £14k p.a. per student commented that "research consumables costs for PGRs are no different to those incurred by postdoctoral research staff, and in many cases are higher due to PGR inexperience".

1.44. In many of the humanities departments, apart from any specialist software and

supplies, the costs are small (in general we did not include a cost for students' entitlements to printing or copying; nor the costs they incur in typing and binding their thesis).

1.45. In order clearly to understand costs that are relevant to HEFCE, we have identified three broad sources of funding for consumables – and ensured that there is no double counting of cost in the totals:

- i. Some PGRs are given full funding for actual consumable costs – Research Council project studentships and some charitable funds' studentships cover the full costs of their consumables.
- ii. Many departments specifically try to integrate their other PGR students with their externally sponsored research grant work. Many will not take on a PGR student unless they work alongside or as part of a team funded through a research grant. The student contributes to the research project as a whole, and to do this, draws upon some of the consumables included within the research project budget.
- iii. Consumables for other students may be partly or wholly covered by a range of other funding sources. These include RTSG, DTA, CASE awards or bench fees.<sup>11</sup> Costs funded in this way will be included in the general departmental budget (unlike those funded through project studentships or research grants – sub-paragraphs i and ii above).

1.46. In all three cases, the consumables have been included in the gross institutional cost, and excluded from the net cost. To arrive at the net cost, consumables funded under projects (i and ii) have been deducted. Those included in general departmental budgets are still shown, but an average consumables spend has been deducted from the indirect cost rates.

#### Bursaries and fees remission

1.47. Some departments specifically make payments to students that are equivalent to a stipend to allow them either to enrol in the first place or to continue with their studies during the writing up phase of the programme. Similarly, fees may be waived at either departmental or institutional level.

1.48. We included these as a cost. We took the total sum incurred by the institution through scholarships, bursaries or fee waivers, on all PGR students (both overseas and home/EU). We divided that by the total number of PGR students to arrive at an average cost that was allocated to each student. In practice the costs would of course be incurred only on some students, and would differ by discipline.

1.49. These costs are funded through institutional or departmental funds. In some universities there are significant endowments or charitable foundations which support this expenditure.

1.50. All four of the case study institutions showed the same average level of cost in this area – around £3,000 per year per student.

1.51. We did not otherwise include the costs of students' stipends in either net or

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<sup>11</sup> for an explanation of these terms, see Chapter 4.

gross institutional costs.

### Equipment and related costs

- 1.52. Laboratory equipment is a key resource required by many students. The equipment is often being used by a number of researchers, sometimes on a number of research projects. It may have been provided through public funding such as the Joint Infrastructure Fund or the Science Research Investment Fund (JIF/SRIF), by a project sponsor, or out of institution/department funds.
- 1.53. Using TRAC costing methods, the costs allocated to PGR work would exclude that for equipment which:
- is being purchased through a research project (all the costs would be allocated to that research project);
  - is more than about three years old (it would be fully written-off, and would have no costs in the TRAC cost totals for charging to this or any other activity).
- 1.54. The costs of other equipment, most technicians, and buildings costs, is included as part of the estates charge.

### Estates

- 1.55. Estates costs relate to all the costs of buildings (capital and recurrent costs) used by PGR students, and by their supervisors. It includes the TRAC infrastructure adjustment.
- 1.56. PGR students generally (but not always) have individual desks, sharing a room with others. In laboratory-based disciplines they have their own bench space, and access to the full suite of laboratory facilities. They generally share computers or have access to hot desks or a computer suite with IT facilities.
- 1.57. Estates costs of research have been calculated for TRAC. Although their robustness is still increasing, we have been able to draw upon data from 37 of the most research-intensive institutions, which can give a well-informed mean for the sector. Two estates charges are calculated – one for laboratory departments, and one for generic/classroom departments. For part-laboratory departments, we used a proportion of each of the laboratory and generic rates, depending on the part-laboratory department's use of laboratory facilities (not necessarily wet-lab) or major equipment.
- 1.58. Estates costs are applied to research activity using FTEs as a proxy. As previously explained, academics (supervisors and investigators), and RAs are counted as 1 FTE each; PGR students in laboratory departments are counted as 0.8 FTE each; and those in non-laboratory department are counted as 0.5 each. This weighting has been informed by a paper from J M Consulting that has been looked at as part of TRAC implementation – see Annex C (separate file).
- 1.59. If the PGR weighting was lower (e.g. 0.3) then the estates cost for this activity would be significantly lower. This is discussed further in Chapter 2.

1.60. The costs calculated for each example have included two elements for estates:

- an estates charge for the supervisors' input. Their direct hours estimated for training and supervision, divided by hours in a standard working year, provides their FTE. The relevant estates charge has then been multiplied by this FTE;
- an estates charge for the PGR students' use of the estate. The relevant estates charge multiplied by 0.58 or 0.5, as appropriate, gives the annual estates cost per PGR student.

#### Management and administration

1.61. The management and administration of a PGR programme (and PGR cohort) includes time on: policy/research strategy; quality assurance; marketing and recruitment; general induction; interdisciplinary initiatives; departmental, faculty and university committees; training for new supervisors; departments' clerical and administrative work, and so on. It is provided by the supervisors, the heads of department, the research director/pro vice-chancellor, the graduate school, the research office, departmental secretaries and administrators, and university managers.

1.62. This time is defined as 'support' under TRAC and is included in the indirect cost rate. A separate estimate of the time and costs of this has therefore not been made.

#### Indirect cost rates

1.63. Indirect costs cover all of the TRAC support costs. The formal TRAC cost allocation model generates the research elements of this cost. Indirect costs include:

- management and administration time;
- scholarship time of the academics;
- central services, together with their estates costs, including finance, registry, student support, secretariat etc;
- academic services, including the library and central IT facilities;
- departmental secretarial and administrative staff, and departmental non-staff costs. The latter includes any costs incurred for PGR students that are not chargeable to a specific project studentship or project grant;
- the TRAC COCE (cost of capital employed) adjustment.

1.64. Indirect cost rates have been calculated under TRAC. As for the estates charge, the robustness of this data is still increasing, but the additional data from 37 of the most research-intensive institutions gives a well-informed mean for the sector. There is one indirect cost rate for each institution, again expressed as £ per FTE. PGR students have been weighted at 0.2 with



supervisors/investigators/RAs again at 1.0.

1.65. We discuss the PGR weighting of 0.5 further in Chapter 2 below.

#### Year 4

1.66. The normal registration period for a PGR is three years for a full-time mode of study and six years for part-time study. All of the time of the supervisor and examiners is included in the methodology, irrespective of the year in which it was provided. Significant one-to-one supervision may be provided in Year 4 of a FT programme, for example, and this time will have been included in the costs. At the end of Year 3 the normal registration period will have come to an end, but most students will not yet have submitted a thesis. Institutions then change the status of students to represent this 'writing up' period, conferring status as a 'continuing student' or similar.

1.67. The inclusion of the indirect and estates costs of Year 4 varies according to the actual practice of the programme. If a science student is no longer in the lab, no consumables or laboratory estates costs have been included. If they are still on campus, and allocated a desk, then the indirect and generic/classroom estates rates have been applied. If they no longer have access to a desk, or to the library, then they are in effect off-campus, and have not been allocated any indirect or estates costs.

1.68. However, in the initial calculation of the indirect and estates rates, only the number of registered students had been used. This means that all of the estates and support costs for Year 4 identified through the method outlined above would have actually been included within the costs for years one to three (FT). Therefore we included Year 4 estates and indirect costs in gross costs, but excluded them from the net costs.

1.69. We did not include any examples of students who choose or are required to register beyond the minimum period required for their degree.

#### Attrition

1.70. We have not built in any costs of attrition. Attrition (student withdrawal during or at the end of a year) becomes a cost if funding is no longer available for the training and supervision costs already incurred for that student. (This might be an issue for the funding deriving from the HEFCE funding method for teaching, for example.)

## 2. THE COSTS

### Cost summary

2.1. Table A (a separate Excel file on the web with this report) shows the costs for each case study programme:

- ten programmes were studied in band A, covering 7 disciplines;
- five programmes were studied in band B, covering 4 disciplines;
- seven programmes, each covering a different discipline, were covered in band C.

2.2. Table 2 gives the averages for each banding.

**Table 2**  
**Summary of case study costs**

£ per FTE student	Band		
	A	B	C
<b>Gross institutional cost</b>			
Total programme	99,944	74,248	54,764
<b>Each of 3 years</b>	<b>33,315</b>	<b>24,749</b>	<b>18,255</b>
<b>Percentage of C</b>	<b>182%</b>	<b>136%</b>	<b>100%</b>
<b>Net institutional cost</b>			
Total programme	79,132	62,481	47,399
<b>Each of 3 years</b>	<b>26,377</b>	<b>20,827</b>	<b>15,800</b>
<b>Percentage of C</b>	<b>167%</b>	<b>132%</b>	<b>100%</b>

2.3. The first part of this table shows gross institutional costs (which includes all costs, but also some double-counting of costs). These figures give the best representation of the real differential between bands. It shows that band A costs are 182% of those of band C; and that band B costs are 136% of those of band C.

2.4. The second part of Table 2 shows net institutional costs, where double-counted costs are removed. This shows that band A costs are 167% of those of band C. Band B costs are 132% of those of band C.

- 2.5. Net institutional costs give the best representation of the annual cost which needs funding (from whatever source). The annual costs of a band A student are just over £26k. Those for a band C student are just under £16k. Those for a band B student are just under £21k.
- 2.6. This masks a wide range. Net institutional costs for one year showed a range of, broadly, plus or minus 15% of average.
- 2.7. We added to the robustness of the data by increasing the sample size, and using standardised data. This is shown in Table 3.

**Table 3**  
**Standardised costs**

		A	B	C
<b>Net institutional cost</b>				
<i>Academic hours</i>		379	312	259
<i>Rate/hour</i>		48	42	42
Salary	£	18,188	13,088	10,897
<i>Indirect/estates rate</i>		42991	42991	40037
Academic indirect/estates *	£	9,423	7,669	5,845
<i>Indirect/estates rate</i>		13166	13166	9447
PGR indirect/estates *	£	37,798	37,798	26,641
Consumables	£	12,908	3,891	0
Bursaries/waivers	£	9,000	9,000	9,000
Total programme	£	87,317	71,446	52,383
<b>Each of 3 years</b>	<b>£</b>	<b>29,106</b>	<b>23,815</b>	<b>17,461</b>
<b>Percentage of C</b>		<b>167%</b>	<b>136%</b>	<b>100%</b>

\* Excluding consumables

2.8. The standardised averages were made up as follows:

- the survey data was used to provide additional data points for academic hours – the hours are now based on the 22 case study programmes and the 33 survey programmes. Hours given in the survey were higher than the case study programmes in the band A disciplines, lower in the band C disciplines;
- the salary cost per hour from the case study institutions was applied:

however, band B costs were assumed to be those of band C<sup>12</sup>;

- average indirect cost rates and estates charges, obtained from 37 research-intensive institutions, were applied. These are between 12% and 16% higher than those from the four case study institutions alone;
- average consumables costs, from the case study institutions and from the survey institutions, were applied<sup>13</sup>. Average consumables costs from the case study institutions were 75% higher than average consumables costs from the survey institutions.

2.9. Table 3 also shows that band A costs are 167% of those of band C. Band B costs are 136% of those of Band C. This represents a minimal change from the net institution averages (Tables 1 and 2). This masks an increase in the number of hours in band A, offset by a reduction in the consumables costs in band A subjects.

2.10. The annual costs for bands A and B have increased by about £3k; and those for band C by about £2k. This is due to the higher indirect costs and estates rates in all bands, and the higher number of hours in band A subjects, again offset by the reduction in consumables in band A subjects.

## Cost drivers

2.11. The main cost elements are described below, with comments on the main factors that influence the levels of these costs.

### Academic staff time (13% of band A gross institutional costs)

#### *Style of supervision*

2.12. The style of the supervisor has a major influence on the amount of time spent on supervision. For example we identified a “hands-off” approach where 180 hours was identified for an anthropology programme; and nearly double that, 324 hours, in an economics programme, where the supervisor/department aims to give students an experience that is equivalent to a US (6 year FT) programme. However, we were told that both examples, and indeed all of the case study programmes, were consistent with both the Quality Assurance Agency (QAA) code of practice and the institution’s own code of practice. Personal factors such as having more time available, or being new to supervision, are likely to lead to a higher time input.

#### *Type of student*

2.13. Of equal significance (and of more importance perhaps), is the input that a particular student needs. A great deal hinges on the demands that the student

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<sup>12</sup> The case study average showed a lower cost per hour than for band C, but this was more likely to have arisen from the small sample size, rather than reflect a real difference in Bandings.

<sup>13</sup> Part 2 of the survey – but only taking consumables funded through earmarked PGR grants (RTSG, CASE, project studentships, bench fees) and those funded through departmental funds. Excluding those funded through the budgets of other research projects.

makes and the challenges of the research that they undertake. We generally asked for data for a typical student (which some academics found difficult to identify), but then amended this time for the needs of the full range of students, to ensure it covered the whole student profile. Each student's needs differ: supervisors identified the following as key influences in increasing the time "normally" required:

- English is not the student's first language, or the student has poor communication or literary skills;
- the research methods are novel. One chemical engineer noted that a new technique or novel approach would require more one-to-one input because of the risk to the outcome of the project;
- the student experiences personal problems leading to a lack of focus or demotivation. These might include writing block, relationship problems, homesickness, family responsibilities, disability issues, financial difficulties;
- their academic background, and the extent to which the research takes the student into unfamiliar territory;
- their ability. A student with great ability can require either much less time than other students, or conversely "the best PG student researcher is one of the most innovative and most demanding";
- the student's own personality. One academic commented that the amount of time he spent with a student depended not primarily on "how bright they were" but on "how much they like to talk".

#### *Type of project*

2.14. Different projects can make different demands:

- one academic noted that an industry-sponsored chemical engineering student required more of his time because of quarterly review meetings with the sponsor and annual half-day presentations of findings. Another academic included 50 hours (10% of his total time) because of additional meetings in industry;
- similarly, self-funded overseas students, often with backing from a government source, might need at least six-monthly reports to take back;
- location off-campus might increase time – for example an academic in a geography department identified that PGR students with research including significant fieldwork elements required an additional 100 hours supervision time, compared to those based in campus laboratories.

#### *Other characteristics*

2.15. The survey respondents marked certain key characteristics in order of their impact on time as shown in Table 4.

**Table 4**

**Characteristics that lead to more or less supervision time**

Characteristic	Band A	Band B	Band C
The student has a background in research or industry	2	3	
There are particular challenges about the research methodology or technique being used	4.4	4.8	4.6
The student is also a member of staff			4
The student is part-time and not a member of staff		3	2.5
The student is working as part of a team on a larger funded project	2.7	4	
The student is working alone on a one-man project	3.8	3.6	3.5
The student is based off-campus for all or some of the time	3.5	3.3	3.4
The student experiences a problem which impacts significantly on the progress of work	4.8		4.5

The characteristics were marked as follows:

- 1: significantly less time required, compared to a student displaying this characteristic. Significantly was defined as 20 hours or more, across the whole programme.
- 2: a little less
- 3: no different
- 4: a little more
- 5: significantly more

The table shows the mean scoring for each characteristic, given by those who gave any scoring to that characteristic. Other characteristics not suggested in the survey were identified by some individuals.

2.16. If a characteristic shows an average score of around 2 to 4, then there is little impact on the time required. A score of around 1 or 1.5 shows less time is required; a score of around 4.5 to 5 shows significantly more time is required.

2.17. No characteristics led to significantly less time. The characteristics that led to significantly more time were a challenging research methodology; and a problem experienced by the student. Other characteristics were identified by survey respondents as leading to significantly more time – these concurred with those identified through the case studies, listed in paragraphs 2.12 to 2.14 above.

*Robustness of estimation*

2.18. We considered how much our reliance on estimates might influence the robustness of the data we were given for academic staff time. No supervisors that we talked to held records of the time they actually spend on supervision: the figures were their best estimates (although informed by a detailed consideration of weekly activities).

2.19. Academics did use different methods of calculating time (notably a “bottom-up” identification of the hours per week provided in supervision, versus a “top-down” calculation based on the time available in a week to carry out a set of research activities, including PGR supervision). However the end figures calculated through these two different approaches were not necessarily

dissimilar.

- 2.20. We believe that some of the lower figures given by case study departments are more likely to be an understatement rather than an overstatement; but that it is possible that the converse is true of the survey institutions. By increasing the overall data set size, we hope to have reduced the impact of the estimations in this area.

#### *Discipline*

- 2.21. The discipline area also leads to differences in the levels of time. The responses from the survey clearly indicate that higher costs of staff time are found in band A (182% of those in band C) and in band B (131% of band C). Although the averages of the case study respondents did not concur with this (all bands showed the same number of hours), there was a very wide range given in both cases, and considerable overlap. This spread is not surprising, given the number of characteristics that influence the amount of supervision time, and is the reason why we added to the case study responses through the survey.
- 2.22. Taking an average from all respondents in each discipline, band A shows costs of staff time that are 167% higher than those in band C, and band B shows costs that are 120% of those in band C. (These are shown in the table of standardised costs, in Table 3, above).

#### Indirect cost and estates cost (47%)

##### *Institutions' cost levels*

- 2.23. Perhaps the most significant influence on the level of indirect and estates costs is the institution. A wide range of institutional factors come into play. However, using the sector average in the standardised figures helps to remove any institutional issues from the totals and comparisons.

##### *The PGR weighting*

- 2.24. The weighting given to PGR numbers, within the calculation of the rates themselves, has a significant effect on costs.
- 2.25. The weightings used for the calculations in this report are those recently approved by the JCPSG (see paragraph 1.17). The impact of the PGR weighting on the costs of a student can be seen in Table 5, which shows the levels of indirect/estates costs if the weighting was 0.5, compared to an average weighting of 0.3 (derived from the three weightings). The higher weighting would lead to an increase in the annual cost of a student of £5k (band A) and £6.5k (band C). This is 17% and 38% of the net standardised cost (bands A and C, respectively).

**Table 5**  
**Impact of PGR weightings on indirect/estate costs**

Sector averages	Band	
	A	C
<b>PGR weightings used in this study</b>		
Rate per PGR		
p.a. £	13166	9447
Costs per PGR prog <sup>14</sup> £	39498	28341
<b>Alternative PGR weighting</b>		
	<b>0.5</b>	<b>0.5</b>
Rate per PGR		
p.a. £	18243	16028
Costs per PGR prog £	54729	48084
Difference		
prog £	15231	19743
<b>p.a. £</b>	<b>5077</b>	<b>6581</b>

The PGR weightings used in this study are 0.8 laboratory estates, 0.5 non-laboratory estates and 0.2 indirect costs: an overall weighting of around 0.3.

The difference shown in this table is slightly overstated as, when the weighting is increased, costs are transferred from PIs (and RAs). The indirect/estates cost on the supervisors' time would therefore decrease. This impact of this is not shown here.

#### *Sub-discipline areas*

2.26. The use of different estates charges for laboratory and non-laboratory programmes (and a combination of these for part-laboratory programmes) means that the discipline type is reflected in the costs. However this is not fine enough to reflect sub-disciplines, or even to reflect different departments within, for example, the laboratory group.

One chemistry department, a band A subject, illustrates this perfectly. The subject is organised into three sub-disciplines – synthetic, experimental and theoretical/computational. Synthetic chemistry requires an intensive use of space and equipment, with bench space, electrical supply and fume hoods for all researchers. Large and expensive equipment is required (mass spectrometers, nuclear magnetic resonance equipment, crystallography). Physical or experimental chemistry has a requirement for mechanical, machining and engineering workshops and specialised tailor-made kit, but is much less space and equipment intensive. Theoretical or computational chemistry requires mainly paper and computer work. All three sub-disciplines are treated the same in terms of both the calculation and application of a laboratory estates cost rate.<sup>15</sup>

<sup>14</sup> This figure is slightly different from that in Table 3 as consumables have not been deducted here.

<sup>15</sup> However, by 2007, TRAC requires institutions to identify staff and students in laboratory departments who are not working on laboratory-based projects, calculate rates on this basis, and apply a generic rate to their projects. This would mean that the generic rates would reduce slightly (more FTEs in the calculation) and laboratory rates would increase (fewer FTEs in the calculation).



Classics, in band C, provides another example, with the difference between language/literature based studies and artefact based studies. Much of the requirement for manuscripts can be met through electronic sources (albeit with obvious requirements to view the source material), whereas the requirement to study artefacts and sites in situ has obvious time, travel and potentially conservation/storage costs.

#### *Year 4*

- 2.27. Most students complete during Year 4 and, theoretically at least, incur indirect and estates costs (as most are still on-campus), albeit at reduced levels. These costs are included only in the gross institutional costs figures on Table 2, not in the net institutional costs.
- 2.28. The level of these costs depends on whether the students are on-campus, and if so, if they use laboratory facilities. We found a small discipline difference here. There is more time spent in Year 4 in band C programmes, and this leads to a higher addition to cost in that group (£5k compared to £4k in band A). However this would not be included as part of the differential calculated on net costs.

#### Consumables (31%)

- 2.29. Consumables are very discipline dependent. Band A programmes incur significant consumables costs, those in band C do not. However, consumables are even more project dependent. One example in particle physics illustrates this. A device is being developed at the university for eventual use at CERN (the European organisation for nuclear research) – our case study institution is part of a collaborative project involving other British and international partners. The development project is expected to last seven years, and after location to CERN, the project may run its experimental phase for ten years. PGR students are currently working on the development project, and future students will work on the project in its experimental phase. The development part of the project is intensive in its use of consumables, but once the project enters the experimental phase, only computer database facilities will be required. Ostensibly the students will be working on the same project within particle physics, but the phase of the project impacts greatly on the cost involved.
- 2.30. Another example can be seen in civil engineering. We saw two projects, one a soil based project and the other a concrete structures project. The level of consumables on the first was only 10% that of the second.
- 2.31. The net costs we calculated specifically excluded the amount funded through research project or studentship budgets. This averaged about half of the total consumables requirements in the band A case study programmes (although it varied from 100% to 25%).
- 2.32. We also excluded the double-counting of the balance of consumables that was present in gross costs (which includes departmental spend both in indirect costs and as a separate consumables item). We did this by reducing all indirect costs (including for bands B and C) equally.

### Scholarship/bursaries/fees remission (9%)

- 2.33. The level of this cost reflects the level of investment that the institution, and the department, is prepared to make (for example, to produce publications that can be submitted to the RAE), and the funds it has available, either explicitly through foundations or through its own resources. We do not know if the level of scholarship/fees remission at the four case studies (which was the same at each) is representative of other institutions.
- 2.34. Whilst it has been assumed that these costs do not differ between disciplines, they could do so. This would arise particularly from the different levels of stipends being paid, and fees being charged for different subject types.

### Part-time students

- 2.35. There are considerable numbers of PT students in the sector.<sup>16</sup>
- 2.36. Unfortunately, very few of the supervisors in our case studies had experience of PT students (it was often the policy of the institution, or the nature of the discipline area, for students to be studying FT). We discussed the training and supervision of PT PGRs mainly in humanities and business departments. We were able, however, to draw upon additional information from some of the survey respondents.
- 2.37. Overall, the hours required in training and supervision may not be very different for a PT student than for an FT student. (Some PT students are not able to attend the masters modules that their FT counterparts attend, but any reduction in hours due to this is probably more than offset by an increased input in supervision because of the longer elapsed time.)
- 2.38. Our sample was not large enough to get robust information on entitlements to, and use of, desk and laboratory space. If the entitlement of a PT student is as much as an FT student, this would significantly increase the costs of a PT student FTE, over that of an FT student. However, some PT students are also members of staff, and many are in employment, and may not use facilities as much as FT students. Overall, we have assumed that their estates costs are the same, per FTE, as those for an FT student. This could benefit from further study, if deemed necessary.
- 2.39. In terms of indirect costs, we have already explained the difficulty of linking spend in this area to the whole activity of training and supervising PGR students (rather than to research projects). It is consequently as difficult to identify the respective costs of a PT versus an FT student. In undergraduate teaching, PT students have been shown to cost more than FT students (partly because of their longer elapsed time, with many central services costs being driven by headcount, not FTEs).<sup>17</sup> However, we have assumed for the

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<sup>16</sup> Of the 65,725 students following a doctorate degree mainly by research in 2002/03 (excluding those writing-up), 22,910 or 35% were part-time. If they are each assumed to equal 0.5 FTE, then they would make up about 21% of research student FTEs. (Source HESA, 2002/03, UK.) The type of PT student varies considerably, but many are likely to be in employment.

<sup>17</sup> “The costs of alternative modes of delivery”: a study for HEFCE by J M Consulting, June 2003.

purposes of this study that the indirect costs of PT students are the same, per FTE, as those for FT students.

2.40. Given these assumptions, the costs for a PT student have been calculated as the same, pro rata, for those of an FT student. This is, however, based on limited evidence.

## Differentials

2.41. Band A projects are on average 167% of the net institutional costs of band C, as seen in Table 2 (this percentage is higher in the gross institutional cost totals).

2.42. The range of all sets of data is wide (band A figures generally range from -15% to +25% of the band A average)<sup>18</sup>; but there is little overlap between the net institutional costs in bands A and C.

2.43. The differential arises from the following factors:

laboratory estates costs	29%
consumables funded from departmental budgets	35%
academic staff salaries	3%
	-----
	67%

2.44. This differential in net costs is, if anything, understated. Firstly, it does not recognise the full costs of consumables (i.e. those funded through projects). Secondly, it does not include all of the new costs of skills-training (which may not be completely covered by the new SET funding).

2.45. A band A project could be characterised by the fact that it was carried out in a laboratory department, and a band C project by the fact that it was not.

2.46. Band B projects could not be so easily described. We used the current subject classifications. We found that our sample of band B projects showed a cost that is between that of bands A and C.

## Net institutional costs

2.47. The level of costs identified in this study for a PGR programme or year of study is probably significantly higher than many in the sector have expected or assumed in the past. Most supervisors would only be considering marginal costs – stipends (if necessary), consumables, and fees waived. Considerable effort is made in identifying sources of funds for consumables (including in many departments not taking a PGR student on unless they can work alongside an existing research project team). Indirect costs and estates costs for research (including the TRAC adjustments to ensure full economic costs are considered) are only beginning to be understood in institutions, and are still only

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<sup>18</sup> Excluding one low outlier.

at the level of the finance department and a few senior managers in each institution. The focus has not yet moved onto identifying the full economic costs for PGRs; and considering what to do about low recovery rates.

2.48. It does not help that the training and supervision of PGR students is not considered by some academics to be a separate activity, to which indirect and estates costs should be allocated. ("PGR students are an input, contributing to research project outputs, not a separate activity".)

2.49. The benefits of PGR students are well known and strongly felt in institutions; we cover them next.

### 3. BENEFITS

- 3.1. As demonstrated above, it can cost a significant amount of money to train a postgraduate research student. The extent to which costs are met by funding varies, and is explored more in the next section. However, universities are not training and supervising PGRs on the basis of a cost/funding analysis. They are actively seeking to recruit and train PGRs because they consider that there are overwhelming benefits in so doing. We have explored this with the case study institutions.
- 3.2. The overriding benefit of training the next generation of researchers and academics is universally acknowledged: it is to increase the supply of RAs (including to the supervisor's own department). "It is tradition, and a function of universities to provide research training". One supervisor expressed it as an important way of academics being able to "put something back". It has formed a training scheme for many departments' own researchers. This accounts for the enthusiasm of those academics who told us that PGRs take "more effort than we can imagine" and "actually slow you up in your own research".
- 3.3. As important, is the need for a "critical mass" of researchers, of different types, to provide stimulating research activity. PGRs form part of this critical mass and contribute to the "research environment". As one supervisor put it: "it is important to have PGRs to demonstrate in the RAE that you have a 'thriving research culture'".
- 3.4. Some benefits are quantitative and well known – the number of PGRs in a department counts as part of the volume measure in the allocation of quality-related (QR) research funding by HEFCE<sup>19</sup>; and the contribution of PGRs to the number of papers appearing in journals is important in some subjects. In some institutions, PGR student activity is seen as key to moving an RAE grading from say 4 to 5 – and many of those institutions have seen a large increase in PGR numbers over the last 10 years.
- 3.5. In some instances, the extra pair of hands on a funded research programme is also a key benefit. This has variously but inaccurately been described as "cheap labour" or a "relatively inexpensive way of getting research done" - a good PGR can be as productive as an RA, particularly in Years 2 and 3 (after the training in Year 1, and before the writing-up in Year 4). In the same vein, "it brings in fee income". However the cost of a PGR student as perceived by those supervisors is very much less than the full economic cost identified during this project.
- 3.6. Other, less tangible, advantages have also been put forward as benefits in their own right of having PGRs in the department:
  - it is a mark of a good researcher;

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<sup>19</sup> This arrangement will come to end in 2005-06 with the introduction of a new HEFCE PGR funding methodology.

- the largest UK department of a particular subject articulated the benefit of future academics in other universities having been trained locally. Benefits of synergy, understanding and approach were envisaged in collaborative projects, a recurring and increasing theme in large funded research projects;
- PGR projects give the opportunity to start research into new or blue sky areas which are not yet ready for major funding from Research Councils – a thesis on a new subject might take a topic to the point where funding is possible;
- it gives access to unearmarked funding – or unearmarked research activity which does not have to be justified to an external sponsor (or seen by one's peers) and therefore gives more freedom of choice to the investigator. Few academics have time to do their own curiosity-driven research, and PGRs provide the means for an investigator to take this forward. It allows them to write papers (with the PGR students) – often a contractual requirement, as well as a driver of income (the RAE) and an indication of status. It helps to “pump-prime research activity”;
- it supports other research activity. One professor saw PGR students as staff. He “wants good researchers to conduct his research”. He did not see much difference between a postdoctoral researcher and a doctoral student, except in the amount of experience that they had. Another commented that his PGRs often worked alongside researchers on an externally sponsored research project: “PGRs have a discrete body of work but contribute to the progress of the contract, for example by providing data or analytical services. They are not directly funded by the project sponsor for this”;
- the presence of a group of the brightest young researchers in a department plays a key part in attracting the top overseas academics, especially where the department cannot expect to compete financially. It is an important part of the package of support for leading professors – “star professors want PhD students working closely in their research areas to help them with their research”.
- PGR students contribute to teaching. They are paid for this, but often at a lower cost to the institution than members of staff.

## 4. FUNDING

- 4.1. Although it was not strictly part of our terms of reference to consider funding, it was necessary for us to understand this in order to ensure that we could present the costs in the most appropriate way. It provides a useful context to the study, and is included here to assist with the interpretation and use of the cost data.

### Types of funding

- 4.2. Funding can come from a variety of sources for the same student: tuition fees, project grants, research training support grants and specific allowances, bench fees, and through the HEFCE resource allocation model for both teaching and research.

#### Tuition fees

- 4.3. The DfES sets a guideline for an annual fee rate for tuition fees for home and EU students, including fees for postgraduate research students. This fee rate is assumed by HEFCE in its calculations of resource and is generally adopted by universities as the home/EU rate for postgraduate research (exceptions in practice occur for high value courses e.g. petroleum engineering, law). The figure for 2003/04 was £2940 p.a.
- 4.4. Universities are free to set their own rates for students from overseas, and most universities differentiate between subjects. Examples of the rates for 2003/04 are:
- Clinical medicine            £17k to £20k p.a.
  - Non-clinical science        £10k to 14k
  - Non-laboratory subjects    £8k to £11k

#### Consumables

- 4.5. In addition to tuition fees, students (or their sponsors) may be expected to make additional payments for bench fees, travel costs or consumables. In practice, whether or not these additional funds are requested by the university may depend on the source of the student's own funding.
- 4.6. The availability of funding to cover consumables varies according to the type of studentship and the funder.
- 4.7. Students funded by an external sponsor to carry out a particular research project may also be funded for specific project consumables – a significant amount in some science subjects, as seen in the cost profiles in Table 1. Self-

funded students will typically pay a bench fee only, unless specifically required to make an additional payment to cover full consumable costs.

- 4.8. Each Research Council has a slightly different arrangement: specific project studentships tend to cover anticipated full consumable costs, but other studentships do not provide actual costs but are accompanied by an additional element (the Research Training Support Grant, RTSG) of £1k p.a. to cover any costs. Research studentships funded through a Doctoral Training Account (DTA) will be eligible for consumables funding through the total grant awarded to the department, and it is up to the department to allocate and account for the funds.
- 4.9. All studentships funded by the Research Councils<sup>20</sup> also attract a variable amount of travel and conference funding (£180 to £300 p.a.). Where there are anticipated overseas or fieldwork elements to the programme, these may also be separately funded by the Research Council.
- 4.10. CASE awards (Co-operative Awards in Science and Engineering) may attract additional payments from the collaborating organisation (industrial or commercial sponsor, or local authorities, research council institutes etc). This may be given to either or both the student and the department.

#### Stipends

- 4.11. We excluded stipends from the costs. Therefore, when referring to “funding” here we are generally including the funding to the university for tuition fees and associated expenses, and not the funding received by the student in the form of bursaries or stipends if these apply.
- 4.12. In some cases stipends are paid to students by the university, with funding from the DTA, or a project studentship, or an industrial or other sponsor. (These costs were not included as part of the full economic costs in this study. Their inclusion in costs and in funding would alter the percentage recovery of full economic costs shown for those students.)
- 4.13. All four case study institutions operated bursary/scholarship schemes, which covered stipends being paid to students, and/or the waiving of tuition fees. There would be no funding for these students apart from HEFCE (teaching and research grants), if eligible. (The waived fee is in effect funded through a “cost” on all PGR activity, as shown in the full economic cost totals.)

#### HEFCE teaching and research funding

- 4.14. PGR student numbers provide one of the volume measures in both the teaching and research funding models. They are one of the proxies used to indicate volume, for HEFCE’s calculation of the total amount of QR (and teaching) funding for each institution. The amount of QR allocated in the model on the basis of PGR student numbers is not an indication of the amount that should be earmarked in an institution for PGR supervision and training. HEFCE

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<sup>20</sup> Including the Arts and Humanities Research Board.



provides a block grant covering all of teaching and research, and does not ring-fence these grants to require their use in funding the training and supervision of PGR students alone.

- 4.15. However, institutional resource allocation models are often based on HEFCE's funding models, and it is therefore of interest to consider how these models currently work.
- 4.16. The total funding allocated through these models on the basis of PGR student numbers is £303M (2004/05). The PGR FTEs eligible for HEFCE funding totalled 42,419. A notional average funding from HEFCE of £7,147 per home/EU student can therefore be calculated for 2004/05. In practice, however, the attributable funding for each PGR student varies according to:
- subject – and the resultant teaching price band (A to D) and research band (A to C).
  - year of study – with year 1 attracting T funding and years 2 and 3 potentially attracting R funding
  - RAE rating of the department – with varying eligibility in years 2 and 3 for both supervision funding (for units rated 3a and above) and as a proxy measure in calculating QR (for units rated 4 and above)

#### Other funding

- 4.17. Two other sources of funding are not included in this analysis:
- the Roberts training funding (some £850 p.a. per FTE for Research Council PGRs, less for the Arts and Humanities Research Board, AHRB) which is expected to be matched by other sponsors. The costs of any additional training provided through this new funding are also not included. We understand that the costs of this may exceed the funding, but we have not built this into our analysis;
  - writing-up status: one case study institution required a £125 "continuation fee" by students so that they could be given access to facilities (not laboratories) during their Year 4 writing-up period.

## Funding per PGR

4.18. As a result of the different types of funding schemes, a number of PGRs working side by side on a project may bring markedly different revenue streams to the university.

4.19. Some examples of how the different funding streams might impact in practice are shown in Table 6.

**Table 6 Examples of different one-year funding flows, by sponsor**  
(2003/04 rates)

		Research Council	Research Council	
		Project	Overseas/	
<b>Life Sciences</b>	Research Council	Studentship	Self-funded	
	Studentship	Studentship		
Tuition fees	2940	2940	12000	
Bench fees			1000	
RTSG	1000	1000		
Consumables		14000		
T&S	180	180		
<b>Total</b>	<b>4120</b>	<b>18120</b>	<b>13000</b>	
<b>Classics</b>	AHRB	Home/EU	Overseas/	
		Self funded	Self funded	
Tuition fees	2940	2940	9500	
RTSG	1000	1000		
<b>Total</b>	<b>3940</b>	<b>3940</b>	<b>9500</b>	
<b>Physics</b>	EPSRC DTA	PPARC	Overseas	EPSRC
	***	Studentship		Project
				Studentship
Tuition fees	2940	2940	12000	2940
Bench fees			1000	
RTSG	1000	1000		
Consumables	10000			10000
Student stipend				** 10500
46% overhead on stipend				** 4830
<b>Total</b>	<b>13940</b>	<b>3940</b>	<b>13000</b>	<b>28270</b>

Notes to Table 6:

\*\* Stipend costs are not included as part of either the gross or net institutional cost calculated under this project. The 46% calculated on the stipends is currently under review by the Research Councils.

\*\*\* The example given for the doctoral training account is only one illustration of numerous variations in a funding method where the institution identifies how it wishes to spend the funding, on how many and on which students.

4.20. This table excludes:

- the skills training SET funding of £850 per student (the costs are not included);
- HEFCE funding (teaching and research);
- any continuation/writing-up fees.

## Levels of cost recovery

4.21. Institutions are recovering just over 60% of their costs on research for the Research Councils (excluding any funding from HEFCE or other sources).<sup>21</sup>

This is likely to rise to at least 70% with the additions to Research Council funds, from 2005/06.

4.22. Recoveries on PGR student activity vary widely, depending on the type of student. Examples given above in life sciences and physics showed those with funding of around £4,000, £14,000 and £18,000 (excluding stipends, and excluding any funding from HEFCE). This can be compared to costs of around £30,000 (standardised costs, Table 3) – recoveries of 14%, 48% and 62% respectively.

4.23. In a classics example, funding of £4,000 can be compared to costs of £17,500 – a recovery of 23%.

4.24. These figures do not imply that it is not in an institution's interest to take PGR students. The benefits described in Section 3 are compelling.

4.25. However this cost/funding information will be of interest to institutions as they prepare to meet the sustainability agenda outlined by the Government.

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<sup>21</sup> Average figures for the most research-intensive institutions, from sector benchmarking information provided to the quality assurance team reviewing TRAC implementation during 2004. The costs and income would generally (but not very robustly) include that for PGR students, but exclude all of QR.

## Annex A Survey and description of activities

(separate Excel file)

## ANNEX B

### Approaches to PGR training and supervision

1. During our case study visits, we obtained descriptive information about approaches to training and supervising PGR students that informed our costing, and are also of potential interest to a wider audience. For this purpose, various aspects of PGR training and supervision are discussed here in more depth than in the main report. Five aspects are covered:
  - i. Types of student;
  - ii. Supervision;
  - iii. The QAA Code of Practice;
  - iv. Masters courses;
  - v. Year 4.
2. Whilst this Annex cannot provide a comprehensive picture of each aspect, it should be of use in furthering understanding about the nature of the training and supervisory activity being carried out.

#### **Types of student**

3. Paragraph 2.13 of the main report describes how the type of student can have a significant impact on the supervision time required.
4. The postgraduate research student is not an easily defined individual. There are many possible combinations of students' origin and status. The student may be full or part time. Their academic background may be an undergraduate degree, a masters in research, or a professional qualification (such as practising medics). They may simultaneously be a member of staff of the university – either as a full-time member (such as a librarian, a researcher, an accountant) or as a part-time member to comply with employment requirements (such as a clinical research fellow). The student may be from the UK ("home"), the EU or overseas.
5. There are an equal number of possible variations in the way that the student's work is carried out: some due to the nature of the institution, some due to the nature of the subject and its sub-discipline, and some due to the nature and detail of the student's source of funding. The student may be required to be on campus for a formal programme of work for at least part of the three-year programme – or not. The student may be located on campus for all of the time involved, or off campus for the whole of the work, or a combination of the two. The student's work may be as part of a long-established team of researchers (perhaps working on a 10 year development project), or as a lone researcher translating an original manuscript for the first time.
6. It is not possible to describe a typical student across the whole of the HE sector. It is equally impossible to describe a typical student for an institution.

However, it is possible to describe the pattern of learning which is most likely in a particular subject for a particular institution and to describe variations from that typical range. It is this approach we have used for each case study when developing the costs. In so doing, the factors we have considered in identifying the typical student, who is the subject of the costing, have included:

- is the student part time or full time;
  - is the student self-funded, funded by a Research Council (through either a DTA, a research studentship or a project studentship), by a charity, or by an industrial partner;
  - does the student spend a part of the study time off campus, either for primary investigation (such as studying artefacts), for collaborative work (such as a development project for CERN), for data gathering (data collection from telescopes or environmental observations in the rainforest), or as part of a development project for an industrial sponsor (at a research or factory site);
  - is the student working alone or as a co-worker in a development project (to consider the impact of the training being available from more experienced colleagues, and from the principal investigator leading the research);
  - does the student have adequate skills in communication – both written English and presentational. (This issue is not necessarily directly related to English being the student's first language);
  - has the student relevant experience in the research techniques required, both academically (from previous degrees, both undergraduate and appropriate masters) and practically (from workplace experience);
  - has the student the academic rigour to approach the work at the outset (considering the need to develop specialist subject knowledge in previous learning, and to augment language skills – e.g. oriental scripts – if necessary).
7. These factors relate primarily to the previous equipping of students to approach their task. Access factors that are issues in undergraduate provision will also be influential in postgraduate education: mature students with family commitments, students with non-standard prior qualifications and students with particular learning difficulties may require more support and supervision and different access to learning materials from others in their peer group. This may have a cost impact. This is not addressed specifically in our costing method.
8. As an illustration of how different a "typical" student might be in different institutions and across different subjects, we describe four examples below:
- A student in receipt of a PPARC research studentship in an astrophysics department might expect to be working on an individual project to map an area of space, accessing previously collected databases, with annual visits to an overseas telescope for observations. The work would be first authored by the student.
  - An EPSRC project student in particle physics might be working on the development of a piece of measuring equipment intended for a large instrument ultimately to be located at CERN. In this development phase of the project, which might last for five or six years in total, the student would

be based at the university. The student's project would be to simulate measurement on the equipment and would be jointly authored by others in the project funded research team.

- A self-funded overseas student in classical literature might expect to spend four years translating and attributing an original Greek manuscript. Necessarily, first hand access to the manuscript is required, and the student would be based for most of the period at an Athens university. The student would be supervised by an academic in the UK, who regularly visits Athens as part of his own research work. The output from the work would be a sole authored monograph.
  - A self-funded student might be working on a large Research Council project in a science laboratory. The student is working as part of the research team composed of research staff who are funded by the Research Council. The student provides data analysis that is used by the team for their work: in doing so, the student uses some of the consumables earmarked on the research budget for this project.
9. These four are examples of the range of arrangements we have found. The two physics examples show the difficulty in assuming homogeneity within a subject: academics we have talked to all point to distinct classifications within their subject which imply very different resource requirements. In some instances, the phase of the work is also a significant factor. This example of particle physics would show a very different cost profile if the project had moved into the CERN-based experimentation phase.

## **Supervision arrangements**

10. Supervision is the primary mechanism by which the student's term by term development is managed, and their individual progress and achievement is measured. It is a driver of a significant part of the costs (13% to 120%).
11. All the institutions we visited have a minimum specification or outline of what the student can expect from a supervision structure. In all these instances the expectation is set out in a handbook or code of practice, which we understand is received by all students (and is in all cases available online). We have also been made aware of the requirement in one institution for the student and supervisor to complete a log of meetings and outcomes over the whole period of study. Another required formal records to be kept of fortnightly discussions, and for formal progress reviews to be held at structured points in the programme (involving assessment). All of the case study institutions monitor and evaluate the supervision sessions as part of regular quality audits, through termly reports from supervisors to the departmental graduate tutor, and in one instance, together with the student's own quality questionnaires.
12. Although our work does not require us to evaluate these arrangements, nor are we indicating we have done so, our findings do illustrate that formal supervision structures and requirements are in place and that their effectiveness is evaluated, and these minimum requirements can be relied upon as "norms" for the costing of individual examples.

13. Although formal arrangements have been specified, and are met as a minimum, the day to day supervision of a PGR student does vary greatly according to a number of factors. It can be arranged through formal fortnightly meetings; meetings at the end of each assigned task; day-to-day contact in a research laboratory; or less formal “knock on door” contacts. Some examples are given below, to illustrate the range of practice according to particular circumstances:
- in a physiology lab, the professor is in receipt of a programme grant from a medical charity and may supervise from 2 to 6 students at any one time. The students working in the lab will be addressing an aspect from within the immediate range of issues within the programme grant. For at least the first four months of the student’s programme, a range of basic lab techniques will be taught, principally through demonstration by the postdoctorate research assistants in the lab. The lab is a room of about 40 feet by 40 feet. There is bench space for 6 people and some static large equipment. On another floor is a researchers’ room where each junior member of the team has a desk – the academics each have their own small office. This professor works in the lab alongside her students and post docs. She spends the majority of her time in the lab and is thus on hand for nearly all of the working day. Apart from the formal requirements for project outline and termly reporting, she does not hold individual supervision sessions with her students – this is fulfilled through constant side by side working for the entire three year period;
  - another example of the supervision of a PGR student being indistinguishable from the supervision of surrounding research projects was described in the main report – paragraph 1.34 footnote 9 (it is included here again for convenience). An academic supervised 7 PGR students, and 7 RAs, who all worked on a set of closely related projects, including that involving the academic’s own research. The supervisor estimated that he spent 3 days a week, or 26 hours, on all of this research activity. He used FTEs to allocate this time – and incorporated weightings of 3 for his own research; 2 for supervising each PGR FTE, and 1 for leading and supervising the research of each RA FTE. 26 hours, divided by 24 units of activity (3 times 1, plus 2 times 7, plus 1 times 7) gives just over 1 hour per unit. Each PGR represented two units of activity – so a weekly estimate of the time required was just over 2 hours per week, per PGR student;
  - a senior lecturer supervising a student on a pure maths programme at a different university used a very fluid approach to supervision, driven by the needs of the student and the area of research. Where new texts are available, and are an integral part of the research methodology, the supervisor spends an equivalent amount of time to the student studying and applying the techniques, in order to determine how to move the project forward. Their involvement in the student’s research arises not only from the need to provide supervision but also because the area being researched is part of the academic’s own research interest;
  - a professor of medicine, practising also as a hospital consultant, operates a pyramid structure to the supervision of PGRs. The area of research concerned has been ongoing for 20 years, with postdoctorate research assistants and PGRs continuously rotating through the programme. Students can expect to see the professor in groups of two on a fortnightly



basis, with ready access to other researchers between times. Additionally, there is a dedicated lab manager, funded through the research programme, to assist and demonstrate technical aspects of the work. A key part of the supervision is e-mail contact. The professor expects to receive and reply to three e-mails per week from each of his students;

- in a humanities department, a fortnightly meeting was a minimum requirement, accompanied by correspondence, and significant reading and preparation outside the meeting. Two hours a week was estimated as supervisory time (including co-investigator/second supervisor input);
- in a laboratory-based psychology department the supervisor expected to see most students once a week. This, plus reading, led to an estimate of 2.5 hours a week time on supervision;
- a smaller amount of time was estimated by other supervisors. A professor supervising a student on a pure maths programme expects to see his student individually for one hour per week throughout the period. This includes the fourth year where the student is writing up, which is actually the heaviest time commitment for the supervisor. Unlike in some other subjects, the student cannot start writing-up until the end of the calculation phase – the maths thesis needs to be written backwards from the end of the period;
- a reader in physical geography is supervising a student carrying out environmental research in the Galapagos Islands. The student will be based there for the entire duration of the programme. For his campus-based students he would expect to see them for 1 hour per fortnight, but in this instance all regular contact is by e-mail. The time spent on supervising is thus about the same – the volume of written work to review is equivalent and the time on e-mail replies falls within the range of 1 hour per fortnight. However, there is additionally a need to visit the student on location – a time commitment of perhaps 40 hours, but some of which is attributable to the academic's own research portfolio.

14. Whether or not the student has a second or co-supervisor varies by institution and by subject:

- in some areas of study two primary supervisors are needed – in area-based humanities, for instance (one for, perhaps, North Africa, one for economics). In some specialised areas it is not possible to offer the student a second supervisor with the same subject knowledge;
- where we have seen formally allocated second (or associate) supervisors, the input of the second supervisor can be restricted (in time) to advice on the development of the research programme, being involved in the progression/transfer process at the end of the first year, and input to the final assessment of the work;
- sometimes the second supervisor only provides an input where there are personal issues between the primary supervisor and the student;

- they can be in the role of academic advisor – where one member of staff offers support to all PGRs, through group events and surgeries (consultation hours);
  - in one department "panel supervision" was used, where two or three supervisors held formal review meetings jointly once or twice a year. This is generally a more costly model in terms of the time required.
15. If a researcher is working close to a PGR student (either physically, or in terms of the research activity itself) there would usually be an interaction between the two. The RA, for example, might show the student how a particular piece of kit is used. However, in none of the institutions did the RA have a formal role as trainer, supervisor or mentor. The RA was considered to be a co-worker, not as a substitute for the supervisor or second supervisor.
  16. Mentors are commonly appointed – a different academic from the supervisor, and often the welfare tutor. We did not include a specific allowance for time on mentoring, but assumed it is in the indirect cost totals.
  17. The number of students being supervised by an individual academic varies according to a number of factors. We saw one example of a medical professor supervising 15 PGRs, but with a defined hierarchical support structure in place. But a professor in a more specialised subject with perhaps only half a dozen such specialists in the world would supervise only 3 or 4 students because of the heavy personal input needed. The supervision ratio can vary over time and according to funding available – for example one professor might expect to supervise 6 PGRs but currently only has 4. Within the small sample of senior lecturers we spoke to, the average number of supervisees was lower – more typically 2 or 3 than 4 or 6. In general, and on average, it would appear that professors supervise more students than senior lecturers and that the typical number of supervisees is between 4 and 6.

## **QAA Code of Practice for the assurance of academic quality and standards**

18. At the time of writing, the Quality Assurance Agency is consulting on a code of practice for the assurance of academic quality and standards in postgraduate research programmes. The impact of the proposals in that consultation document are of relevance to this study to the extent that they have cost implications, or procedural implications which lead to a cost impact, which affect the supervision or management of postgraduate research students.
19. The code of practice contains 27 precepts covering all aspects of postgraduate research, including institutional arrangements, the research environment, supervision, assessment, and complaints and appeals procedures. They could impact on the level of resources required for various areas, including:
  - audit and monitoring;
  - documentation (codified regulations, criteria for assessing standards, etc);
  - data capture and interpretation;
  - admissions;
  - personalised development plans and induction;
  - supervision (including associate supervisor, and explicit progress and review stages).
20. All the precepts potentially have cost implications for institutions: however, with the exception of one precept, institutions express the view that they are routinely achieving the standards being proposed. (It cannot be assumed or denied however, that other institutions not involved in our case studies are as well placed to meet these standards. It should also be noted that some individuals interviewed by us have been closely involved in the development of the code of practice, and we would therefore expect to observe a high degree of compliance in these institutions.)
21. We have observed some potential issues around meeting the code in relation to precept 14: the need to appoint a second, associate, supervisor for each student. This was not routine practice in some of our case study institutions: however, in all instances a second academic would be available to the student through existing mechanisms (such as “the postgraduate tutor”) should the need arise. If the position of second supervisor were to require a formal and regular supervision session – to allow the second supervisor to be involved on a term by term basis in the student’s work, for example by making an input to every progress review – then additional costs would be experienced.
22. However, we have not built this assumption into our costings, as the code is currently at consultation phase and the precise role of the second supervisor is expected to vary according to local circumstances (in our reading of the text).
23. Overall, we have assumed that the code of practice does not add to the costs of training and supervising PGRs.

## Masters in Year 1

24. Although entry requirements in the institutions participating in our case studies tend towards a masters degree, it is often the case (in three out of four of our case studies) that the first year of the programme consists of an awardable research-based masters degree. The designation of the degree varies but may be an MRes or an MPhil. Following successful completion of the degree the student has a “transfer of status”, “upgrade” or a “progression” from a masters-registered student (or a probationary research student) to a doctorate-registered student (back-dated to the beginning of Year 1). There then follow two further years of registered doctorate study. (In these three institutions, failure to complete (the doctorate programme) is rare. Failure to progress beyond the masters programme varies, but is not insignificant in some areas.)
25. In one institution, an MPhil was considered to be an “exit strategy”, for students who were not going to continue with their PGR programme after Year 1 but who had successfully completed the MPhil requirements. Otherwise, students are initially registered for an MPhil, and at the end of Year 1 are transferred to the PhD programme, backdated to the commencement of study.
26. When the masters degree was formally awarded (and sometimes when it is not), the first year is examinable, either by successful completion of taught modules, by oral presentation or by presentation of a mini-thesis (which in some subjects will form part of the final thesis). The content, delivery and style of these masters programmes varies significantly both by subject and by institution.
27. In most departments, masters or research training was required in Year 1, except where students arrived with “appropriate equivalent research training”.
28. We have noted a range of first year programmes: from a seemingly institution-wide structured approach to the first year, with the emphasis on a broad grounding in aspects of the subject area together with taught techniques for researching; to a departmental-based learning approach dependent on the input and style of the supervisor. In the former of these two examples, the particular topic for study may not be clearly defined until several months into the programme – in the latter, the subject is necessarily clearly defined on entry. These two styles of learning and delivery both carry the formal masters award.
29. Where a formal learning programme forms the first year, accreditation of prior learning is permitted through substitution of appropriate alternative modules. In one humanities department students always have a masters on entry, but they still do a 20-credit research skills module, and some do tailored research training or subject-specific modules. Other institutions would use the term “workshops”, or “group sessions” rather than modules.
30. The average attendance in one institution was for 40 hours of lectures and classes, but individual needs were assessed by supervisors. The courses were typically those for one or two selected modules, including research skills training. The assessment of these modules varied: no assessment, assessment by the lecturer, and assessment by the supervisor were all given as examples.

31. The most structured Year 1 programme we were shown was a social science subject involving 120 formal lecture hours in addition to seminars and tutor groups. Only on entry to the second year is the area of study clearly defined.

#### **Year 4**

32. In the experience of our case study institutions it is rare to complete within three years. A Research Council survey found that the average time to completion for an FT student is 42 months – or 3 ½ years. This average was supported by information we obtained from the case study institutions.
33. There are, of course, differences according to subject and the individuals involved. For example, medical doctors on clinical training fellowships need to return to work at the end of three years, so tend to complete in or near three years. Instances were given of students being offered postdoctoral research positions in other universities and needing to complete in order to move to that role.
34. There are many examples of exactly the opposite – students being expected to complete by the four-year marker, rather than the three-year marker. Academics we spoke to actively encouraged students to take more time to complete, reasons being cited as:
- the doctorate requires three years of actual experimenting in the lab/computation of the mathematical problem before writing-up can begin;
  - the volume of material already in existence on the subject is so great that there is simply too much to cover in 3 years;
  - the student needs to have a broader base of skills before the thesis can be completed. There is more to receiving a doctorate than simply researching; the individual needs to have teaching skills in order to pass on that knowledge;
  - the breadth of study required to allow the student to compete in the international market place (the US six-year PhD programme being cited as a competitor) cannot be achieved in three years.
35. In our findings it is rare for a student to still be researching in a science subject after 3 years – the experimentation part of the work is completed and the writing-up will commence. In most instances, but there are some subject exceptions, some findings will already have been published in journals.
36. At this stage the science student's demands on the university facilities will change. The student will no longer require a bench space or access to equipment (except in rare instances of the need to retest or perhaps to access databases), but will still require a desk space and support facilities. The student is also generally still part of an active research group, attending and presenting at lunchtime forums, journal clubs or coffee groups.
37. There is not such a marked change in the time of the arts or humanities researcher (except in lab-based humanities such as physical geography where the above outline would apply). The writing-up phase may be a continuation of previous work, with as many as four previously published papers forming part of

the thesis. The work is likely to become entirely desk based, no longer with visits to artefacts or source documents, and in our examples is mostly continued at university premises.

38. For both the arts and the science supervisor the requirement for input in Year 4 will change. In some science subjects where a “result” has been produced, the one-to-one supervision requirement will at this point increase, with help in interpretation of results and in their presentation, especially if a hypothesis has not, after all, been proven. This fourth year will not be a “winding down” or “wrapping up” session for the supervisor.
39. Input to the thesis itself varies. Theses tend to develop over several drafts and the reading involved can be very significant (for example, 40 hours reading). Supervisors vary in their approach to thesis reading. One supervisor no longer reads early drafts of material because of the time input involved – he will only a review a draft which the student considers to be near final. Another requests his secretary to read and comment on a draft before he sees it to allow errors of presentation, continuity and grammar to be corrected.
40. One factor mentioned repeatedly by supervisors as a driver of time to complete was the requirement for the student to earn money. Hence some self-funded students are able to take longer to complete than a Research Council funded student – although this comparison could equally be reversed in some personal circumstances. The ability of departments to offer work as a teaching assistant may impact on the time a student takes. Whilst working as a teaching assistant some expenses at least can be met; the weekly time available to write up is reduced, but the student is gaining valuable academic experience.
41. The final assessment, through oral examination or viva, is often undertaken in Year 4. This requires time for reading, attendance, and reporting, by the internal and external examiners. Sometimes the institution also involves a chair of the panel (who attends, only). This might take 3 to 4 days of time in addition to that of the supervisor and the lecturers.

## ANNEX C

### Indirect cost rates and estates charges

This annex is a copy of a paper that was considered by the TRAC Development Sub-Group (a committee of the Joint Costing and Pricing Steering Group, JCPSG) on 14 October 2004.

The proposals made in this paper were not adopted as they are expressed here – differential weightings were selected. This is explained in the main body of the report.

## TRAC Development Sub-Group

### Cost weightings used in the calculation of indirect and estates cost rates

#### Summary

This paper discusses the weightings that should be applied to PGR students in the calculation of the indirect cost rate and estates charges. It has a direct, and significant, impact on the costs of PGR students, and on the costs of research projects.

The paper is an update of that produced at the beginning of July 2004. It has been updated to reflect the comments received by those invited to consider it – representatives from the Research Councils and twelve (mainly Research-intensive) institutions. It has also been discussed with HEFCE (in the context of costing the training and supervision of PGR students) and the OST (in the context of setting the percentage rate for funding research projects).

We calculated that an overall weighting of 0.5 (across all disciplines, all students, and all indirect/estates costs) might be applicable. This was however based on very poor cost driver evidence in almost every area, which could not be tested. Institutions consider that weightings of 0.1 to 0.2 better reflect a reasonable estimate of costs. However, these estimates are based on equally poor evidence. There are high risks associated with either setting this weight too high, or too low, at this stage.

**We propose therefore that a weighting that is midway between 0.5 and 0.1 is applied, i.e. 0.3**

**This should be a mandatory weighting (institutions should not be allowed to calculate their own).**

**Institutions should then gather evidence on cost drivers over the next two years, which could be used to inform a national study at that time.**



# The costing of PGRs

## Indirect costs and estates rates

### 1. INTRODUCTION

- 1.1. This paper sets out the issues concerning the calculation of the indirect cost rate and the estates charges applicable to PGR students: specifically, the weighting that should be applied to PGR students. This weighting directly affects the levels of the rate and charges that are then applied to principal investigator (PI), co-ordinating investigator (Co-I), and research assistant (RA) time when they are working on a research project.
- 1.2. Considerable judgement is needed in determining the weighting. Costing models might possibly be inappropriately influenced by institutions' perception of funding implications. There is a need to:
  - a) inform the sector what an appropriate weighting might be;
  - b) use the rate and charges thus derived, in the HEFCE PGR cost study;
  - c) use this weighting in the modelling being carried out to inform Research Council funding policy.
- 1.3. This paper has been informed by:
  - a study for HEFCE to cost the training and supervision of PGR students;
  - an in-depth knowledge of TRAC indirect cost and estates cost models – and how they are developing and becoming more robust (they are not quite there yet);
  - an enquiry made to the sector to determine whether any institutions had considered the issues around indirect cost rates and estates charges allocated to PGR students (very few responses were received).
- 1.4. An earlier draft of this paper was sent for review by:
  - officers in HEFCE, involved in the study to cost PGRs;
  - officers in the Research Councils who are involved in the whole sector modelling and who lead the PGR Training Committee;
  - TRAC pilot institutions;
  - a number of other institutions who have expressed interest in contributing to debate in this area;
  - the chair and relevant members of the JCPSG.

1.5. The paper consists of the following sections:

2. Background
3. Worked example
4. Different types of PGR student
5. Estates
6. Indirect costs
7. A calculated weighting

## 2. BACKGROUND – THE CALCULATION OF THE TRAC INDIRECT COST RATE AND ESTATES CHARGES

2.1. TRAC recognises two main types of research activity in institutions:

- research projects (both external grants and contracts, and institution-owned Research);
- the supervision and training of research students (PGRs).

- 2.2. The costs of both are established through TRAC (further developed through TRAC full economic costing, fEC, to a project level). The fEC of both activities includes indirect costs and estates costs.
- 2.3. It should be noted that the second activity is concerned with production of a trained workforce (with a qualification at doctorate level). The aim of a PGR programme is first and foremost educational.
- 2.4. During such an educational programme a PGR student will undertake primary research under supervision. That research will have an output, usually as a thesis that is examined as part of the test for qualification. The standard set is usually that the work should be of a publishable standard. PGRs often have their work published in peer reviewed professional journals, either alone or as part of a team. This assists in demonstrating that the required standard has been met in the work, and it is a first step in the development of a career by the student. The work published is often of considerable value in its own right, but is secondary to the principal purpose of the programme.
- 2.5. In research groups, PGRs are often (and rightly) considered to be an integral part of the group structure, with responsibilities to the team. They are often regarded by academic staff as junior research assistants, but this is part of their training and development. They are different from technicians, and should not be regarded as part of the research structure.
- 2.6. Because of these arguments, PGR training should be regarded as a separate stream of activity for costing, and a primary activity to which direct, indirect, and estates costs are attached.
- 2.7. The costs chargeable to the activity of supervising and training a PGR student will include:
  - consumables used by the student (which may or may not be funded through a research project);
  - travel and subsistence costs;
  - costs of training;
  - the PI's time (and other staff) in supervising students ('direct' time);<sup>22</sup>
  - the indirect costs and estates costs associated with the supervisor's use of university facilities;
  - indirect costs and estates costs associated with the PGR's use of university facilities.
- 2.8. It is the latter that is the focus of this paper. However, it should be remembered that the total costs of PGR students would also include the PI's share of indirect and estates costs allocated on the time they spend on supervising the PGR student.
- 2.9. By definition, indirect costs are not 'direct' – they cannot easily be linked to one particular project or course/student. Therefore, institutional TRAC costing models currently use a number of cost drivers to allocate these costs

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<sup>22</sup> The term PI and supervisor/co-supervisor have been used synonymously in this paper.

to the activities of Teaching, Research, Other. These cost drivers include measured use (e.g. for space, libraries) and proxies (the number of staff and students, academic staff time, etc).

- 2.10. These cost drivers are applied to each element of cost within the indirect cost total. The resulting allocations then create a cost pool for the indirect costs of Research (and associated cost pools for Teaching, and Other), and another cost pool for the estates costs of Research (and Teaching, and Other). These cost pools are included in the total costs of Research, reported annually to the funding councils in the TRAC return (split into publicly funded, PF, and non-publicly funded, NPF). They also form the numerator of the indirect cost and estates charge calculations:

total indirect costs of Research  
divided by  
FTEs working on Research = indirect cost rate for Research

estates costs of Research  
divided by  
FTEs working on Research = estates charge for Research

- 2.11. Two estates charges are actually calculated – one for laboratory departments, and one for all other departments.<sup>23</sup>
- 2.12. The FTEs include PIs and Co-Is, RAs, and PGR students.<sup>24</sup>
- 2.13. However, the level of costs that should be allocated to one PGR student may not be the same as the costs that should be allocated to a PI or a RA. This paper explores the different dimensions to this issue. There is very limited information or evidence to inform this area, and it is very subjective.

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<sup>23</sup> Institutions can calculate more if they wish and if their data is robust at a lower level.

<sup>24</sup> The time of the PI and Co-I FTE should be their direct time on Research only, not the whole FTE for an academic who is working for only some of their time on Research.

### 3. WORKED EXAMPLE

- 3.1. The worked example (see separate Excel file) shows the impact of weighting PGR student numbers in the calculation of indirect cost rates and estates charges. This is based on draft figures from one of the largest institutions in the country.
- 3.2. Research costs are divided by academic staff, RA and PGR student FTEs to arrive at a cost per FTE. This cost is then attached to each FTE when they are either working on a research project (external or institution-own funded) or working towards a research qualification (or sometimes, doing both).

Example A shows PGR FTE students weighted at 0.7 of a PI/RA FTE  
Example B shows PGR FTE students weighted at 0.2 of a PI/RA FTE

Under example A, the indirect cost and estates charge for a laboratory PGR FTE student would total £20,141 p.a. (shown in bold: £13,010 + £7,131) That for a PI or RA FTE would total £28,773 p.a.

Under example B, the indirect cost and estates charge for a laboratory PGR FTE student would total £7,903 p.a. That for a PI or RA FTE would total £39,513 p.a.

(All cost figures quoted should only be regarded as illustrative. Other institutions will show significantly different cost levels.)

- 3.3. Whilst this paper deals with costing, not funding, it is of note that example A would currently lead to a very significant under-recovery on the costs of training and supervising most PGR students. That shown in example B would lead to a better level of cost recovery. Because the overall pool of costs does not change, allocating fewer costs to PGRs (example B) means that more costs are allocated to research projects. Example B would therefore lead to higher costs being charged to a project (lower costs to PGRs) than under A, where the costs of research projects would be lower (higher costs to PGRs).
- 3.4. The level at which the indirect cost rates and estates rates are calculated is currently determined by TRAC fEC. The minimum requirement is for only two estates rates to be calculated (lab and non-lab), and only one indirect cost rate (TRAC assumes that, broadly, indirect costs do not vary by discipline).<sup>25</sup>
- 3.5. There is no requirement in TRAC to apply different PGR weightings to indirect cost rates than those that are applied to estates rates, nor to apply different PGR weightings to laboratory from those applied to non-laboratory rates. Whilst it could be done, it would add complexity to what is already a very complex area. It would also suggest a degree of accuracy that is not really supported by the amount of evidence available.
- 3.6. **It is therefore proposed that the same PGR weighting is used in the calculation of all £/FTE rates.** However, this weighting should have been calculated in a way that takes into account the respective size of estates vs.

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<sup>25</sup> More rates can be calculated if institutions wish and can do so robustly.

indirect costs, for example.

## 4. DIFFERENT TYPES OF PGR STUDENT

- 4.1. There are a considerable number of different models of PGR student. Many (PT) students are staff members; some students work as part of a research project team (whether project studentships, tied studentships, or not formally linked); others are more independent. Their practices and experiences are very different.
- 4.2. **It is proposed that a single weighting (and rate) is calculated for all PGR students; irrespective of the type of student.**
- 4.3. The weighting applied for PGR students would be compared with a weighting of 1.0 applied to both PIs and RAs. There is no plan to weight RAs. Yet they are very different from PIs.
- 4.4. And where a PGR student is working as part of a research team they are very similar to a RA. There may be additional time on supervision (of the thesis, as opposed to the research work), which becomes part of the PI's costs (of PGR supervision). But that does not alter the fact that there is one PGR who is working on a research project and using the same sort of resources as a RA does (or indeed a PI, carrying out similar research).
- 4.5. The employment status (and therefore institutional responsibilities) of PGRs and RAs are very different, as are their activities outside of their direct research work. However, the similarities between many RAs and PGRs in their use of university resources means that their weighting for many cost elements is the same.
- 4.6. This means that any weighting that compares PGRs to PIs and RAs will show less differential than one that compares PGRs to just PIs. This is particularly so as there are significant numbers of RAs, compared to the direct Research time of PIs, in Research-intensive institutions.

## 5. ESTATES

- 5.1. Estates costs are the fEC of the space in academic departments. This includes laboratory space, space occupied by equipment, offices, Support staff space, common rooms etc.
- 5.2. In our interviews with academics we have not found anything that indicates that a PGR student in a laboratory department has a need for or use of space that is very different from a RA. Laboratory space and equipment requirements are identical if the RA and the PGR are working on the same

project. It is the needs of the science that influence the requirement i.e. the type of research. It is not the type of person carrying out the research, nor the purpose of the research (i.e. research project or thesis).

- 5.3. It could be appropriate to consider PGR space requirements in laboratory departments at something of the order of 0.8 or 0.9 of those of a PI. That for a RA might be slightly higher than a PGR, closer to that of a PI.

**Possible weightings for PGRs in laboratory departments might be: PI/RA = 1.00; PGR = 0.9**

- 5.4. In the creative and performing arts there are not the same numbers of RAs as in science, but where studio space is used, the PGR might use as much space as the PI. In pure maths, again the requirement by the PGR for a desk, computer, and library space is the same as for a PI. The use of space over a working year might be the same.

**Possible weightings for PGRs in 'part-laboratory' departments might be PI/RA = 1.00; PGR 0.9**

- 5.5. In Social Sciences the PGR is not a member of staff, and is perhaps less likely always to have as full a complement of desk and support space as a PI. Much of the work of a PGR, including writing-up, might be done in the library. A number of PGRs might share two desks (a PI might have their own desk; no more than two RAs might share one desk). Part-time students will not use any 'hotel-desk' facilities as much as full-time students, or RAs.

- 5.6. Space requirements for PGR students in non-laboratory departments might be something like 0.5 of a PI. Again that for a RA might be higher, closer to that of a PI.

**Possible weightings for PGRs in non-laboratory departments might be: PI/RA = 1.00; PGR = 0.5**

- 5.7. HESA (01/02) shows that approx 10% of PGR students (FT, UK, including overseas) are in "part-lab" departments. Of the remainder one-third are in non-laboratory departments; and two-thirds are in laboratory departments.

- 5.8. **A combined weighting might possibly be: PI/RA = 1.00; PGR = 0.7 for estates.**

## 6. INDIRECT COSTS

- 6.1. Indirect costs or Support costs are made up of four main elements:
- i. the Support time of academics (preparing bids/interviewing prospective PGR students, general management of the university, administration, scholarship);
  - ii. the COCE (reflecting risk/restructuring/development);
  - iii. support staff costs and non-staff costs in academic departments; and

iv. central service costs.

6.2. In the TRAC QA benchmarking exercise, it was established that the relative size of these in a typical indirect cost rate for Research might be as follows:<sup>26</sup>

i. PI Support costs	20%
ii. COCE adjustment	10%
iii. support staff and non-staff costs in academic departments	20%
iv. central service costs	50%
	100%

6.3. We consider each briefly below, to identify what a fair and reasonable weighting to PGRs might be. In all of these, please note that allocations have already been made to Research, Teaching, and Other. It is only the further allocation of the Research costs amongst: the direct Research time of PIs (research projects, and PGR supervision), RAs (research projects), and PGRs, that is being considered.

**i. PI Support costs (20%)**

6.4. This is the time PIs spend on administration (e.g. preparing bids - including for student funding, interviewing students pre-registration, internal department and university administration); management (staff, department and university committees etc), quality assurance, and scholarship (updating knowledge, not the development of new knowledge).

6.5. All of these activities are as appropriate for the training and supervision of a PGR student as they are for a research project. However, we note that the PI's own time attributable to the supervision of PGR students already carries with it a share of these indirect costs.

6.6. It could be considered to be double-counting if a further allocation of these costs was also to be made on the basis of PGR student numbers.

**Possible weightings might be: PI/RA = 1.00; PGR = 0.10**

**ii. COCE adjustment (10%)**

6.7. This is the COCE adjustment included under TRAC that provides a 'cost' for restructuring, rationalisation, and development. It could be used to cover the costs of voluntary retirements, to invest in new areas (e.g. the development of

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<sup>26</sup> May 2004 figures – average for 50 R-intensive institutions. Individual institutions' figures varied widely around the average. This is for all of Research.



new ideas or to build up new areas of research which are not yet fundable), to maximise opportunities (such as a new initiative or buildings project) or to cover risk (e.g. of a failed venture, of a sudden reduction in a funding stream).<sup>27</sup>

- 6.8. These costs are mainly linked to staff (voluntary retirements is a common use of this type of funding); and to investment (in people, buildings, facilities, initiatives). These seem to be related to Research more generally rather than to a particular PGR student or to PGR supervision (although there are some exceptions with institutions making investments in Graduate Schools, PGR scholarships and in relevant space for PGRs in new builds).
- 6.9. Spend on restructuring, rationalisation and investment that has been allocated to Research should be driven by the research needs and strategy of the institution. However this should take into account the significant contribution made by PGR students to the research output of the institution.

**A weighting of PI/RA = 1.00; PGR = 0.33 might be appropriate.**

**iii. Support staff costs and non-staff costs in academic departments (20%)**

- 6.10. This includes secretaries, clerical and administrative staff, technicians (non-lab) and all non-staff costs in academic departments that are not directly attributable to Research.
- 6.11. The Research-related activities of secretarial and administrative staff include bid preparation, and liaison with sponsors. Funding arrangements for PGR students can be as complex and time-consuming as for research projects (taking into account differences in the size of this activity). Sometimes secretarial staff help to proof-read theses for supervisors.
- 6.12. Non-staff costs in academic departments can include a significant item for consumables particularly in laboratory departments. Research projects funding generally includes consumables (and the costs are not therefore left in the general expenditure line for allocation) and about half the consumables used by PGR students are funded through research projects as well. However the other half of consumables used by PGR students – amounting to around £3k p.a. per FTE across the whole institution – is currently part of the non-staff expenditure and included in the indirect cost rate. Travel and subsistence is also included in departmental expenditure. The same would be true for PI's own-funded-research although the budgets are likely to be lower.
- 6.13. Other items in departmental budgets cover IT, recruitment, office supplies etc. Some of this is likely to be required for PI and more for RA activities than for PGRs. However much will still be “background support” used to support all, equally. There may be other large expenditure items to be considered.

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<sup>27</sup> HEFCE has commissioned a study to design a new ‘rate of return’ for TRAC, to replace the current COCE. This will include a standard sector risk-free rate of return, which is likely to produce costs at broadly the same level as the current COCE calculation, and an institution-specific risk premium.

**Possible weightings might be 1.00 for PIs, RAs, and PGRs.**

**iv. Central services (50%)**

- 6.14. This consists of the central service departments (and their share of estates, but not academic department estates). It includes library, IT, general educational expenditure, external relations, finance, audit, personnel, registry, staff and student support, office of the VC/Secretariat, research services, etc.
- 6.15. Library and IT are often a significant part of this total (some 4-5% of total institutional costs; or 10% of indirect and estates costs). Here there is no reason to believe that a PI, RA or PGR, in similar subjects, do not have a similar level of need. (Some post-doctoral RAs may be more specialised and sophisticated in their needs than the PGRs, but equally the best PGR research is some of the most innovative and demanding.) Possible weightings might be 1.00 for PIs, RAs, and PGRs.
- 6.16. Payroll and personnel are staff-related, so PGR weightings would be nil. But this would be offset by the administration involved with the receipt of fees, other funding, and the payment of stipends (as appropriate).
- 6.17. Registry costs would not be allocated to PIs or RAs at all (only to undergraduate taught, UGT, postgraduate taught, PGT and PGR students). Similarly, general educational expenditure (examinations, scholarships, international office, etc) is only student related. Staff and student facilities (careers advice, health service, sports, student welfare) would obviously be allocated to the respective groups. In most of these items the weighting would be higher for a PGR than for a RA or PI.
- 6.18. Other central services costs include the rest of finance, audit, subscriptions, the office of the VC/Secretariat, etc. These costs apply to both PGR supervision and to research projects. However, it could be considered that the element attached to the PI's time (when supervising students) was an appropriate indication of the total cost that should be allocated. If this were the case, then the PGR weighting for these cost elements would be nil.
- 6.19. A review by one institution identified that a weighting of 0.3 for PGR students might be appropriate for central services costs. Another institution identified 0.1. Neither of these are considered particularly robust, but they give an indication of the possible magnitude of the weighting.

**Possible weightings might be: PI/RA = 1.00; PGR = 0.33**

## 7. A CALCULATED WEIGHTING

7.1. The individual weightings proposed above can be summarised as follows:

cost element	(a) relative size of all Research indirect and estates costs  £ total <sup>1</sup> % of	(b) relative size of cost	(c) With PI/RA = 1.00  PGR weighting (see paper):	(d) calculation of weighted average:  (b) x (c)
estates lab	338m      20%			
non-lab	79m <u>5%</u>			
	<b>25%</b>	<b>25%</b>	<b>0.7</b>	<b>.175</b>
indirect costs	1.300m <u>75%</u> 100%	totalling 75% of all Research indirect and estates costs  % of      % of 75%      all		
i. PI support costs		20% <b>15%</b> <sup>2</sup>	<b>0.1</b>	<b>.015</b>
ii. COCE		10% <b>7.5%</b>	<b>0.33</b>	<b>.025</b>
iii. Support costs in acad depts		20% <b>15%</b>	<b>1.0</b>	<b>0.15</b>
iv. central services		50% <b>37.5%</b>	<b>0.33</b>	<b>0.124</b>
<b>overall calculated weighting</b>				<b>0.489</b>

note 1. The figures are based on data from 33 of the 50 most Research intensive institutions; 2003/04; provided September 2004.

note 2. 20% of 75% is 15%

**Using the assumptions given in this paper, an overall weighting for PGR students can therefore be calculated at 0.5.**

7.2. At a PGR weighting of 0.5, the total costs per FTE would be:

£ per FTE	PIs/RAs	<b>PGRs</b>
Estates – (weighted average of lab and non-lab) <sup>28</sup>	9,159	<b>4,579</b>
Indirect costs	20,884	<b>10,442</b>
Total	30,043	<b>15,021</b>

(see Example C)

7.3. The example shows that the number (FTEs) of PGR students in this institution is almost the same as the number of RAs and PIs (direct time on Research) (this is not untypical of Research-intensive institutions). In Research-intensive institutions, using a weighting of 0.5, one third of the estates and indirect costs (allocated to Research), would be attributable to PGR students.

### **Assessment of reasonableness**

#### *Lack of robustness*

7.4. The weighting of 0.5 can only be considered to represent a reasonable estimate, based on the assumptions given above. The assumptions are not based on robust evidence, and therefore the calculated weighting cannot be regarded as robust. They are untested.

7.5. It would probably be possible to justify any weighting between 0.2 and 0.8 – based on the quality of information currently available.

#### *Comparison with teaching*

7.6. This level of estates and indirect costs per student can also be compared to the costs allocated to UG students. Publicly funded Teaching is in breakeven overall. If the total cost of an UG student is around £6,000, and about half of this relates to central services and estates<sup>29</sup> then these would total around £3,000. They would be lower for non-laboratory students.

7.7. This means PGR costs are calculated here at five times those of a UGT. The size of this differential might be to some extent explicable on estates. A sizable differential is also explicable on central services (arising from the longer academic year, and the individual nature of the PGR students).

<sup>28</sup> Assuming both research and PGR supervision is 2/3 lab, 1/3 non-lab.

<sup>29</sup> See for example the 'Review of the Unit of Resource for Initial Teacher Training: Study of Provider Costs', for the DES. February 2004.

However the overall size of this difference is surprising.

### *Sensitivity*

- 7.8. If the costing model and the weighting are 'correct' for PGRs, then the indirect cost rate and the estates charge for other activities should be independent of increases and decreases in the number of PGRs within reasonable limits. A weighting that is high, or low, will lead to unjustified fluctuations in costs in other areas.

### *Applicability to all institutions*

- 7.9. A weighting of 0.5 will be more relevant to some institutions than others. Institutions with a significantly lower proportion of laboratory research activity than assumed here (at 83%); or very few RAs (compared to PIs); or a much higher proportion of PT students (if their estates use is significantly lower); or a different spread of indirect costs; could all calculate different weightings.
- 7.10. Institutions have historically believed that weightings of 0.1, 0.15 or perhaps 0.2 are appropriate. Robust evidence has not been used to inform this. The whole concept of costing PGR student activity is very new. (The main focus of institutions' attention is currently the robustness of the cost drivers to arrive at the allocation of costs between Research and Teaching, let alone the split within Research itself.) However, institutions do not believe that a weighting of 0.5 is fair and reasonable; nor that a third of their costs (more in some institutions) are driven by the activity of training and supervising PGR students.
- 7.11. Institutions could be allowed to produce evidence to justify different weights, at the same level of robustness as in this paper. However, this would allow considerable judgements to impact heavily on the rates that are applied to sponsors, and could allow 'game playing', which would be very unhelpful.

### *Pricing*

- 7.12. There are clearly implications for funding agencies for the pricing of PGRs, but these are separate from costing implications (although the pricing implications should not be forgotten). If the price of PGR activity is inadvertently set too 'high' (in the absence of robust cost driver evidence), then potential funders will find it difficult to match it. In the context of institutions' drive for sustainability, the level of activity may fall too far, and perhaps even be extinguished.

### *Risk management*

- 7.13. Applying a high weighting brings with it a prospect of sector failure in the production of a trained research workforce.
- 7.14. There is a risk that other research activity will have too low an indirect cost attached, and so may become less sustainable as PGR numbers fall (the most likely scenario). This may be made more difficult to manage because sector level modelling of the pricing of publicly funded Research will indicate

too low a price, and perhaps permit too high a volume, exacerbating the problem. This would undermine the reform of the dual support system, and pose a relatively high risk.

- 7.15. If the weighting is set too low, then the opposite will occur, with too high an indirect rate attached to research projects and the possibility of a curtailed volume of publicly funded activity or a high price for research activities in the non-publicly funded market segment.
- 7.16. In addition, an overly low weighting might (a) disguise a sustainability problem that institutions (and their funders) need to tackle; or (b) create an expectation about the level of resources that should/can be available to a PGR student (as compared to a RA).
- 7.17. The future is already known to include a steadily increasing public funding stream, that is targeted on increasing the percentage of fEC paid by public funders. This will provide a relatively low risk environment in which a robust weighting can be identified in a stable manner, as better evidence becomes available.

### **Our proposal**

- 7.18. We suggest that the default weighting is set broadly midway between the calculated weighting of 0.5 and the institutional perception of 0.1 to 0.2
- 7.19. We propose that the default weighting is set at 0.3 and that this is mandatory for all institutions, all PGR students, and all disciplines.**
- 7.20. It should be made clear that this is a proxy, and does not represent the weighting that actually describes resources available to, or used by, every type of student, every discipline, and every cost element. For example, it does not represent the level of estates and library resources that an individual PGR student needs compared to a RA (these cost elements however make up only part of the total indirect and estates costs attributable to a PGR).
- 7.21. It would be appropriate to reconsider this whole area in a two or three years' time, when institutions have had a chance to develop their costing methods, and to improve their understanding of their cost drivers at this detailed level.
- 7.22. Institutions should be required to reconsider their cost drivers with regard to PGR activity, and be prepared to inform a wider study in two years' time.**