A Snapshot of Final Year Project Practice in UK Bioscience Departments

Richard J. Cowie

School of Biosciences, Main Building, Cardiff University, Cardiff, CF10 3TL, UK

Abstract

A survey of current practice with respect to final year project-work was carried out for 58 Higher Education Bioscience departments. All departments had students involved in practical projects and many also offered data-analysis projects (43%), literature projects (52%) and other project types (20%). Data on project allocation, project resourcing, project supervision and project assessment are presented. Projects are usually allocated using a central system with students indicating preference for project titles or subject areas. On average academic staff supervised 3.8 students, and had a funding allocation of £176 for practical projects. Most project students were accommodated in research laboratories. Students were estimated to spend a mean of 240 hours conducting their projects over 16 weeks. Day to day supervision of the project often involves post docs and research students. Final Year projects normally account for between 25% and 30% of the final year mark, although a lower weighting tended to be given for literature projects. Techniques such as oral presentation, posters and vivas are used in assessment, but most departments still rely heavily on a formal, written project reports.

Keywords: bioscience; project; final year

Introduction

In almost all Bioscience departments within the UK Higher Education (HE) sector the final year project forms a substantial component of the final degree result. This is not surprising as the QAA Subject Benchmark Statement for Biosciences makes it clear that all honours students should have personal experience of scientific research:

> *All honours degree students are expected to have some personal experience of the approach, practice and evaluation of scientific research (eg within a project or research-based assignments). This is likely to be in the student's final year, and may draw on the experience gathered during the course as a whole. Such work is likely to include collection and analysis of information (eg from fieldwork, laboratory work, or questionnaires, as well as from the literature), interpretation of the information within the context of current knowledge, suggestions for further work, reference to safety and ethical considerations where relevant and a presentation or report on the findings. It may sometimes be appropriate for students to do this kind of work in areas not strictly related to research, for example in education or in the public understanding of science.* (QAA, 2002)

Clearly, supervising students who are undertaking research in their final year provides an important interface between research and teaching, which characterises the educational approach encouraged in many UK Universities. However, the UK HE sector is one that has expanded

rapidly in recent years, but has not necessarily benefited from an equivalent expansion in resources (Hounsell 2005). Supervising students who are conducting independent research in the biosciences can be time-consuming and expensive, and place a significant burden on already over-stretched staff.

Against this background, the HE Academy Centre for Biosciences Special Interest Group in Final Year Project-work was established in 2003, with the aim of providing staff with a forum where issues relating to this important element of teaching could be discussed. One of the initial aims of this group was to conduct a survey throughout as wide a range as possible of U.K. Biosciences departments, to establish current practice with regard to final year projects. This paper, summarises the results of that survey.

Methods

The survey was conducted using a questionnaire that was designed to be relatively quick to complete as it was based mainly on a series of tick-boxes (See Appendix 1). Slightly different forms were developed for each of the following project types: practical projects, data-analysis projects, literature projects and 'other' projects. Only the pro-forma for practical projects is included in the Appendix as the other versions of the form were similar, but slightly narrower in scope. Once a draft form had been produced it was sent out to several colleagues in other Bioscience departments for their comments. In the light of their advice the form underwent a number of minor revisions, before a final version was produced.

HEA Bioscience Departmental Representatives were contacted and asked to identify the staff members in their department who were responsible for coordinating final year projects. Following this, the questionnaire was mailed to these project coordinators with a request to complete it by 31st August 2003.

Results

General Background

Overall, there was an excellent response to the questionnaire, with 70 completed forms being returned. Some departments were especially enthusiastic, with one submitting four separate returns. By the time such duplicates had been eliminated there were 58 returns from separate Bioscience departments, which were included in subsequent analyses. These are shown in Appendix 2. There was good coverage of both pre-1992 universities (62%) and post-1992 universities (38%).

All departments that responded required the majority of students to undertake a final year project and in 93% of departments it was compulsory for all final year students to undertake some form of project. Of the remaining four departments, two did not require non-Honours students to undertake projects, and two did not require students to do a project if they had completed an alternative piece of independent research, for example on a professional training (sandwich) year.

All departments offered practical projects (laboratory or fieldwork); 52% let students do literature-based projects; 43% of departments used data-analysis projects where students were

given a previously collected data-set to analyse and interpret; and 20% offered other types of projects that did not fall into one of these categories. These other projects were quite varied and included: developing computer-aided learning packages; web site construction; developing business plans for bio-technology companies and developing science writing skills.

Project Allocation

Sixty four percent of departments allow students to negotiate projects directly with individual members of staff, although only 18% of departments rely on this as the sole means of allocating projects. Most have some kind of central allocation system. Of those with such a system, 4.3% allocate students randomly, the remaining 95.7% use one (or more) of the following methods.

The commonest method (69%) is for students to be presented with a list of project titles, and for which they are then asked to indicate a preference, with these preferences being taken into account in the allocation process. This system may also go hand in hand with students indicating the particular subject areas in which they wish to work (43%) or with which particular staff members they want to work (43%). A few departments (14%) ask students to identify areas in which they definitely do not want to work, and use this information in the allocation process. Clearly, any method like this can pose problems for the member of staff faced with resolving the allocation process, and in 50% of departments the students' previous academic performance is taken into account.

Project Resourcing

Final Year projects are a relatively costly way of teaching with regards to staff time, expenditure on research materials, and space to accommodate them. The next series of questions related to these resourcing issues.

Respondents were asked to estimate, on average, how many students were supervised by each member of staff in their department (Figure 1). Overall, the mean number of students supervised per member of staff was 3.8 and the median 3.5. However, the range was from 1 to 12. In all departments students were allocated to a particular member of academic staff, however, on a day-to-day basis they were often supervised by postdocs, and sometimes postgraduate research students. The extent to which these 'research staff' were used depended on the type of project. A summary of the data is shown in Table 1.

Figure 1. Histogram showing the average number of students allocated per supervisor at 51 departments. Each department was asked to indicate, on average, the mean number of students supervised by a member of staff.

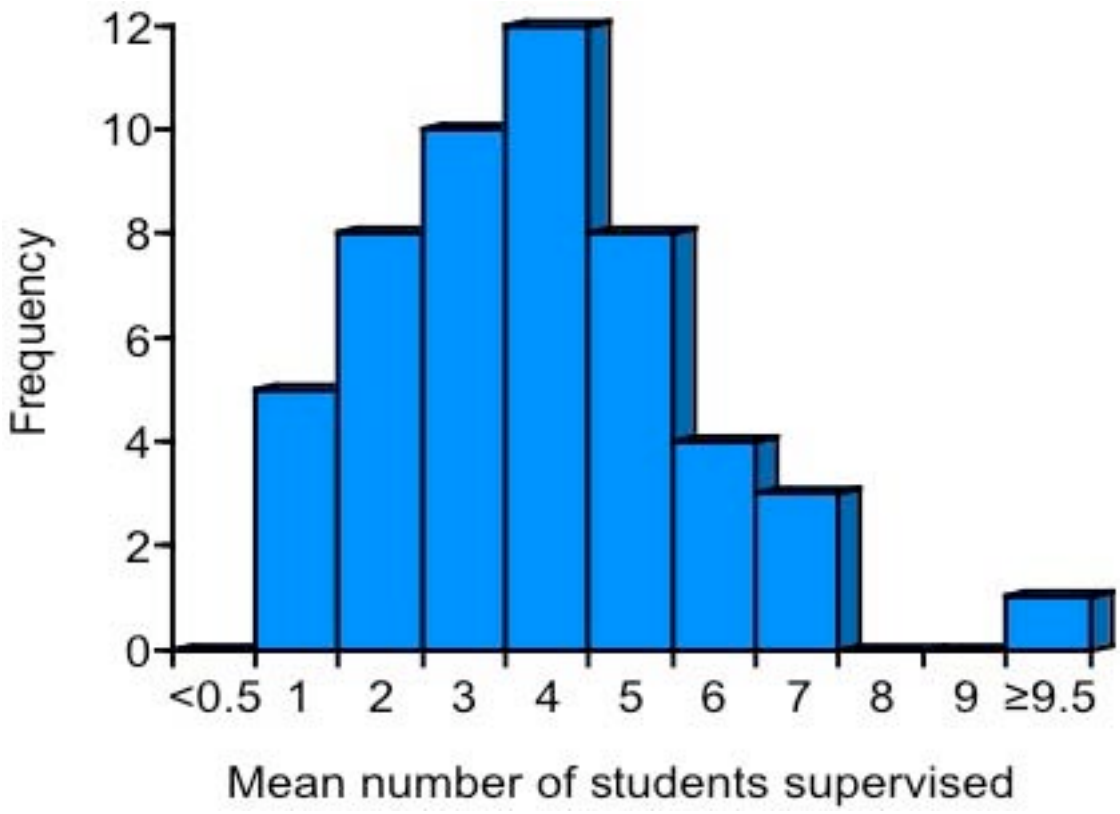


Table 1.Staff involved in the day-to-day supervision of different types of project. Figures are the % of departments reporting.

	Academic	**Post-docs**	**Post-grads.**	**N**
Practical project	96.6	82.8	60.3	58
Data Analysis project	100.0	87.0	39.1	23
Literature project	92.3	46.2	11.5	26
Other projects	84.6	76.9	30.8	13

Clearly, several different categories of staff may be involved in the supervision of students, and respondents were only asked whether certain categories of staff supervised projects on a day-to-day basis in their departments. So we can say, for example, that in 60.3% of departments some postgrad students were involved in the supervision of some practical projects. However, it is

also clear that other research staff are less involved in the supervision of literature projects, and here the task of supervision falls more often on the academic supervisor alone.

As well as time resources, practical projects involve expenditure on consumables and small pieces of equipment. Respondents were asked about the amount of money that staff or students receive specifically to fund final year practical projects. These data are summarised in Table 2.

Table 2. Departmental funding allocations for different project types.

Project Type	**N**	**% giving funding**	**Mean amount (£)**	**Median amount (£)**	**Required amount (£)**
Practical	58	65.6	176	145	396
Data Analysis	25	60.0	113	50	136
Literature	30	43.3	47	50	83
Other	12	75.0	67	50	50

Approximately, two thirds of departments funded practical projects, with the mean allocation per student being £176 and the median £145 (the range was £0 to £800). As may be expected, the funding for other types of project was less, with only 43% of departments providing any funding at all for literature projects and most of these giving around £50. We also asked for estimates of the amount that respondents thought was needed for projects and these are shown in the final column of Table 2. The biggest discrepancy was with practical projects, where roughly £400 was quoted as the average amount needed, over double the actual figure allocated. Roughly half of departments (56%) gave equal allocations to all practical project students, whereas the remaining 44% varied the project allocation depending on the nature of the project and its financial requirements. Interestingly, there was no correlation between the amount of funding allocated to projects and the amount of time that students were estimated to spend working on their project (see below).

Space is another major resourcing issue for students undertaking practical projects and the majority of departments accommodated students in research laboratories (90%). Only 14% of departments had designated project labs. for the use of final year students. Overall, roughly half of the respondents (47%) identified finding space to accommodate practical projects as a problem.

Of the other project types: 18% of students undertaking data analysis projects were found some kind of personal space within departments. However, for literature projects and ‘other’ project types, students were expected to rely on central university facilities such as libraries and IT resource centres.

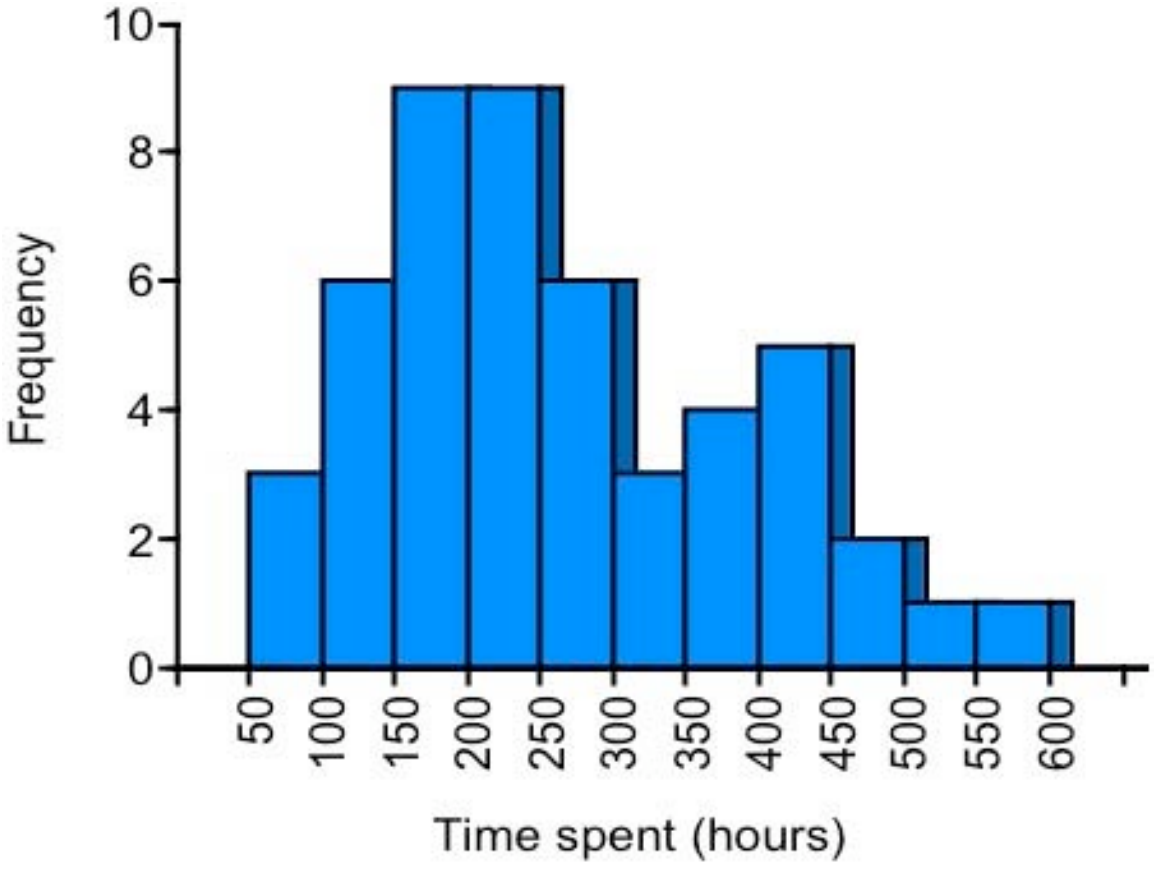
Conducting the Project

The vast majority of students undertake their project over both semesters of their final year (80%). Of those remaining, 5.5% do their project in the autumn semester and 14.5% in the spring semester.

Respondents were asked to estimate how much time students spent on their practical projects, but this question was not asked with regard to other project types.

Fifty one respondents provided estimates of both the number of weeks over which projects lasted, and the number of hours per week that students were expected to spend on their projects. These data are shown in Figure 2. The median amount of time that students were estimated to spend on their projects was 240 hours, and given that projects were usually spread over 16 weeks (median), this represents about 15 hours or two full days per week.

Figure 2. Frequency distribution showing the amount of time that students were expected to spend doing their final year practical projects. The mean duration was 259 hours and the median 240 h.



In most departments, students worked alone on individual projects, although roughly one fifth of departments had at least some students working in groups. Of the 13 departments with students working in groups, only one had all students in groups. Three had roughly 50% of their students in groups and the rest all had less than 20% in groups. The group size was usually two, and of

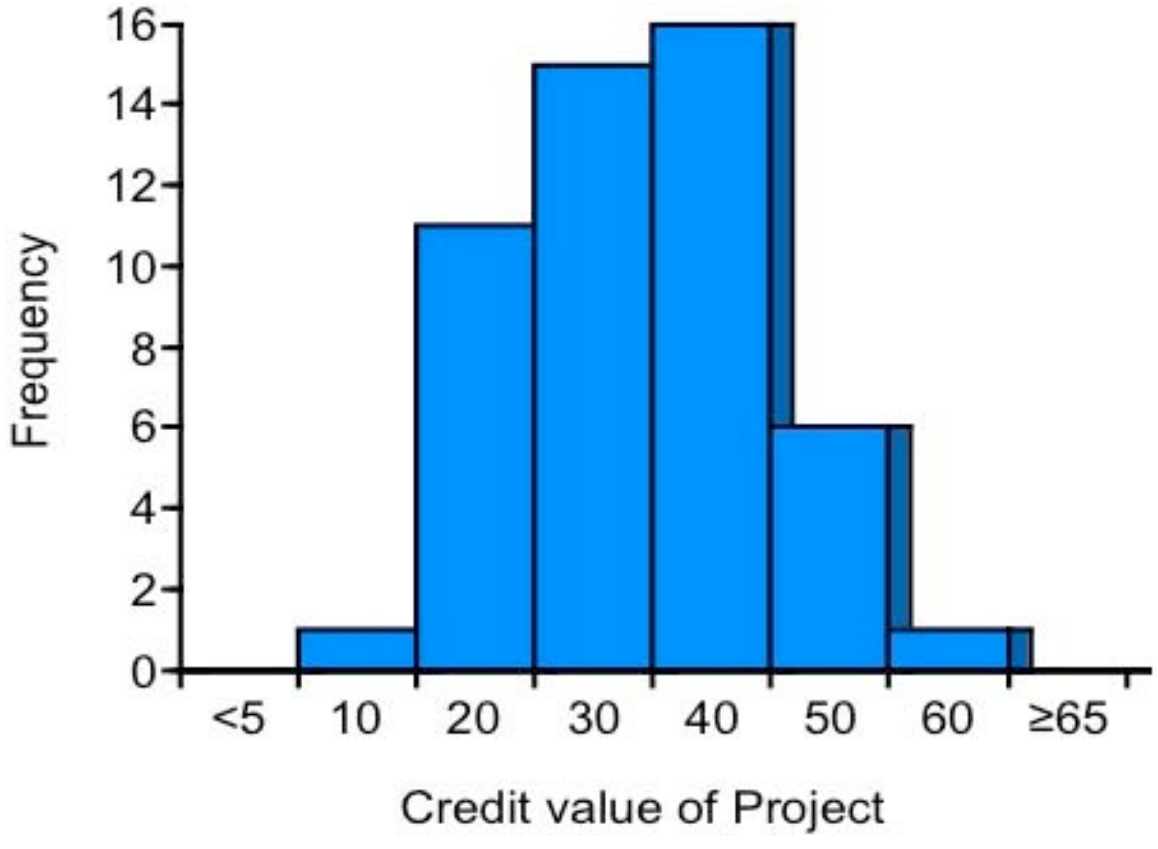
the three departments that had students in larger groups, the maximum was six. In all cases where students were working in groups, they were assessed individually.

Supervising the Project

In most departments (62%) supervisors met with their students doing practical projects on a variable basis with the frequency of the meetings being agreed between individual supervisors and their students. In the 38% of departments where regular meetings were scheduled, these were usually held once a week. In only 25% of departments were formal records of these meetings kept, for example, by supervisors signing off their students' laboratory notebooks. The pattern for literature, data-analysis and other project types was similar to that for practical projects.

Assessing the Project

Figure 3. Frequency distribution of credit weightings for final year projects, corrected to an overall final year credit weighting of 120.



In most degree schemes, the final year project counted for a substantial proportion of the overall final year mark, and hence was influential in each student's final degree classification. Most universities with a modular system had 120 credits in total in the final year (and those with a different system were adjusted so that they were comparable with this system). Figure 3 shows

the distribution of final year credits that were awarded to final year practical projects. The modal value (just) was 40 credits with a median of 30 and a mean of 33.

Usually, but not always, the credit weighting reflected the proportion of the project mark towards the overall final year mark; i.e. if the project was worth 30 credits out of 120, then the proportion of the project contributed 25% to the final year mark. Table 3 shows the average contribution toward the final year mark made by different types of project.

Table 3. Contribution of different project types towards the final year mark.

Project Type	N	Mean % of final year mark (± s.d.)
Practical	56	28.0 ± 12.8
Data Analysis	23	27.2 ± 7.5
Literature	24	21.3 ± 8.4
Other	12	27.8 ± 9.2

In most cases the contribution from different types of project was roughly equal, with the exception of literature projects where 38% of departments gave a lower weighting than for practical projects. In these departments, literature projects often counted only half as much as practical projects; they were apparently viewed as being less demanding than practical projects.

Most departments (71%) imposed some kind of word limit on project reports and 29% required practical projects to be written up in the style of a paper for a specified scientific journal. The word limits prescribed for different types of project are shown in Table 4. There is not a great deal of variation between different project types, and most word limits are around 8000 – 9000 words. Interestingly, there was no relationship between the word limit set and the percentage of final year marks accounted for by the final year project ($r=0.24$, $n=39$, $p= 0.142$). This means that departments that weight the project more highly, do not necessarily expect students to write a longer report.

Table 4. Summary of the word limits on different project types. 71% of departments imposed word limits on students' project reports

Project Type	N	Mean	Median	Min	Max
Practical	39	8583	8000	4000	15000
Data Analysis	18	9236	10000	5000	15000
Literature	18	8194	9000	3000	13000
Other	4	7500	6250	5000	12500

In all departments, and for all projects types, supervisors were involved directly in the assessment of undergraduate final year projects. In most cases (87% of departments) supervisors were also expected to look through drafts of the students work and to comment on them before the final report was handed in.

Practical projects often had an element of assessment that was based on the perceived practical field or laboratory skills of a student. Two thirds (66%) of departments used such a measure and on average it counted for 24% of the overall project mark. Apart from this, projects were principally assessed using one or more of the following techniques: a written report, an oral presentation, a poster presentation, and a *viva voce* examination. Table 5 shows the percentage of departments using these four methods.

Table 5. Techniques used to assess projects. Under each column, the first figure shows the percentage of departments offering one of three assessment techniques. The figures in brackets show the mean percentage mark weighting given to that component of assessment.

Project Type	**N**	**Written**	**Oral**	**Poster**	**Viva**
Practical	58	98.3 (75.4)	55.2 (10.9)	25.9 (13.8)	17.2 (24.0)
Data Analysis	23	95.7 (92.5)	47.8 (12.4)	17.4 (12.5)	21.7 (25.5)
Literature	26	96.2 (88.0)	57.7 (12.4)	26.9 (16.6)	15.4 (25.5)
Other	12	100.0 (87.3)	58.3 (10.0)	41.7 (15.0)	16.7 (35.0)
Overall mean		97.6 (89.5)	54.8 (11.4)	28.0 (14.5)	17.8 (27.5)

For example, 58 departments in the survey ran practical projects. Almost all (98.3%) required students to submit a written report. In addition, 55.2% required students to give an oral presentation, 25.9% asked students to produce a poster and 17.2% used some kind of oral examination. Obviously, these percentages add up to more than 100%, which is because almost all departments required a written report, but some also asked students to give a talk, produce a poster or have a viva. (However, no departments required a student to do all four and only five departments required students to undertake three of these activities). The figures in brackets represent the mean weighting towards the final project marks of the different components. For example, across the 98.3% of departments requiring written project reports, the mean weighting for the written report was 75.4%. Similarly, of the 32 departments (55.2%) that also used oral presentations, on average these were awarded 10.9% of the total project mark, and so on. The main conclusion that can be drawn from these data is that although quite a few departments now use alternative assessment techniques, there is still an overwhelming reliance on written reports for the bulk of project assessment. Relatively few departments interviewed students and held project vivas, but those that did often awarded quite a high percentage of marks (around 25%) for this activity.

All departments involved at least two markers in the assessment of final year projects, and in most cases (85%) this involved 'blind' double marking. Differences in the marking are settled by taking a straight mean in 15% of practical projects, but interesting this rises to 35% for literature projects and 33% for other project types. Most institutions have a system whereby

means are used for relatively small discrepancies (typically < 10%) but larger discrepancies involve discussion between the two markers and often referral of the project to a third independent marker.

Discussion

This survey has not been conducted with the intention of testing any educational theories or assessing what benefits students may gain from different types of project. Rather it is a snapshot of current practice throughout UK HE Bioscience departments. The comparisons may prove helpful if you want to see what others do, and perhaps you could use some of the data as ammunition if you are pressing your Head of Department for more project funding, or a lower number of project students per member of staff. (However, note that the Head of a generous department might also be able to use them to argue for less funding or a larger allocation of project students!)

It is clear from this survey that projects continue to represent a very significant component of the final year in most UK Biosciences degree programmes. Although many departments now allow students to undertake a wider range of project types, the majority still expect most students to undertake a laboratory or field-based research project, which is usually assessed via a traditional written project report. Some departments, even though they allow literature or library based projects as an alternative to a traditional practical project, clearly have concerns about the degree of intellectual challenge that they represent. In many departments the percentage of the final year mark coming from a literature project was only half that of a practical project, and discrepancies in marking were more likely to be resolved by the simple expedient of taking a straight mean. Other departments, however, appear happy to treat literature projects on an equal footing with other projects and do not discriminate between the two. Perhaps this difference depends on varying requirements on what is expected of a literature project? On one hand it might involve a relatively straight-forward literature review, but in other cases be more demanding with the involvement of hypothesis testing using data culled from the literature. Clearly, this is one area of final year project-work that could benefit from further investigation and perhaps a comparison of project-guidelines, marking criteria and learning outcomes from different institutions.

Acknowledgments

Thanks are due to the many project organisers in different departments who took the time to complete the questionnaire. Heather Sears from HEA Biosciences provided much valuable help and support throughout. Martin Luck, Nigel Dunstone, Peter Evans, David Lees and Jon Erichsen provided helpful feedback on the draft questionnaire. The survey was funded by the HEA Biosciences.

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Appendix 2. The Project Work Questionnaire

LTSN Biosciences
Special Interest Group on
Final Year Project Work

Project Work Questionnaire

Please take 20 minutes to complete this questionnaire. It may look daunting, but the majority are simple Yes/No questions that take a few seconds to answer. You will also only need to complete those parts of the form that are relevant to the types of project your department offers.

The results of the survey will be published for the benefit of the entire academic community. Two aims of the SIG are to identify the range of current practices regarding final year projects in the Biosciences and to come up with recommendations regarding good practice. All returns will be treated in confidence and no individual departments will be identified in the analysis or reports of the SIG without prior agreement.

Name of person completing this questionnaire _____

University _____

Department _____

Section _____

Position (Lecturer etc.) _____

Address _____

_____

_____

Telephone _____

Email _____

1. Do all final year students undertake a project as part of their final year studies? YES ❑ NO ❑

2. If not all students have to undertake a project, please indicate below if there are any conditions which apply. (For example, some students may not be required to undertake a separate final year project if they have completed a sandwich year and have submitted a report for that).

_____
_____
_____
_____

Project Allocation

3. Do students negotiate projects with individual members of staff directly? YES ❑ NO ❑

4. Is there a central allocation system for projects? YES ❑ NO ❑
(If NO skip the rest of this section)

5. Are projects allocated to students at random? YES ❑ NO ❑
(If Yes Go to Q8)

If NO, please indicate if the students are required to indicate preferences for any of the following (please tick as many as apply):

6a (a) working with particular named members of staff ❑

6b (b) working in particular subject areas ❑

6c (c) particular named projects ❑

6d (d) subjects or projects that they do NOT want to do ❑

7. Is a student's previous academic performance taken into account when allocating final year projects? YES ❑ NO ❑

8. Please specify any other factors used in determining project allocation:

_____
_____
_____

9. Typically, how many final year project students are supervised by one member of staff, each year? Range _____ Mean _____

Types of projects

Please indicate by ticking the check boxes on the list below, the types of project that students may undertake. Then proceed by answering the relevant following sections:

10a	Practical project (involves research in the laboratory or field)	❑ answer Section A
10b	Data Analysis project (student is given a data-set to analyse)	❑ answer Section B
10c	Literature project (research using the scientific literature)	❑ answer Section C
10d	Other (please specify) _____ _____ _____ _____ _____	❑ answer Section D

Section A Practical Projects

Credit and Project Weightings

A1	If you operate on a modular structure how many credits are given for the final year practical project?	_____ credits
A2	How many credits do students take overall in the final year?	_____ credits
A3	What is the weighting of the practical project towards the students' final year mark?	_____ %
A4	What is the weighting of the final year towards a students' final overall mark determining their degree classification?	_____ %

Project resourcing

A5	How much money, if any, do students or supervisors receive to fund their final year practical projects? (Enter 0 if no allocation).	£_____
A6	Does this depend on the nature of the practical project being undertaken or are all students given an equal funding allocation?	Equal ❑ Variable ❑
A7	If variable, please enter range.	£_____
A8	In general, is this amount of funding adequate?	YES ❑ NO ❑
A9	If NO, what would you consider to be an adequate amount?	£_____

Conducting the practical project

A10	When is the project carried out? Please indicate semester:	Autumn ❑ Spring ❑ Both ❑
A11	How long does the project last. (Please enter number of weeks)	_____ weeks
A12	How many hours of work per week are students expected to spend on their project	_____ hours
A13	Are students expected to work during the vacations to any significant extent?	YES ❑ NO ❑

A14	Do any students conduct any part of their final year projects prior to the start of their final year? (e.g. this may be important for projects where fieldwork is undertaken in the summer vacation)	YES NO	❑ ❑
A15	If YES, please indicate below the details and any problems that this may cause: _____ _____ _____		
A16	Do students conduct their projects in a dedicated final year project laboratory?	YES NO	❑ ❑
A17	Are students accommodated in the research laboratories of individual members of staff?	YES NO	❑ ❑
A18	Is finding space to accommodate practical project students a problem?	YES NO	❑ ❑
A19	What percentage of students work singly or in groups? (e.g. if all students do individual projects enter 100% under 'singly').	Singly ____% Groups____%	
A20	If in groups, typically how many students are in each group?	_____	
A21	If students collaborate in conducting the research, is the project written up independently and students assessed individually?	YES NO	❑ ❑

Practical Project supervision

A22	Does each student have to be supervised by a named member of academic teaching staff, or can other staff (eg research staff) be the formal supervisor? (Tick all categories that apply).	Academic staff Other staff	❑ ❑
A23	Who supervises final year project students on a day-to-day basis? (Tick all categories that apply).	Academic staff Research staff Research students	❑ ❑ ❑
A24	Are supervisors required to meet on a regular basis (e.g. once a week) with their project students or is the amount of supervision left to the supervisor / student?	Regular Variable	❑ ❑
A25	If on a regular basis, how often do they meet?	_____	
A26	Is a formal record kept of each meeting? For example, do project supervisors 'sign off' their students' lab. books?	YES NO	❑ ❑

Practical Project Assessment

A27	Are project supervisors involved in the assessment of the project?	YES NO	❑ ❑
A28	Are supervisors expected to comment on draft reports of their students' work before a final version is submitted?	YES NO	❑ ❑
A29	For a practical project, are the students given a separate mark for their laboratory / field skills.	YES NO	❑ ❑
A30	If YES, what percentage of the final mark for the project is given for the student's practical skills.	_____	%
A31	Do students have to provide a written project report?	YES NO	❑ ❑
A32	Specify the word limit in the adjacent box. If no strict word limit, write n/a.	_____	words
A33	Do reports have to be written up in the format of a scientific paper for a particular named publication?	YES NO	❑ ❑
A34	If YES, which journal's format is used? _____		
A35	Do students have to give an oral presentation on their final year project work?	YES NO	❑ ❑
A36	In the case of practical projects undertaken jointly by two or more students, are they required to give an individual oral presentation?	YES NO	❑ ❑
A37	If the oral presentation counts towards the assessment of the project please indicate the % of the total mark in the box opposite. If the oral presentation does not count enter 0%.	_____	%
A38	Do students have to give a poster presentation on their final year project work?	YES NO	❑ ❑
A39	In the case of projects undertaken jointly by two or more students, are they all required to give a poster presentation?	YES NO	❑ ❑
A40	If the poster presentation counts towards the assessment of the project please indicate the % of the total mark in the box opposite. If the poster presentation does not count enter 0%.	_____	%

A41	Do the students have an oral exam (viva) specifically on their final year project?	YES NO	❑ ❑
A42	If there is an oral exam what % does it count towards the final project mark? (If the oral exam does not count, enter 0%).	_____	%
A43	Are project reports double marked?	YES NO	❑ ❑
A44	If YES, is it 'blind' double marking (i.e. the independent markers are unaware of each others marks until they have awarded a mark themselves).	YES NO	❑ ❑
A45	If there is a difference in the mark awarded by the two markers is a straight mean taken?	YES NO	❑ ❑
A46	If not a straight mean, please give details of how the final mark is decided: _____ _____ _____		
A47	Is there any element of self or peer assessment in the overall assessment of the practical project?	YES NO	❑ ❑
A48	If peer or self assessment is included please give details below _____ _____ _____		

Appendix 2. List of Responding Departments

1. Aston University, School of Life and Health Sciences
2. Bath Spa University College, School of Science and the Environment
3. Birkbeck College, University of London, School of Biological and Chemical Sciences
4. Cambridge University, Department of Plant Sciences
5. Cardiff University, Cardiff School of Biosciences
6. Coventry University, School of Science and the Environment
7. Imperial College London, Department of Agricultural Sciences
8. Imperial College London, Department of Biological Sciences
9. Liverpool John Moors University, School of Biomolecular Sciences
10. Loughborough University, Department of Human Sciences
11. Manchester University, School of Biological Sciences
12. Napier University, School of Life Sciences
13. Northumbria University, School of Applied Sciences
14. Nottingham Trent University, School of Science
15. Nottingham University, School of Biosciences
16. Oxford University, Department of Biochemistry
17. Queen's University Belfast, School of Agriculture and Food Science
18. Queen's University Belfast, School of Biology and Biochemistry
19. Royal Holloway, University of London, School of Biological Sciences
20. Scottish Agricultural College, Life Sciences Teaching Group
21. Sheffield University, Biomedical Sciences
22. Staffordshire University, Department of Biological Sciences
23. Strathclyde University, Dept. of Physiology and Pharmacology
24. Sunderland University, School of Health, Natural and Social Sciences
25. UMIST, Department of Biomolecular Sciences
26. University College London, Department of Biology
27. University College London, Dept. of Biochemistry and Molecular Biology
28. University of Aberdeen, School of Biological Sciences
29. University of Abertay, School of Contemporary Sciences
30. University of Bath, Dept. of Biology & Biochemistry
31. University of Birmingham, School of Medicine
32. University of Bristol, Department of Pharmacology
33. University of Bristol, Department of Physiology
34. University of Bristol, School of Medical Sciences
35. University of Central Lancashire, Department of Biological Sciences
36. University of Dundee, School of Life Sciences
37. University of East London, School of Health and Bioscience
38. University of Glamorgan, School of Applied Sciences
39. University of Huddersfield, School of Applied Sciences
40. University of Keele, School of Life Sciences
41. University of Leeds, School of Biochemistry and Molecular Biology
42. University of Leeds, School of Biology
43. University of Northumbria, Applied Sciences
44. University of Nottingham, School of Biosciences
45. University of Paisley, Biological Sciences
46. University of Plymouth, School of Biological Sciences
47. University of Portsmouth, School of Pharmacy and Biomedical Sciences
48. University of Reading, School of Agriculture
49. University of Salford, School of Environment and Life Sciences
50. University of Sheffield, Dept. of Molecular Biology and Biotechnology
51. University of Strathclyde, Dept. of Immunology
52. University of Sussex, School of Life Sciences
53. University of Teesside, School of Science and Technology
54. University of the West of England, Faculty of Applied Sciences
55. University of Ulster, School of Biomedical Sciences
56. University of Wales Aberystwyth, Institute of Rural Studies
57. University of Wales Bangor, School of Biological Sciences
58. University of Wales, Aberystwyth, Institute of Biological Sciences