



The STAR Project

(Student Transition and Retention)

Doing Biosciences for Real: Acquisition of Work-Based Skills During External Scientific Research Placements

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SUMMARY

The Department of Biology, University of York organises a placement year with paid research experience in the laboratories of industrial or research institute employers for biology and biochemistry students between their second and final year. This case study outlines the time-lines for the pre-placement period and the placement year itself and the support mechanisms that have been put into place to support the students before, during and after placement.

Keywords: Work-based learning, placement, sandwich courses, student transition, management of placement, industrial study, research study.

INTRODUCTION

“The development and place of skills and capabilities in the curriculum have been major aspects of the higher education agenda for more than 10 years. During this time developments and shifts of emphasis have occurred, influenced by debates at both national and institutional level. There has been an increasing emphasis on student experience, focussing not only on the development of academic and intellectual capabilities and subject knowledge, but also on the development of skills to equip students for employability.” (Nobel, 1999).

The importance of work-based skills was recognised by the Committee of Vice-Chancellors and Principals when it reported that “it is one of higher education’s purposes to prepare students well for working life” (CVCP, 1996) and is emphasised in many university websites (e.g. University of Bath, 2005). Different models exist for the integration of work-based skills within the curriculum – industrial visits embedded within the curriculum through to short (typically 4-6 week) placements to one-year industrial placements. In these latter cases, it is now widely recognised that students need extensive support and guidance equivalent to the support and guidance that is offered to students prior to entry to higher education and through induction. Thus students who choose to spend an extended period away from the university on an industrial placement must be prepared appropriately for the challenge ahead, given help and advice about making applications to employers, attending interviews, etc., advised about health and safety issues whilst on placement, supported throughout the process and, subsequently, inducted back into university life after placement.

Fortunately, ASET (Association for Sandwich Education and Training – integrating work and learning) (2005) is available to support practitioners in this process and the QAA *Code of Practice* (Anon, 2001) provides a framework for good practice.

This case study describes how the placement scheme works in Biosciences at the University of York. They have been organising placement since 1975 and each year 5-30% of their students undertake a year-long industrial placement. They have now built up an extensive network of supportive employers.

RELEVANCE TO THE STAR GUIDELINES

At its outset the STAR project researched, produced and published a set of guidelines based on the causes of student attrition and which pointed the way towards possible good practice. The STAR guideline relevant to this case study is 3.1.

3.1 The curriculum should be relevant to and inform students' vocational aspirations early on in the course.

Cook *et al.*, 2005

THE PRACTICE

The Department of Biology at the University of York offers sandwich courses in Biology and Biochemistry that include a year's paid industrial research experience in the laboratories of industrial or research institute employers. Known as 'Year in Research' the placement period starts at the end of the second year and culminates with students returning to the University for the Autumn term of their fourth year.

Summer Term, Year One

First year students who are interested in joining the scheme are invited to attend an introductory meeting in May. Those wishing to proceed make a preliminary application to the Year in Research Administrator via their academic supervisor; this is accompanied by an initial CV and a personal statement. The academic supervisor also provides a statement of suitability.

Placement opportunities are limited and, as competition is high, preliminary selection interviews are held with the Year in Research Organiser. During this interview the first year students' performance is assessed and skills and work preferences are established. Usually only a few students who have both poor marks and poor motivation are prevented from participation in the scheme.

Successful applicants then take part in a number of training workshops organised by the Careers Service in preparation for their placement year. In the summer term of their first year they attend two sessions. One session is run by the Year in Research Organisers – this is a 'Sequence of events' meeting designed to outline the whole placement process and to highlight milestones. See link below.

http://www.ulster.ac.uk/star/curriculum_development/Sequence_Events2005.DOC.

The students then attend a CV writing course run by the Careers Service and academic staff that lasts about an hour. In this session they examine a variety of CVs that illustrate poor and good aspects of CV preparation. See link below. http://www.ulster.ac.uk/star/curriculum_development/cv_writing.doc. They then have to prepare a final e-CV by the end of term and a supporting personal statement for potential employers. The CV writing meeting is compulsory and an attendance list is taken. The students receive feedback on their CVs and they also show them to their academic supervisor who may also comment on them. The CV writing course is the only 'event' the students attend before the second year and as long as they have submitted their CV and personal statement, then they will be allowed to stay on the Year in Research programme or to transfer into it if they have not already done so.

The sequence of events that take place before placement are summarised in Table 1.

Table1. The sequence of events prior to placement in Biology and Biochemistry, University of York.

Period	Activity
Summer term, Year One	<ul style="list-style-type: none"> I. Introductory meeting. II. Registration. III. Preliminary interview. IV. Training workshop on job applications. V. Submission of e-CV and personal statement to accompany eventual job applications submitted to the Year in Research Office. The Year in Research Office normally sends off applications on the students' behalf in Year 2. VI. Those not already registered for a four-year course do so before the end of the Summer term.
Summer vacation	<ul style="list-style-type: none"> I. The Year in Research Office matches applicants with potential placements and seeks additional placement opportunities.
Year Two	<ul style="list-style-type: none"> I. Year in Research meeting for all selected students at start of Year 2. II. Year in Research talks presented by returning students. III. Students notified of placement opportunities by e-mail. Opportunities also posted on a website. IV. Students are then responsible for applying for jobs. These applications are sent to the prospective employer by the Year in Research Organiser. V. Training workshops on interview techniques. VI. Employer interviews (usually held at employers' own sites). VII. Acceptance for placement (generally by Easter). VIII. Unsuccessful applicants revert to three year, non-placement course.

The Summer Vacation

Over the summer, the Year in Research Organisers work to try and find new contacts to add to the existing list of placement providers. The students are allowed to find their own placements, which they do occasionally, but they have to provide all the details to the staff so that the potential placement can be vetted before they can accept. The key criteria are that the placement can provide a genuine research project (i.e. one that provides the opportunity to investigate a real industrial/research problem) and is not just routine work and also that the placement provides a reasonable salary and has the people in the organization to support the student during their time there.

Year Two

The training workshop on job applications occurs in the first week of the Autumn term when the students return for their second year.

The second year students also attend the 15-minute talks that are given by the returning students; these talks are not assessed. The sessions allow returning fourth year students to give the second years (and some first year students) an idea about the range of placements available, about living in a different environment as well as a brief summary of the science that has underpinned their placement. Each student is allowed four slides only in their presentation. The first slide is solely about where they did their research and their reflective comments on this; the last three are their Introduction, Results and Conclusion of their placement research project. Pizza and refreshments are provided after the talks to encourage the first and second years to talk to the fourth year students and find out more about their placements in an informal setting. First and second year students may also view preliminary reports ('First impressions') on a website – these are prepared as informative and reflective accounts by students just starting placement (see below).

During the Autumn term, students are notified of placement opportunities by e-mail and opportunities are also posted on a website. Attempts are made by the Year in Research Administrator to match applicants to placements. Students have to take the initiative to apply for specific jobs but applications are sent to prospective employers by the Year in Research Organiser. The vast majority of the applications go out through the Year in Research Office, but as more companies move to online applications (e.g. the big pharmaceutical companies) then the students are tending to make more applications themselves. Generally, most students apply for between 5 and 10 positions and attend between 2 and 5 interviews.

A training session on interview techniques is organised by the Careers Service and, again, attendance is compulsory. The students can also do a mock interview at the Careers Service though this is not compulsory and only about 20 % of the students use this opportunity. Interviewers at these mock interviews are Careers Service staff and not industrialists; extensive feedback is provided.

Once interviews with employers have been held and placements secured, a number of students will remain unplaced. These students revert to the three-year degree programme pattern and enter their final year in the Autumn term.

Some students are placed very late in the academic term (even as late as the last week of the Summer term) though most are placed by April of their second year. This is largely dependent on the placement providers, as some do not know if they have funding for a student until very late in the year.

The Year in Research

The time-line for the placement year is given in Table 2. Once the placement has been organised students are provided with an on-line booklet – the Year in Research Booklet. See link below.

http://www.ulster.ac.uk/star/curriculum_development/YearResearch.doc. This covers contact with the Department while away, the mid term report, the assessment of the Year in Research and writing the placement project report. It also covers the eligibility for Council Tax exemption, applying for university accommodation in the final year and important contact details.

Soon after the students start placement, usually in September, they are asked for an entry for the 'First Impressions' booklet. This booklet is posted on the Year in Research website for the benefit of students currently choosing a placement year. The booklet is also produced in hard copy format for exhibition stands for potential undergraduate students considering placement.

A visit by a member of academic staff during placement ensures that the student has settled in, is doing meaningful work, is planning a suitable research project in cooperation with the industrial supervisor and is generally performing well. There may also be informal contact, largely through e-mail, between the students and their academic supervisors though the extent of this varies from individual to individual. Apart from engaging with the work of the placement provider, the student has no formal academic work to complete. The visit allows for a tri-partite discussion (academic staff, industrial supervisor, student) to resolve issues. When the students are out on placement they are sent all the documents they need in order to make decisions for their final year modules and final year research project; these are sent out early in the summer semester.

The majority of students are placed with large companies and therefore Health and Safety issues are well covered. Where a student is placed in a smaller organisation or where there is an above normal risk, contact is made with the student to ensure that Health and Safety issues have been addressed.

Table 2. The sequence of events during the Year in Research in Biology and Biochemistry, University of York.

Month/Period	Activity
September	'First impressions' entry in on-line booklet.
November/ December	Mid term visit. Completion of reports by student, http://www.ulster.ac.uk/star/curriculum_development/Student.doc academic supervisor http://www.ulster.ac.uk/star/curriculum_development/ASupervisor.doc placement supervisor. http://www.ulster.ac.uk/star/curriculum_development/ISupervisor.doc

Early Spring term	E-mail alert to availability of module and project choice booklets for final year with deadlines for decisions.
End of placement	End of Year in Research assessment produced by the industrial supervisor on attitude to and aptitude for the research undertaken, combined with a scientific report of that research from the student. The industrial supervisor's assessment is confidential and is not prepared in consultation with the student. The students' reports often contain commercially sensitive confidential material. In these cases, confidentiality agreements have to be drawn up and only nominated members of academic staff are allowed to see the work for assessment purposes.
Enrolment, Year Four	Welcome back party for returning Year 4 students.
Autumn term, Year Four	Seminar presentation to an audience of academic staff and Year 2 students contemplating the Year in Research.
Spring term Year Four	Evaluative questionnaire on the placement experience

Anecdotal evidence suggests that students returning from an extended placement period require a measure of re-induction to academic learning. However, the nature of the placements undertaken by students at the University of York is such that they require little academic induction. However, a Welcome Back Party is organised for returning students in order to ensure that they 'touch-base' with the academic staff and re-new acquaintances among their peer group.

RESOURCES

The placement scheme in Biosciences at the University of York caters for approximately 30-40 students per year and is organised by two academic staff (Year in Research Organisers) with part-time clerical/secretarial help (Year in Research Administrator).

EVALUATION

Students are required to submit a feedback questionnaire (not anonymous) at the end of January following their return from placement.

Student Opinions

The STAR project held a Student Focus Group with Bioscience students from the University of York, some of whom had completed a placement period. The students were very positive about the experience and the support they had received.

Their main reasons for doing a placement were for the research/industrial experience and the opportunity to earn a living rather than as a lead into any specific job though

they did appreciate that undertaking a placement was a positive career move, especially as many employers look for experience in the field as a pre-requisite. For one student, it did provide a negative (though also positive) experience:

"[It] taught me that I didn't want to do a PhD."

They valued enormously the support given by the academic staff and thought it was sufficient, but indicated that it focused more on getting a placement, rather than preparing them for what to expect when they got there. They were surprised by the nature of the work they were asked to do (not that they were 'making the tea', but they had not really thought about or been introduced to what goes on in a research or commercial environment). Adjusting to placement was, however, satisfactory: they

"grinned and got on with it".

They seemed very keen on the placement system and confirmed that they were not concerned about the amount of time they had to devote to preparing for it. They valued the sessions on CV writing.

The placement is assessed via the research report they produced and this makes a contribution to the overall degree award (it counts 10% of the final mark for the honours degree). They thought that as an element of the placement mark derives from the industrial supervisor's report there could have been a more objective way of assessing performance.

The visit by the academic staff during the year was seen as very beneficial in assisting them in overcoming difficulties but they were also concerned that perhaps assessment of performance during a single visit by just one member of staff could be rather subjective.

Overall, however, the students in the group would do a placement again.

Staff Attitudes

The academic staff generally acknowledge that a period of work-based learning is very beneficial but this has not been assessed in any formal way. It is recognised that it would be very difficult to objectively assess the importance of placement, as those students who choose to go on placement are usually those students who are already performing well. There is a feeling that they are much better prepared for their final year than those who have not been away – they have well developed time-management and planning skills, communication skills (verbally and in writing), group-working skills (including leadership skills), decision making and problem solving skills and are able to work under pressure. Typical comments include:

"They [the placement students] have got a lot of experience. They have got a lot of self-confidence, and it shows up in finals marks too."

"They go mainly to research organisations, and for many of them it is to confirm their aspirations for a research career. That is what they would like to do. Or for some [it] helps them to decide what they do not want to do."

Improved Student Performance

At the University of Ulster, a year's placement is optional in Environmental Science and Geography and some analysis of student performance would support some of the above observations though it must be re-iterated that those students who choose a placement option are often the better students. In these two degree programmes, 14 students undertook a placement in the years 2002/03 and 2003/04. Of these, all ultimately obtained either a 2i or a first class degree. Further, there was an overall 5% increase in their marks between Year One and Year Four (after placement) – Year One, 61.4% average; Year Four, 66.4% average. This difference was significant (using a matched t-test) at between 0.01 and 0.001. Analysis of students who did not go on placement indicated that there was also an overall increase between Year One and Year Four (from 58.0% to 60.4%) but this was less than that for placement students and was not significant.

CONTEXT

Institutional profile University of York	<ul style="list-style-type: none">• The University of York was founded in 1963. In 2003 it reported having 9277 FTE students. Eighteen of its 23 departments, including the Department of Biology, were rated 5 or 5* in the last Research Assessment Exercise.• The University has a collegiate system in which most staff and all students are members of colleges. All first year undergraduates are guaranteed accommodation in one of the eight colleges or in University residences within walking distance of the colleges.• The main campus at Heslington is a 200-acre landscaped park, well known for its lake and wildfowl. Here the colleges and academic buildings are on a level site within walking distance of each other. It is on the outskirts of the city of York.
Course title	<ul style="list-style-type: none">• Biology single subject degrees
Size of course	<ul style="list-style-type: none">• 103 (2002-3)
% mature	<ul style="list-style-type: none">• "Very few – 1 or 2 per year"
% living at home	<ul style="list-style-type: none">• "Practically none. We get very few applications from the York area. Even local students like to live on campus. A lot of students would rather live on campus"
Relevant entrance data	<ul style="list-style-type: none">• Intake requirements – ABB to BBB including BB in Biology and Chemistry• Average on intake 254 points (equates approximately to AAB)

	<ul style="list-style-type: none"> • 89% offered A level or Highers in fulfilment of the entry requirements
	<ul style="list-style-type: none"> • In 2003 there were 6 early leavers; 4 changed course within York. (Four of these left immediately after registration and a further 2 students transferred into the course.)

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