

An IT solution to a pedagogic problem.

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The problem and context

The Faculty of Applied Sciences (FAS) has run Sandwich degree programmes in Applied Biological Sciences for over 30 years. Few doubt the importance of the placement year for the workplace experience gained, but we have also found statistical evidence that placement students perform better academically not to mention enhanced employability prospects on graduation. Employers, understandably, prefer graduates with experience of the workplace during their academic programmes.

Despite these advantages, and having visited placement students and seen evidence of high-level learning – e.g. names on research papers and presentations at conferences - we were concerned that our placement year was not properly recognised in terms of academic credit.

We therefore decided to rectify this by fully integrating the placement within our degree structures by awarding academic credit.

Our solution

Define the problem - First understand the issues surrounding the current position.

Our suggestion to accredit the placement year was met by a range of reactions from 'about time' to 'it can't be done' and 'it'll undermine the academic integrity of the whole degree'. Most opinions were negative and concerned a variety of aspects...

- The placement occupied time outside formal academic learning, so awarding academic credit was inappropriate.
- T&L quality assurance procedures had no equivalent for placement learning.
- Our placements are diverse in terms of type (e.g. hospitals and industry) and geographical location (e.g. UK and USA), so how could consistent standards be applied in a cost-effective manner?
- How would placement credits be accommodated within the degree? If assigned level 2 credits, then how would students cope in Year 2 with the expectation of gaining credits in the Sandwich year? If level 3 credit was assigned, then the taught content in the Final Year would be reduced.

Don't reinvent the wheel - Find out approaches elsewhere in the sector.

We visited a number of HE sector colleagues and found mixed approaches. Like us, many places did not give credit for the placement year. For those that did, the accreditation process often seemed less rigorous than for taught credit within the programme.

Get policy-makers on board.

To effect change you need to get people with influence (e.g. senior management/university policy-makers) on board. Although colleagues' initial reactions were lukewarm, our suggestion was well-received by our Dean and our Modular Scheme Office. This support gave impetus to our intentions, although both still required a detailed case to be made about integrating the credit within the degree structure.

Building a case for change.

As with any suggestion for change arising from grassroots level, a strong case is required.

- **Drivers for change. Why change the status quo?**

A number of drivers for change developed over three decades of running Sandwich degrees. Although placement quality had improved from when employers offered basic work experience with students regarded as an extra pair of hands, academic learning opportunities were underplayed with the emphasis on the experience of the world of work. Nevertheless, students still saw the application of science in industry and learned transferable skills. More recently, students start placements with more expected of them - in return being treated as work colleagues and even as graduates. There is also increased recognition of the workplace as a learning environment in itself, with experiential learning translated into academic credit through schemes such as APEL (Accreditation of Prior and Experiential Learning).

The placement year attracted half-tuition fees yet did not lead to 'real' academic credit, so it was unsurprising that these were negative factors influencing students' decisions to go on placement. Sizeable numbers of students started to opt out of the placement year and transferred to the final year, adversely affecting employability prospects and final year performance. Giving the placement academic credit could be an 'incentive' for students to continue on the Sandwich route.

- **Poor pedagogy – A basic assessment.**

It is tempting to continue with existing systems for historical reasons, even when they are adequate rather than ideal. Our assessment of placement learning, we felt, fell into this category. Placement students were allocated a Visiting Tutor (VT), but communication tended to be sporadic, with contact made half-way through the placement to arrange a visit and once again at the end, but with little formal guidance during the placement period itself. This relaxed approach reflected the notional credit-rating assigned to the year. The visit generally affording the VT their first opportunity to discover what the student was doing, turning it into more of a fact-finding operation than an evaluation. Also, the 'special' nature of the visit did not reflect the student's day-to-day work. Essentially, there was little opportunity for the VT to guide the student or support their learning.

The basic assessment comprised a VT report on the visit, a work supervisor's report on the student (written at the end of the placement, too late for feedback to the student or VT) and a final report written by the student covering the highlights of the placement, particularly those elements that worked. All elements had to be passed (as a simple pass/fail) for the Sandwich title to be awarded.

- **Articulating our aims.**

We aimed to:

- Monitor students learning in an iterative fashion to steer and provide feedback.
- Produce a transparent pedagogical model based on that of taught modules, thereby assessing student workplace learning with sufficient rigour to satisfy our academic procedures for the award of academic credit.
- Award HE level 3 (final year) credit.
- Be sufficiently flexible to cope with the diversity of placement experience.

- **Basing our approach on accepted practice.**

To strengthen our case, we wanted whatever system we produced to be based on accepted practice. We went back to first principles and the generic criteria for awarding credit for taught modules, namely:

- Credit value (10, 20, etc.).
- Notional learning time (with 1 credit equivalent to 10 notional learning hours).
- Learning objectives or outcomes.
- Level of learning (credit-level descriptors defining the expectations required of students at each level of their learning, e.g. SEEC level descriptors [7]).
- Assessments providing evidence that the learning objectives had been met satisfactorily.

The pedagogic system we developed to accredit workplace learning reflected these criteria.

- **A modular approach to placements.**

One approach HE takes to the complexity of degrees is to divide the broader subject into smaller modular units. This is efficient as groups of degrees can share modules drawn from a larger pool. Furthermore, the criteria listed above to some extent apply within and between degree programmes as a consequence of applying to their constituent modules. We adapted this approach to the placement year, considering the relationship between each slightly different placement as being analogous to that between each slightly different degree within a modular scheme. Additionally, just as each degree was defined in terms of its constituent modules (some of which might be shared), so each placement could be defined in terms of a variety of learning opportunities we called 'tasks', each of which could be referenced against the above generic criteria for awarding credit. The characterisation of these tasks in terms of generic criteria could then be used as the basis for awarding 'real' academic credit.

Given the diversity of placements, we developed a model where students, upon starting their placements, formulated a Learning Agreement (LA) in negotiation with their work supervisor and VT describing their placement in terms of these individual 'tasks'.

- **Anatomy of a 'task'.**

Any identified task was described in terms of:

- A title.

- A brief description.
- Learning outcomes (LOs).
- Generic/transferable skills.
- Specific skills.
- Justification of level of learning (using level descriptors).
- Assessments or evidence that the LOs are met.

This format is essentially a module description, so students are effectively required to write their own individual module. The generic structure within this approach makes it suitable for workplace learning in degree programmes of differing disciplines, not just science.

Incorporating the placement year within the degree structure.

We delivered this approach via a 20-credit, level 3 module offered during the Sandwich year called the Professional Practice in Applied Science Module (PPM). Students take the original Sandwich year assessment route (described earlier and worth 120 notional 'p' credits) or the PPM. Students taking the PPM produced a LA defining the tasks contributing to the PPM. During the year, the learning associated with those tasks were monitored closely and steered towards L3 by the VT, a process facilitated by the students producing detailed task descriptions, LOs, and evidence that these had been met.

Given its credit-value, students passing the PPM had the option to take 3 taught modules instead of 4 on joining the final year.

Administrative and pedagogic challenges.

In theory, this scheme appeared workable but there were a number of challenges to implementing such an approach:

- Each student would have individual LA, tasks and evidence due to the unique nature of the placement.
- VTs needed a clear and simple communication channel established between the two geographically-separated stakeholders to monitor students; ideally, this would also include the work supervisor.
- Communication via the postal system was seen to be slow, time-consuming and administratively cumbersome. Although email addressed the issue of speed, difficulties in organising and administering the PPM via this method remained.
- How could we expect students successfully to take an active part in the formulation and justification of learning at L3 when they had only experienced L2?

For taught modules, the learning outcomes and assessments are designed by the academic staff. In our approach, the student, through negotiation with the work supervisor and academic tutor, sets the learning outcomes and produces the evidence used to assess their attainment. This reflects the paradigm shift from the traditional role of the learner as passive recipient to one where the learner takes active responsibility for and ownership of the learning objectives. But how could this process be managed?

Developing the IT solution.

A portfolio approach.

Task-orientated learning is best captured in a portfolio. However, such an individual, detailed approach to the assessment of work experience could incur a significant administrative overhead.

An electronic -portfolio approach.

However, modelling placements in terms of the 'modular' metaphor described earlier makes their detailed description ideally suited to a database solution and, furthermore, managing this detail via the internet could address the problem of geographic diversity. Therefore, we developed a novel electronic-portfolio (e-portfolio) system, called Profile, to deliver this 'modular' approach to the recording and assessment of placement learning. Each student was given access to a secure e-portfolio within which s/he completed web-forms in order to develop and describe their unique learning agreement, as well as web-forms to define selected work activities in terms of the criteria for academic credit; to support assessment, evidence of learning could also be uploaded.

Different user roles.

The student, being the main user, was considered as the owner of his/her portfolio. Certain other people could also gain access to the portfolio at the invitation of the student, the two main ones being the work supervisor and academic tutor; these people had separate logins and could view the material in the portfolio and communicate with the student, providing ongoing feedback. Users with these roles could also 'sign off' work electronically (as described below). The involvement of the other stakeholders in this way allowed students' learning to be both monitored and modified to help them reach their agreed learning goals. This combination of remote tracking and feedback proved ideal for students on placements that were both diverse and dispersed.

Communication tool.

Within Profile, a communication tool allowed messages to be posted so that all stakeholders in any particular placement could see the questions posed and the suggestions made.



Figure 1. Screenshot of an example communication page which allows stakeholders to send and leave messages to each other. The dialogue was captured and proved useful for auditing purposes.

Features of web-forms.

To ensure that the work being reported by the student was indeed his/hers, a sign-off facility was incorporated whereby the work supervisor confirmed the authorship and standard of the student's work. The VT also signed-off to confirm that the work has met academic requirements. To accommodate the sign-off facility, we produced a novel system whereby on the same form different form elements could be restricted to different types of users. For instance, for the majority of forms, the items on the form were restricted to the student to complete except for sign-off checkboxes used solely by the work-supervisor and tutor. This novel approach permitted the natural simulation over the internet of familiar, paper-based processes involving forms.

Flexibility and devolved management.

The system features devolved management in that appointed administrators can set up their own independent e-portfolio areas for their students, and contain their own custom web-forms and standard web-pages designed to meet their own particular needs. The system replicates generic features of paper-based administrative systems:

- Distribution: a web-form can be 'released' to a particular type of user.
- Help: standard web-pages can be delivered to assist users.
- Sub-sections: parts of a web-form can be reserved for filling in by other users.
- Attachments: uploaded files can be 'electronically stapled' to a web-form.
- Hand-in: web-forms can be electronically 'signed off' which locks their content.

These features make the Profile system into a very flexible tool. Instead of a programmer having to modify the underlying scripts that drive the system in order to deliver the required outcomes of a particular administrative task, those needs can be met by the person responsible for that administrative task creating a set of, to them, familiar forms that represents the process. The way the users interact with these forms within the Profile system then achieves the desired outcome. In a way, the person creating the forms to run on the Profile system is performing high-level programming, for the forms evoke certain responses in users designed to collect and collate data in a particular way. Seen in this way, forms within the Profile system are effectively 'programs' that 'run' on the users.

Profile e-portfolio forms.

Profile homepage.

The homepage www.profile.ac.uk (Figure 2) serves as the login page to the e-portfolios and contains a few links take visitors to explanatory web-pages. The website is constantly undergoing development and the screenshot below is current as of publication of this paper.



Figure 2. The Profile e-portfolio homepage.

Once logged in, the user is taken to the homepage of placements (Figure. 3) and from this the user accesses forms from the left hand menu and help web-pages from the main body of the homepage.

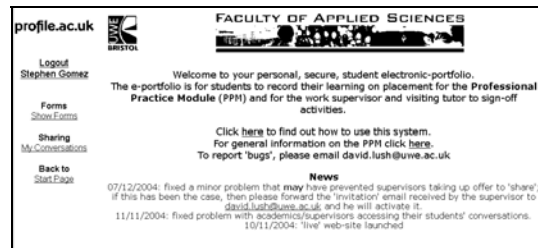


Figure 3. The homepage of an individual Profile e-portfolio.

Learning agreement web-form.

The Learning Agreement (LA) web-form allows the student to layout his/her learning during the placement period. The activities during placement are described in terms of tasks, with each task representing a learning opportunity. For science students, typical tasks may involve: learning a particular laboratory technique or procedure; data analysis or synthesis; formal presentations; report writing. The LA web-form consists of several sections:

i. Student identification fields.

Student name:	<input type="text"/>
Student number:	<input type="text"/>

ii. List of tasks.

Next, the student enters the list of 5-10 tasks they are hoping to perform on placement.

Proposed activities or tasks HELP	
List proposed activities with starting & ending dates;	
eg: Task 1: Maintaining bacterial culture collection (Oct 04 - Dec 04)	<input type="text"/>

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iii. Task deadlines.

The student sets deadlines which have to be agreed with the work supervisor and VT to ensure that the student steadily works through their portfolio.

Deadlines for Assessment of the Portfolio	
There are four deadlines within the LA. You set 3 of them and the final one is the deadline for the Faculty. Ensure that the first deadline is within the first 6 weeks of the start of the Profile web-site going 'live' and that the other two deadlines are evenly spread. Your VT will need to be satisfied that these dates are reasonable.	
Deadline 1: For submitting the LA and Health and Safety form (usually 6 weeks from the start of your placement).	End of: <input type="text" value="Select"/>
Deadline 2: For submitting first assignment.	End of: <input type="text" value="Select"/>
Deadline 3: For submitting second assignment.	End of: <input type="text" value="Select"/>
Deadline 4: register for your student project module on line.	<input type="text" value="01 Aug 06"/>
<i>Please note that failure to meet these deadlines are likely to result in you being transferred from the PPM.</i>	

iv. Sign off.

The student, work supervisor and VT have separate logins and each has a separate section on the sign off area where they check a box (electronic sign off) and can write comments.

Student Sign-off: <input type="checkbox"/>
Tick the box to confirm that you have completed the form.
Use this space to write any comments specific for this form:
<input type="text"/>
Work Supervisor sign-off: <input type="checkbox"/>
Tick the box to confirm agreement with the tasks listed.
Use this space to write any comments specific for this form:
<input type="text"/>
Visiting Tutor Sign-off <input type="checkbox"/>
Tick the box to confirm that the Agreement equates to Level 3 activities and occupies about 200 'notional' learning hours.
Use this space to write any comments specific for this form:
<input type="text"/>

v. Submit button

At the bottom of the web-form is a Submit button which saves any valid changes made to the form when clicked.

Task web-form.

The Task web-form is used to document the individual tasks contained in the LA; one Task form per individual task. Like the LA, the task web-form consists of several sections which are again separated into smaller sections below for ease of explanation. Whereas there is only one instance of a LA, the task web-form was made 'clonable' in that students could make as many copies of this form as required.

i. Student identification field.

Similar to the LA above.

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ii. Description of the task.

Student describes the intended task in terms of: a title, period when the task would be performed, a brief description of the task for the layman, and the intended learning outcomes. Context sensitive help and examples available through hyperlinks guide the student through this process.

This screenshot shows a web form titled "Click here to access LIBRARY of Examples". It contains three text input fields, each with a vertical scrollbar on the right side. The first field is labeled "Title of task*". The second field is labeled "Date from" and "Date to", with "Select" dropdown menus next to each. The third field is labeled "Brief description of the Task*" with the instruction "Keep it clear and succinct." below it. The fourth field is labeled "What you hope to learn from the Task *".

iii. Transferable skills.

Making students aware of the transferable skills they use on placement is important as previously these were neither recognised nor valued. This section on the task description web-form provides an extensive table of transferable skills. Only two skills are shown in the screenshot below but the full list includes:

- Communication
- Information technology (IT)
- Application of number
- Working with others
- Improving own learning
- Problem solving
- Professionalism

For each of these skills, a checklist of salient features is provided which students check off as appropriate, as well as a text area where students explain how that skill is involved in the task (not every skill needs to be justified for every task, only those that are appropriate).

This screenshot shows a section titled "Transferable Skills involved in the Task". It includes instructions to complete only those sections that apply to the task and a link to "Transferable Skills HELP". There are two main sections: "Communication" and "Information technology [IT]". Each section has a "HELP" link and a text area for explanation. The "Communication" section has a checklist: "Written skills", "Verbal skills", "Group discussion", "Give a presentation", and "Read & synthesize information". The "Information technology [IT]" section has a checklist: "Plan & use different sources.", "Explore, develop & exchange information.", and "Present the task using IT methods.".

iv. Specific skills.

Student lists any skills specific to the task in hand.

This screenshot shows a section titled "Specific Skills involved in the Task *". It contains a text input field with a vertical scrollbar on the right side. There are two links, "HELP" and "Examples", located to the left of the text area.

v. Supporting evidence.

Students need to provide us with evidence to support the claims they are making and they can upload any electronic file, such as: Word, Excel, PowerPoint, or text documents, image, audio and video files, etc. This facility can be thought of as an 'electronic paperclip'.

This screenshot shows a section titled "Evidence to support the Task HELP". It contains a text input field and a "Browse..." button next to it.

vi. Justification of task at Level 3.

The portfolio forms part of the assessment for awarding academic credit at L3. The students, therefore, are required to justify individual tasks at this level. They are assisted in this by the 'Criteria for Level 3' section on the web-form. Seven areas are covered:

- Knowledge and understanding
- Ethical issues
- Analysis
- Synthesis
- Evaluation
- Application
- Autonomy in skill use

The screen shot to the right only shows the first two of these.

Criteria for Level 3	
Complete those sections that apply for this particular task. Click here for notes on Criteria HELP	
Knowledge and Understanding Briefly explain how the task relates to your discipline (eg Biosciences, Environmental Science) and extends your previous knowledge at L2.	<input type="text"/>
Ethical issue Does the task raise any ethical issues? If so, explain your personal responsibility or how the task relates to professional codes of conduct.	<input type="text"/>

For each category, an explanation is provided as well as a text area to be completed by the student explaining how the task is justified.

vii. Sign off.

Similar to that shown above for the LA.

Tips/things to look out for

Don't be put off by negative comments by colleagues.

- Use criticisms to strengthen you case.
- Look to outside your immediate situation to see if your idea can be applied elsewhere. Quite often when others take up your ideas, closer colleagues will feel left out.
- Bring detractors on-board to help you develop ideas.

What problems/issues have arisen?

- Workload issues.
- Sustainability.

Does it work?

Yes. Uptake amongst colleagues across the HE sector is very high.

- The strengths in the system include: flexibility, generic, sharing good practice, setting up a community, no bottle-necks.
- It's free. Under the terms of FDTL 4 the system is offered free to the HE sector.

Further developments

With the rise in number of people taking the system up, we need to track client requirements and the progress of the work. We are developing a Profile Incubator to assist interested parties produce their materials and realms.

Generic nature of Profile e-portfolio.

Profile was originally designed for our particular needs, but the software permits the uploading of any form to manage students' learning; if you wish to use Profile, please contact: profile@uwe.ac.uk

References

<http://www.profile.ac.uk>