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Technology Enhancement for Quality Assurance and Management of Tailored Industry Work Placements

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Abstract

This practice-sharing paper describes the development of an effective process to address various challenges to implementing quality driven, administratively sustainable and pedagogically appropriate work-placement, particularly where career options are broad and appropriate industry opportunities diverse, such that success involves tailoring to be mutually beneficial to all stakeholders. Effectiveness leveraged technology, firstly to manage the complex process of placing individuals in an appropriate role within a suitable organisation; secondly to quality assure the learning outcomes in diverse industry-based learning environments; and thirdly to enhance assessment and feedback of core competencies and graduate attributes. Whilst transferable across various sectors and technology solutions, the context involved food industry placements, and use of Google Apps and blog tool in the Blackboard VLE. Technology has improved the management of the work-placement process, from generating ample high-quality and relevant opportunities, increasing productivity through better communication, whilst simultaneously guaranteeing quality by collaboration for defining suitable learning activities, and the creation of individualised placement Learning Agreements. Meanwhile, online blog assessments support students' reflection on learning and foster a community of learning amongst peers. This paper aims to provide guidance to those involved in engagement at the interface between industry and the university for similar work-based learning.
Keywords work-placement; learning agreement; reflective assessment; blog; Google Apps.

Introduction

It is recognised that employers demand graduate applicants that are work-ready, with relevant experience and non-technical skills to be effective in the workplace (Edwards et al., 2015). Many Universities provide work-related opportunities during studies as a mechanism to develop work-ready graduates. Learning activities which connect industry with education are known as Work Integrated Learning (WIL), and allow students to apply their theoretical knowledge in a practical setting. The terms ‘experiential learning’, ‘work-based learning’, 'work-placement', ‘professional learning’ and ‘cooperative education’ are used synonymously with WIL (Jackson et al., 2017). Specifically, work-placement is a period of planned work-based experiential learning, where the learning outcomes are part of a programme of study and should be associated with a formal assessment (European Commission, 2009a, 2009b). Learning is attained through listening, observing, reflecting, practising and refining skills, trial and error, supervision or coaching, mentoring, problem-solving, learning from mistakes, getting information and asking questions, being proactive and giving and receiving feedback (Pang, 2015). From an employer perspective, it provides industry with one of their most important vehicles for engagement with higher education institutes, whereby their voice can influence curriculum design so that it remains current and relevant. However, a recent report has identified several challenges and barriers from the employer perspective that can limit their ability to engage with work placement (Jackson et al., 2017). These include a lack of shared understanding between the university and industry of what is involved in work placement; misalignment between employer and university expectations on the purpose and nature of the placement experience, especially what constitutes a quality placement and how
this can be achieved; insufficient resources for coordinating and supervising placements; and ability to locate a suitable student.

Establishing mutually beneficial partnerships with local universities can be particularly problematic for smaller businesses, where personnel who are typically involved with multiple functions in the organisation and have little time to support student learning. Additionally, not being approached by universities and the aligned problem of access to the relevant staff in the university who arrange work-placements can be problematic for businesses. For more diverse, unstructured work-placements, identifying suitable projects for students to undertake is found to be a considerable challenge.

Recommendations to the university from Jackson et al. (2017) to reduce such barriers centre around developing collaborative relationships. Several recommendations relate to administration, including ensuring up-to-date information on the university contact person for particular placements; providing relevant details about the placement; using third-party industry support organisations to disseminate information; assisting with finding and appointing a suitable student to the business; and simplified paperwork. Recommendations for successful student learning include developing fact-sheets, guides or videos with lists of authentic workplace tasks aligned with learning outcomes; guides for industry supervisors on appropriate mentoring, including using evaluation forms, and informal and formal feedback processes, and remediation practices to enhance student performance; use of three-way learning agreements setting out roles and responsibilities of all parties; and active student preparation in professional etiquette prior to placement. This resonates with earlier reports for achieving high-quality WIL experiences. Smith (2012) highlights the administration aspect
of induction and preparation as critical for a successful placement, whilst Pilgrim (2012) ascribes successful work-placement to a design that benefits all stakeholders.

More specific guidelines related to best practice for work-placement learning have been compiled in Ireland, in the report ‘Roadmap for Academic-Employment Partnerships (REAP) Work-placement in Third Level-Programmes’ (Sheridan & Linehan, 2011), which also provides an overview of important international literature relating to work-placement learning. The REAP report makes several recommendations for planning, organising and managing work-placement curricula based on an extensive review of the literature and empirical research on the three stakeholders involved in work-placement, namely the university, the industry and the student. These align very well to the recommendations of Jackson et al. (2017) outlined above. The REAP report provides guidelines intended to form a framework to facilitate enhanced learning opportunities and improved collaboration and communication between all stakeholders in the placement process, such that all parties involved are aware of their responsibilities. The responsibilities focus mainly on communication between all parties, learning agreements, mentoring practices, student selection processes, reflection on practice, and assessment and feedback mechanisms.

Indeed, of key importance in any curriculum is the role of assessment. Work-placement-based assessment provides the ultimate in authentic assessment, which aims to imitate the tasks and standards typically found in employment, and which impacts positively on student learning, independence, motivation, self-regulation and metacognition (Villarroel et al., 2018). As work placement involves experiential learning, best practice recommendations include that students should actively participate in reflection, which is key to turning experiences into learning. However, students require support to enable them achieve
successful reflection on work-placement learning (Smith et al., 2007). Students have reported that having 'appropriate experiences' were seen to be a key part of developing reflective skills (Vivekananda-Schmidt et al., 2011).

This practice-sharing paper describes the development of an effective technology-enhanced curriculum design and management process to address various challenges to implementing quality driven, administratively sustainable and pedagogically appropriate work-placement modules, and aims to provide support to those involved in engagement at the interface between industry and the university. The focus is particularly where the programme is not overseen by a professional or regulatory body and accordingly the industry supervisors will have variable backgrounds, and the professional competencies of the placement are not externally defined. The model applies where the career outcomes and aspirations of graduates of the programme are broad, and consequently appropriate industry opportunities and activities can be diverse such that successful placement involves tailoring to be mutually beneficial to all stakeholders.

The specific context relates to a curriculum model for food industry work-placements for undergraduate students in a range of food-based honours degree programmes in the School of Food Science and Environmental Health, Technological University Dublin. The success of the curriculum design has been largely due to the judicious use of technology firstly to manage the complex process of placing individual students in an appropriate role within a suitable industry, secondly to quality assure the student learning outcomes for an industry-based learning environment, and thirdly to enhance the assessment and feedback both of core competencies and graduate attributes.
Part 1: Before placement – curriculum design and management

The learning outcomes of a typical 25-credit 12-week work-placement module in the School of Food Science and Environmental Health are listed in Table 1. This paper describes how these learning outcomes were contextualised for all stakeholders such that a successful collaboration for a quality work-placement curriculum could be realised.

Table 1

Learning outcomes

1. Demonstrate the development of core competencies relating to theoretical principles, concepts and skills studied to a real working situation
2. Reflect on participation in and contribution to the successful operation of a production/research facility.
3. Demonstrate a clearer understanding of structures in industry, the role of the technologist in those structures, and the relationship between theoretical modules and the workplace.
4. Demonstrate oral communication and presentation skills.
5. Reflect on professional development and learning through the work-placement experience, relating it to programme aims, and identify future goals.

Students’ work-placement learning is achieved in a wide variety of food companies, and as it is not a professional-body accredited qualification, the supervisors of the student on placement will be from diverse backgrounds. In these cases, there are challenges for any higher education institution to oversee the quality of the experience, and ensure relevance of learning activities, compared to highly structured well-defined work-placements, such as in healthcare and other professional training which is typically overseen by an external regulator. Consequently, it is of utmost importance that a process is put in place to set out an
appropriate and clearly defined learning agreement, as advocated by the *REAP* report (Sheridan & Linehan, 2011).

The following section explains the stages of the work-placement management and quality assurance process, using Google Apps technology, specifically Google Forms, Google Sheets and Google Docs. This process commenced for the BSc in Food Innovation in the academic year 2015–16 for 32 student placements. Since then, it has been expanded to the BSc in Nutraceuticals in Health and Nutrition (since 2016–17), and the BSc in Culinary Science since (2018–19). Altogether, 282 student placements have been secured and managed through this process, with four individual academic work-placement coordinators utilising the system over the years with ease, and minimal handover training.

*Step 1: Securing and advertising a wide range of suitable placement opportunities*

The industries that host our student work-placements typically range from very small start-up and micro enterprises (less than five employees), small enterprises (fewer than 50 employees), though medium and more established businesses (between 50 and 250 employees), up to multinational large enterprises. There are different advantages and challenges to each type of offering. Furthermore, students in food programmes embark on their studies with a wide variety of career ambitions, from scientific roles in food technology and quality control, to more creative aspirations in food product development and entrepreneurship. Finding a good fit for students can be key to a successful learning experience, networking opportunity and transition into employment. Small start-up businesses can offer the student a wide range of roles over the course of the placement as commonly there is a multi-tasking nature to employment in this sector. Students who thrive in such companies tend to work at a fast pace, be adaptable and flexible, be good problem
solvers, have excellent interpersonal and communication skills, have a broad knowledge of regulatory affairs, food safety management, marketing, and a desire for entrepreneurship. However, access to advanced technologies and more sophisticated business structures are not a feature of such placement opportunities. On the other hand, large companies expose the student to structured business operations, with clear roles, responsibilities and line management within departments, highly automated technologies for processing and production, well developed food-safety management and quality systems, separate marketing departments, etc. This can suit a student who prefers a more structured career path and employment security.

Consequently, the first step to a successful placement is a clear understanding of what the company can, and cannot, offer to the student. Naturally, students will also have constraints related to the location of the company, which will influence their ability to opt for a particular opportunity. To secure a range of well-defined and suitable placement opportunities for our students, an electronic booklet was developed that explained the programme learning outcomes for the food programmes in the school. For each programme it listed, broadly, the type of roles and tasks within a company that would be suitable for the work-placement. For each individual programme, a Google Form was developed that mirrored the information in the booklet, and the link to the form was added into the booklet. The link was also available to work-placement coordinators to circulate via email, LinkedIn, and to food-industry representative groups such as associations and state bodies.

Mandatory questions in the Google Form included company and supervisor contact details, location, work times, how students should apply for a position, etc. to gather logistical information about the placement. However, more importantly from a curriculum quality
perspective, the form set out key areas of focus for suitable activities in mandatory questions. These included both 'industry-specific core skills' and 'transferable skills'. Industry-specific core skills were devised based on a review of the programme-wide module learning outcomes, as well as the programme team's wealth of experience of overseeing food industry placement, including site visits and student placement reports. The transferable skills were aligned to the university's graduate attributes policy, which defines skills that are incorporated as module learning outcomes. Companies could select which skills would be developed through the placement opportunity. An example for our BSc in Food Innovation is shown in Table 2, demonstrating the frequency which particular activities were offered by industry respondents (55 in total) in the initial year 2015–16. Additionally, more than half the respondents competed an optional question that allowed them to expand further on the details of the role. The original form can be viewed at this link.

### Table 2

<table>
<thead>
<tr>
<th>Suitable placement activities - please select a range of the following:</th>
<th>Frequency offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Technical: using food industry machinery or instruments</td>
<td>40</td>
</tr>
<tr>
<td>2. Technology: using IT software applied to food industry</td>
<td>18</td>
</tr>
<tr>
<td>3. Process development and control: for example manufacturing, analytical, quality control</td>
<td>39</td>
</tr>
</tbody>
</table>
The form was set up so that each time it was completed it automatically generated both (a) an entry in a Google Sheet, and (b) a Word document that contained all relevant information about the company and the type of placement activities offered. These documents, once approved by the placement tutor, were released as 'Placement advertisements' in a dedicated Google Drive folder. Access was set at the security level that prohibited any user who did not hold a university Google account with authentication via a secured login page from retrieving the information. Students could access the information and submit applications to the companies they were interested in applying for.

Table 3

Profile of Food Businesses that offered placements (2015–16)

<table>
<thead>
<tr>
<th>Company type</th>
<th>Artisan Food Producer</th>
<th>Baked Goods/Biscuits Manufacturer</th>
<th>Meat Processing</th>
<th>Beverage (alcohol and non-alcohol)</th>
<th>Catering</th>
<th>Food Regulatory Body</th>
<th>Contract manufacturer</th>
<th>Food Manufacturing/Processing</th>
<th>Food Distribution/Sales/Marketing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>9</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>27</td>
<td>3</td>
</tr>
<tr>
<td>Company Size</td>
<td>Artisan/Small Scale/Start-up</td>
<td>Medium</td>
<td>Large/Multi-national</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>21</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In this manner, a wide range of clearly defined opportunities for placement were generated quickly and considerably more easily than in previous years, rapidly expanding our network of industries offering to take our students, as well as the diversity of opportunities from which they could choose. As an example, Table 3 shows the profile of food businesses that offered placements in the first year the process was rolled out (2015–16). This essentially
commenced a database of industry partners, and in the subsequent years there have been repeat offers of placements from most partners. Additionally, the database has grown to include a wealth of industry partners offering diverse opportunities, both in terms of breath of tasks and roles, as well as geographical location, demonstrating the success of the process.

**Step 2: Student selection**

The application process was managed by the placement tutor who shared with the students the Google Sheet that listed all the placement opportunities. Students indicated when they had opted to apply for a position, and when they were successful in securing a placement. In most cases, the companies selected the students either from applicant CVs or through a more formal interview process. In other cases, the school was requested by the company to select a suitable student. Sometimes students had their own contacts for placement, and in these cases the company still completed the form so that accurate records were maintained for the workplace and the university had assurance that suitable activities would be available to the student.

**Step 3: Creating a unique learning agreement**

Once a student was successfully appointed to a placement, the student used the information from their own company's 'placement advertisement' document to create a unique 'learning agreement' document, which mirrored the placement advertisement, and also contained a student code of conduct and a performance review section. The purpose of the learning agreement was to provide quality assurance that (1) the company would provide the relevant experiences as specified by them when completing the Google Form; (2) the student would clearly understand the areas of focus and the relevant skills they would be expected to develop; (3) a mechanism for structured mentoring, feedback and assessment was set out; and
(4) guidance to all parties was provided on how to deal with issues such as under-performance and unprofessional behaviour. This document was key to stakeholder communication as outlined in the REAP report, as it was shared between the student, the company supervisor, the placement coordinator, staff engaging with placements (e.g. for mid-placement visits), as well as providing for feedback and assessment on practical skills and knowledge.

**Part 2. Placement assessment and feedback**

*(I) Learning Agreement - Assessment and feedback on practical skills and knowledge*

Once on placement, the learning agreement was used to structure a mid-placement review of the student's performance and development of the specified skills set out by the company. The learning agreement included a space for documenting a mid-placement review, with each of the areas of focus/skills listed, and a section on 'progress to date' to be completed. It also provided for a final pass/fail assessment and feedback by the industry supervisor on the student's development of each of the specified tasks, knowledge and skills. Placement supervisors had direct contact with and observation of the student in the work place, and were expected to hold at least two formal meetings to review, assess and document the student's performance against the criteria outlined in the learning agreement (as shown in Table 1). The signed learning agreement was returned by the industry supervisor to the placement coordinator in the university, either in hard copy or electronically, and this formed the basis for the evaluation of the student's performance and development of work based skills, and contributed to the placement module assessment. An overview of the Google Apps used to management the quality of the placement experience is outlined in Figure 1.
(II) Reflective practice and developing a community of learning through an online blog assessment

As part of an ongoing project in the School of Food Science and Environmental Health to investigate the use online technologies as assessment-for-learning to enhance the student experience on work-placement, a model developed for a healthcare programme in our school has been fully evaluated (Dunne, 2017; Dunne & Ryan, 2016). Students can struggle with conceptualising work in terms of academic knowledge and with the reverse process of transforming tacit knowledge from the workplace into a form they can verbalise.

Additionally, they are isolated from their peer support group. To address these issues, a blog assessment has been implemented to actively encourage reflection and also foster peer-to-peer learning through providing an opportunity to share experiences of the diverse range of activities during work placement. Key requirements and resources to prepare, support and engage students in all aspects of the work-placement assessment were identified. Examples include an assessment rubric, instructional videos and reflective writing resources, a pre-placement reflective writing workshop, feedback mechanisms, and assessment strategies that actively promoted student interaction with their peers. The aim of the blog assessment is (1)
to utilise a virtual learning environment (VLE) to provide an effective online learning space to foster a community of learning for work-placement students; (2) to engage students in collaborative learning, encouraging deeper analysis and critical thinking; (3) to enhance career development through sharing work-placement activities; (4) to provide student-friendly peer and tutor support while isolated from college on placement, thus supporting student retention; (5) to provide timely tutor feedback and peer review on assessment; (6) to enhance professional development through reflection on practice and written communication; and (7) to broaden the curriculum through gaining, sharing and discussing external perspectives on core knowledge gained in theoretical modules.

Figure 2

Anonymised student blog using Discussion tab in Blackboard.
A full description of the implementation and evaluation on this assessment has been described previously (Dunne & Ryan, 2016), and was subject to research-ethics guidelines (DIT Research Ethics Committee approval number: 65/10). Students were instructed to post an approximately 400-word blog on four prescribed dates, describing the tasks and experiences they had on placement, how these related to college modules, graduate attributes and reflecting on their performance. An example of a student blog is shown in Figure 2.

Students were also instructed to comment and respond each week. Students had access to read the complete set of blogs from the entire class. Formative tutor feedback was provided to each student after the first blog and comment postings using the blog commenting feature.

Figure 3
Tutor and peer interactions in the blog commenting feature of the Discussion tab of Blackboard.
Feedback was presented in a positive and constructive manner, and focussed on encouraging concise description, reflection, and relating experiences to theory. Peer feedback is obtained through reading the blog posts of other students and through their interactive comments to one another. An example of the comments between the students, and including a tutor feedback comment is given in Figure 3. Each student learned from the diverse blogs of those in their group, as well as from the tutor feedback on their own blog as well as their peers' blogs.

In the 2018–19 academic year the School of Food Science and Environmental Health successfully rolled out this model of placement assessment to our three food science and technology programmes, including a transferable grading rubric (Table 4) that aims to clarify the areas of focus for the student, encouraging reflection, peer-interaction, and a focus on programme theory as well as graduate attributes (Dunne & Ryan, 2016).
Table 4

Grading rubric for work-placement reflective blogs (based on Dunne & Ryan 2016)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Beginning</th>
<th>Developing</th>
<th>Proficient</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>Identify some general ideas or issues from outside experiences related to the topic. Experiences are poorly described or are not relevant to the course of study or profession</td>
<td>Some detail explaining some specific ideas/issues from outside experiences related to the topic. Makes general connections between work experiences and college theory. Experiences are reasonably well described and somewhat relevant to the course of study, but not related well to theory</td>
<td>Good detail explaining some specific aspects of work experience related to the topic. Makes some connections between what is learned from work experiences to college theory.</td>
<td>In-depth synthesis and well described appropriate aspects of work experiences. Makes clear connections between what is learned from work experiences to college theory.</td>
</tr>
<tr>
<td>Graduate Attributes</td>
<td>No reference made to graduate attributes</td>
<td>Some mention of graduate attributes but little evidence to support skill development</td>
<td>Discussion on the development of an attribute supported by evidence from placement experience to support</td>
<td>Critical discussion on the development of an attribute based on evidence from the scenario and discussion on the impact or importance on professional development and future career</td>
</tr>
<tr>
<td>Reflection</td>
<td>No evidence of reflection on performance or personal response to experiences described</td>
<td>No evidence of reflection on performance but some personal response to experiences described</td>
<td>Evidence of reflection on performance and good personal response to experiences described</td>
<td>Evidence of deep reflection on performance and clear personal response to experiences described, together with statement of learning achieved both from the experience and reflection.</td>
</tr>
<tr>
<td>Comments</td>
<td>Lack of comments, or comments of a trivial nature with no evidence of empathy with blog group</td>
<td>Comments of a somewhat trivial nature, and showing only slight empathy with the blog group</td>
<td>Comments show interest and empathy with blog group, requesting further information, and comparing to own experience. Replying to peer comments and questions is evident</td>
<td>Comments show empathy with blog group, requesting information, making suggestions, and evidence of deep reflection of others' experiences, and how it to own practice. Replying to peer comments and questions is evident and very meaningful and purposeful.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Completely insufficient blog posts.</td>
<td>Sufficient blog posts, but always late.</td>
<td>Sufficient blog posts, rarely late. Comments mostly on time.</td>
<td>Always posts blogs and comments on time.</td>
</tr>
<tr>
<td>Style</td>
<td>Poor grammar and spelling, and poor general language usage makes blogs difficult to read or follow. Blog is incorrect length.</td>
<td>Spelling and grammar are good, but little thought out into construction of blog post into a coherent piece. Incorrect length.</td>
<td>Good grammar and spelling, and correct language usage. Blog is correct length.</td>
<td>Good grammar and spelling, excellent language usage, demonstrating style and personal expression. Blog is correct length.</td>
</tr>
</tbody>
</table>
Discussion

Like many others involved in work-placement curriculum design and management, our challenge was to define and realise an appropriate work-placement curriculum involving a wide assortment of companies where the range of suitable learning activities was diverse. This included providing information and guidance to the industry about the types of activities that the student could be expected to undertake, such that there is a shared understanding between the industry and university of what constitutes a quality placement, and allowing companies to confidently identify suitable projects, tasks and roles for students to undertake, as explained by Jackson et al. (2017) to be important to secure industry buy-in for hosting placement students. Related to this was the challenge of how to provide information to the student about the nature of the work-placement experience on offer, so that they could make informed choices that aligned to their career interests, and so that the company secured a suitably interested student. Additionally was the challenge of providing quality assurance in relation to learning activities and assessment associated with a validated module's learning outcomes when the learning takes place outside of the university.

The school chose Google-based technology (Google Apps/G-Suite) to support a relevant and high quality curriculum, as it was available in the Institute and had been shown in previous studies to be relatively easy for most users to adopt (Brown & Hocutt, 2015). In terms of productivity-management in education, Google Forms had already been shown to be useful, for example, to generate a list of research projects and associated objectives for students to review; as well as to manage student project preferences, thus increasing productivity and avoiding the workload of manual sorting methods (Bakrania & Johnson, 2015). Meanwhile Hay and Canny (2011) reported that Google Forms enabled genuine collaboration around assessment item development, training and standardisation, and feedback across
geographically disperse learning sites. In our case, we also found the introduction of Google Apps had many similar advantages that relate both to productivity enhancement though workload efficiency, as well as enhanced curriculum quality with bespoke learning agreements and a blended approach with individualised assessment and feedback tailored to the host company. Evaluation in our school showed the main advantages to be:

- The technology was successfully adopted by all work-placement stakeholders – tutors, students and companies.
- Companies could identify the type of learning activities that are relevant to the student on work-placement giving confidence to the company that they were a suitable organisation to support a student on placement;
- Companies could select from a range of suitable activities to build a bespoke work-placement that is suited both to the company and the student;
- Our range of companies and types of opportunities was rapidly expanded;
- The students were clear from the outset what the placement would involve, empowering them to select an appropriate opportunity to match career aspirations;
- The management of the placement allocation process was streamlined;
- The student had a personalised and bespoke learning agreement as a document that could empower them to have conversations with the industry supervisor if the appropriate learning activities were not being provided to them;
- The learning agreement formed the basis for structuring a mid-placement review between the industry placement supervisor and the student enhancing feedback on performance in a structured manner;
• The learning agreement can structure the conversation with academic tutors who visit the student on the work-placement, assuring that the student is achieving suitable learning while on placement;

• The learning agreement provides a framework for feedback and remedial action if the student is not engaging fully in the placement experience;

• The learning agreement formed the basis for the industry supervisor to assess the student learning at the end of placement;

• The completed and signed learning agreement provides evidence for the university to decide if a student has met the validated learning outcomes of the industry placement module and providing transparency as well as a record of the placement activities and the student progress.

Additionally, using the online blog assessment has helped:

• University staff to remain abreast of developments in industry through engaging in the blog assessment and reading the diverse experiences of the students;

• Students to share experiences and learn from each other;

• Students to be supported while separated from the peers for the first time in their programme of study;

• Students to actively reflect on their overall development, linking placement experiences to theory and finding evidence for the development of graduate attributes and allowing them to articulate these and enhance future employability (Dunne, 2017).
Programmatic review of BSc Food Innovation

Evaluation of this placement management process was included in the review of the BSc Food Innovation in 2017. This included a survey of a sample of students of the 2015–16 placement cohort by the Programme Chair in relation to the overall work-placement experience. Some questions relevant to this study are included in Table 5, along with some student quotes. Furthermore, feedback from industry recommended increasing the time on placement to at least 12 weeks. The key finding related to work-placement that emerged from the review process were:

- A supported advertisement and recruitment process;
- Existence of a contract between student, company and TU Dublin;
- Facilitated monitoring of progress through contract of learning and staff site visits;
- Blog assessments facilitated monitoring; during term would better facilitate academic staff engagement and visits.

The increased confidence of the programme committee in securing sufficient relevant placements led to the embedding of the placement in the academic semester, increasing the placement to 12 weeks and to 30 ECTS. This has been successfully in operation since the 2017–18 academic year.
Table 5

Student evaluation of work placement experience (N=14; taken from Programme Review 2017 BSc Food Innovation)

<table>
<thead>
<tr>
<th>Survey Evaluation Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work placement was well organised for our class</td>
<td>3</td>
<td>7</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>'Enough work places were given to the class we just had to contact the work place. Good involvement such as visits to the work place.'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Overall I thought everyone who made an effort to be interactive to and a placement thought it was very well organised.'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Google doc made it easy to look at options, options were given in sufficient time, any help needed was given.'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Numerous placement options were made available to me.'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Julie reached out to many food companies on behalf of the students and there were many options available.'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Briefly explain the factors that influenced your choice of where you would carry out placement:

- 'The type of work e.g. Food technologist and the location'
- 'The modules I liked in college'
- 'Location, type of products, established - I wanted somewhere that was established and took placement before'
- 'Location'
- 'It was close to my house as I do not drive.'
- 'I considered what the job entailed and if it was something that I would like experience in and that would interest me. I should have spent more time considering the location as this ended up being the most important factor.'
- 'Quality of the company'
- 'Location was my main factor and if the company was a small business or large. This is because I wanted to work in a smaller company (more experiences and less intimidating)'

The work placement experience was relevant to my degree

- 'Good experience into the real world, to understand the stress.'
- 'I got to do NPD, a little on quality control and a lot on health and safety.'
- 'Most of the work done was on a production line, varied slightly every so often but there was one or two things relevant but not a whole lot.'
- 'I carried out duties I have carried out previously in labs in college.'
- 'Only related to one module from last year.'
- 'It was more business focused than I expected but I ended up enjoying this aspect.'
- 'I worked in the labs but also conducted work which was linked to every module in the course, some only minorly linked.'
- 'It was relevant to my degree although it was not as practical as I had hoped as it involved a lot of office work including audit preparation etc.'
- 'It gave me an opportunity to put my knowledge from college to the test and got to see what it's like in the "working world" in the industry that I want to be a part of.'
Conclusions

The introduction of a process supported by Google Apps technology has been successful to address various challenges to implementing quality driven, administratively sustainable and pedagogically appropriate work-placement modules particularly where graduate career options are broad, and the appropriate industry opportunities and activities can be diverse, such that success work-placement involves tailoring to be mutually beneficial to all stakeholders. It has provided a straightforward mechanism for work-placement coordinators to approach industry, which has been identified as a barrier to work-placement from an industry perspective (Jackson et al., 2017). The Google Form doubles as a guide to inform industry of the relevant activities and tasks for each programme. This helps to align expectations for all stakeholders, and for the placement to be designed to suit all participants, which Pilgrim (2012) explains is key to successful work-placement. This has resulted in securing ample placement opportunities for our students. Productivity has increased through better collaboration and communication amongst all stakeholders, as well as a simplification of paperwork, which is a known barrier to industry participation in work-placement (Jackson et al., 2017). As part of managing the collaboration and flow of information, the technology has successfully supported the administration of the crucial early induction of the students into the work-placement curriculum, setting them up for success through pre-placement preparation by informing them fully about the specifics of each individual placement. This administration is essential to a high-quality WIL experience (C. Smith, 2012). The technology enhanced process has simultaneously guaranteed the quality of the placement, from defining suitable learning activities and roles, through to the creation of individualised learning agreements that enable structured feedback and assessment that is straightforward for diverse industry supervisors to participate effectively. This overcomes a challenge
identified by Jackson et al. (2017) in relation to supporting industry to mentor students effectively while on placement.

Overall, the technology has allowed us to efficiently address the central recommendations of the REAP report, which discusses the vital importance in successful work-placement of communicating the responsibilities of all stakeholders such that there is a suitably defined and tangible learning agreement, there is support for the student selection process, and there is guidance on mentoring and provision for industry feedback on performance through the formal assessment design (Sheridan and Linehan, 2011). Alternative technologies could be implemented, for example, Microsoft Office 365 package which has similar functionality to Google Apps, as the data from forms can be exported to Microsoft Excel, allowing for mail merge options to create documents, and individual form responses to be printed.

Meanwhile, we have also successfully rolled out online reflective blog assessments in the food science and technology programmes that have been previously piloted (Dunne & Ryan, 2016), and shown are successful in supporting students' development of employability skills, fostering a community of learning amongst peer groups (Dunne, 2017) and increasing level of critical reflection on practice (Dunne, 2019). Taken together, the overall curriculum of the work-placement modules has been enhanced by the judicious use of technology, and has allowed us to successfully address the recommendations of the Roadmap for Employment-Academic Partnerships (REAP); Work Placement in Third-Level Programmes report. Targeted efforts have been made since the implementation of this process initially to secure more diverse enterprise locations, in an ongoing building of the network of placements available to students.
**Recommendations**

Based on the experience and conclusions above, the following are some pragmatic recommendations for those considering incorporating or reviewing work placement for programmes with more diverse career pathways:

Consult broadly with industry representatives, as well as graduate networks, to identify categories of relevant work-based activities and tasks that underpin the development of core skills and knowledge learning outcomes in terminology meaningful to industry. These are useful to assist companies in considering what to offer a student during placement, and ensuring the placement is relevant to the programme.

Develop mechanisms to promote the opportunities and advantages of engagement in work-placement, providing complete information to industry that can be shared via various channels, including presentations at corporate and trade events, social media e.g. LinkedIn, university websites, and industry and state third-party support organisations, HR departments and industry graduate programme managers.

Prioritise building and maintaining a strong network with relevant companies, following up on all opportunities, addressing queries promptly and keeping good records.

Ensure all relevant information needed to advertise a work-placement opportunity to students is captured in a single communication from industry.

The process of applying for a placement position is valuable for students' employability development. However, expect that they will require ongoing support to deal with the
application process, and ensure CV writing and interview skills preparation, as well as preparation for all elements of assessment is carried out in advance.

Empower and support students to deal with placement issues themselves, using a learning agreement in cases where work has become overly routine and new learning opportunities are low. Be aware that intervening on their behalf too early can reduce their transferable skills development.

Develop and formally approve a process to clearly define how an untenable placement will be managed, and communicate this to all stakeholders e.g. via a learning agreement.

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