Exploring Models of Work-Based Learning in the Chemical and Related Industries

being a Thesis submitted for the Degree of Doctor of Philosophy

in the University of Hull

by

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**Abbreviations**

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<th>Description</th>
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<td>ANOVA</td>
<td>Analysis of Variance</td>
</tr>
<tr>
<td>APEL</td>
<td>Accreditation of Prior Experiential Learning</td>
</tr>
<tr>
<td>APL</td>
<td>Accreditation of Prior Learning</td>
</tr>
<tr>
<td>CD</td>
<td>Compact Disk</td>
</tr>
<tr>
<td>DVD</td>
<td>Digital Versatile Disk</td>
</tr>
<tr>
<td>FE</td>
<td>Further Education</td>
</tr>
<tr>
<td>HE</td>
<td>Higher Education</td>
</tr>
<tr>
<td>HEA</td>
<td>Higher Education Academy</td>
</tr>
<tr>
<td>HEFCE</td>
<td>Higher Education Funding Council for England</td>
</tr>
<tr>
<td>HEI</td>
<td>Higher Education Institution</td>
</tr>
<tr>
<td>HNC</td>
<td>Higher National Certificate</td>
</tr>
<tr>
<td>HND</td>
<td>Higher National Diploma</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communications Technology</td>
</tr>
<tr>
<td>NEBOSH NGC</td>
<td>National Examination Board in Occupational Safety and Health, National General Certificate</td>
</tr>
<tr>
<td>NVQ</td>
<td>National Vocational Qualification</td>
</tr>
<tr>
<td>PhD</td>
<td>Doctor of Philosophy</td>
</tr>
<tr>
<td>RSS</td>
<td>Rich Site Summary</td>
</tr>
<tr>
<td>SME</td>
<td>Small to Medium Enterprise</td>
</tr>
<tr>
<td>SSC</td>
<td>Sector Skills Council</td>
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<tr>
<td>STEM</td>
<td>Science, Technology, Engineering, Mathematics</td>
</tr>
<tr>
<td>VLE</td>
<td>Virtual learning environment</td>
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Abstract

The term work-based learning is widely used throughout the literature, academia and industry to describe a multiplicity of approaches by which one can learn through work. This thesis focuses on the rationale for conducting work-based learning and blended learning. Qualitative data was gathered from questionnaires with students and interviews with students, industry champions, course developers and employers.

The results show that effective work-based learning is not the simple implementation of one single model or single tool, but rather a negotiated approach to the students’ learning which takes account of the business case for the employer. Another key to successful work-based learning is the opportunity for the student to implement their learning and theory in a workplace environment.

A novel matrix was developed, which was designed to build upon the research findings and the literature. The matrix was developed to aid course design and to assist with the bespoke development of employer-facing work-based learning and in identifying authentic assessment opportunities.
Acknowledgements

I would give huge thanks to Professor Tina Overton and Doctor Ruth Mewis for their continued guidance and assistance throughout the project. I would also like to thank the other members of the project team, Dr Brian Murphy and Pauline Maden, as well as all of the course developers and industry champions who worked on the Working Higher project and were willing to be interviewed a number of times by myself, and for guiding and helping me where necessary.

Thanks to all the students who completed my questionnaires and were willing to be interviewed and thanks to their supervisors for equally being willing to be spend some time with me being interviewed.

And last but my no means least, many thanks to my mum, dad and brother, Krysia, Bogus and Adam, for supporting me through the many years spent in Higher Education and before.
1.0 The Working Higher project

The Working Higher project was a £2.9m initiative funded by HEFCE through their Strategic Development Fund with the aim to develop and deliver industry-specific Foundation Science (FdSc) or Foundation Engineering (FdEng) degrees. These degrees were designed to cater for the education and training of the current technical workforce within specific science-based industries. The Working Higher project ran from September 2009 until April 2012 and was a collaboration managed by the following higher education institutions (HEIs) and sector skills councils:

- University of Hull (Sponsoring or lead HEI)
- Cogent, Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers
- Higher Education Academy (HEA) UK Physical Sciences Centre
- Semta, Sector Skills Council for Science, Engineering and Manufacturing Technologies

The foundation degrees were produced through a collaboration with a consortium of universities, each designing industry-specific, unique and bespoke courses; the consortium members and industrial sectors are shown in Table 1:

Table 1: Working Higher project consortium members

<table>
<thead>
<tr>
<th>Institution</th>
<th>Related industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>London Metropolitan University</td>
<td>Polymers Industry</td>
</tr>
<tr>
<td>Manchester Metropolitan University</td>
<td>Chemical Industry</td>
</tr>
<tr>
<td>University of Hull</td>
<td>Petrochemical industry</td>
</tr>
<tr>
<td>University of Kent</td>
<td>Biosciences/Pharmaceutical Industry</td>
</tr>
<tr>
<td>University of Central Lancashire</td>
<td>Nuclear Industry</td>
</tr>
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A major advantage of creating such a consortium is that it ensures that the relevant expertise is gained by collaboration with differing universities. An academic lead, or main course developer, was employed in each consortium university; the course developers were experienced academics in the STEM sectors highlighted above. They were established lecturers, course facilitators and developers, with experience in both designing learning materials and the delivery of. A part-time industry champion was appointed for each industry sector by secondment to cooperate with both the consortium
university and corresponding industry in the development of the foundation degrees. Figure 1 shows the stakeholder positions with respect to both academia and industry, as well the flow of information between institutions or stakeholders. Industry champion roles were advertised, with successful applicants assessed in terms of their industrial and prior experience through an interview process. The industry champions selected were individuals with a huge wealth of experience in the respective sectors, having held jobs at senior levels, directors, training managers and skilled operators, all with established networks, colleagues and potential marketing leads within their respective sectors. The aim of champion role was varied, with responsibility for strengthening links between university and industry to ensure that any issues industry were are addressed. Additionally, industry champions were to play an important role in engaging employers with a two-fold aim: the first to determine the inputs, knowledge and activities that employers would like incorporated when designing underpinning knowledge and specialist knowledge modules and skills; secondly, to raise demand for the new programmes. The industry champion secondment was for two years. Following the project end, every champion maintained contact with the host institution and in three cases, contracted to develop additional material or to further raise demand.

Figure 1: Schematic to show stakeholder positioning and flow of information

The Working Higher project aimed to fulfil several of the recommendations within the Leitch Review, with focus on strengthening the employer voice through the industry champions, as well as increasing employer engagement in the development of skills through sector skills councils; which in the case of Working Higher are both Cogent and Semta.
2.0 Work-based learning, realistic science education for the future?

This chapter reviews the literature on work-based learning; how it is defined, how modules and models are developed and why. Secondary aspects that the literature review focuses on include blended learning and e-learning, and an overview of qualitative research worldviews and techniques.

2.1 Identifying the need – the skills gap

Many national reports have identified the need to upskill the Science, Technology, Engineering, Mathematics (STEM) workforce,\(^1\)\(^2\) with the Leitch Review of Skills,\(^1\) published in 2006, setting short and long term goals for education in the United Kingdom (UK). The 2008 Cogent Skills Review analyses in great depth the many aspects affecting the major STEM industries.\(^3\) It outlines future priorities for each industry whilst considering the role of Sector Skills Councils (SSCs) in increasing the skills of the workforce within the chemicals, pharmaceuticals, oil and gas, nuclear, polymer and petroleum industries.\(^3\) The Leitch Review of Skills\(^1\) sets an ambitious target; that by 2020 the UK will be within the top eight countries worldwide for achievement at each skill level, with emphasis on delivering qualifications to a far higher percentage of the workforce than currently.\(^1\) The targets aim for over 90% of adults to be qualified to above Level 2 whilst also shifting the balance of skills from Level 2 to Level 3 and, additionally, increasing those with Level 4 qualifications and skills from 29% to 40%, combined with increasing the number of adult apprenticeships.\(^1\) The qualifications and skill levels are defined by the National Qualifications Framework (NQF) as shown in Figure 2.\(^4\)
Levels 4 and above are of interest to Higher Education Institutions (HEIs) where collaboration with industry is traditionally not common. The following recommendations are reproduced directly from the Leitch Review of Skills:\footnote{1}

- Increase adult skills across all levels.
- Route all public funding for adult vocational skills in England, apart from community learning, through Train to Gain and Learner Accounts by 2010.
- Strengthen employer voice.
- Increase employer engagement and investment in skills.
- Launch a new “Pledge” for employers to voluntarily commit to train all eligible employers up to level 2 in the workplace.
- Increase employer investment in level 3 and 4 qualifications in the workplace.
- Increase people’s aspirations and awareness of the value of skills to them and their families.
- Create a new integrated employment and skills service.

The Leitch Review anticipated that Sector Skills Councils would take an integral role in the approval of vocational qualifications; this role allows for cooperation between employers and Sector Skills Councils to produce qualifications that benefit industries. These courses may be delivered at established institutions, through private

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**Table: Skills Levels**

<table>
<thead>
<tr>
<th>Level</th>
<th>Qualifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2</td>
<td>GCSEs grade A*-C, BTEC First Diplomas and Certificates, Key skills and NVQs at level 1</td>
</tr>
<tr>
<td>Level 3</td>
<td>A-levels and GCE in applied subjects, International Baccalaureate, Key skills and NVQs at level 3, BTEC Diplomas, Certificates and Awards</td>
</tr>
<tr>
<td>Level 4</td>
<td>NVQs at Level 4, BTEC Professional Diplomas, Certificates and Awards, Certificate of Higher Education</td>
</tr>
<tr>
<td>Level 5</td>
<td>Diploma of Higher Education, Foundation Degrees (Fd)</td>
</tr>
<tr>
<td>Level 6</td>
<td>BTEC Advanced Professional Diplomas, Bachelors Degrees</td>
</tr>
<tr>
<td>Level 7</td>
<td>Masters Degrees, Postgraduate Certificates, Diplomas, NVQs at Level 5</td>
</tr>
</tbody>
</table>

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**Figure 2:** Skills levels, as defined by the National Qualifications Framework\footnote{4}
providers, as well as via work-based learning qualifications and will attract public funding.¹

When discussing education-leavers as new employees, the concept of their “work-readiness” is often mentioned. The UK Commission’s Employer Skills Survey 2011 introduced a perceived work-readiness question-set for employers, relating to leavers from secondary school, Further Education and Higher Education (HE).⁵ The authors of the survey conducted interviews with 87,572 businesses and noted that 24% of establishments questioned had employed an education-leaver to their workforce.⁵ The following statistics are positive, particularly for Higher Education, and show how work-ready education-leavers were perceived to be. The statistics below are for England, Wales and Northern Ireland:⁵

- 59% perceived 16 year-old school leavers to be work-ready.
- 64% perceived 17-18 year-old school leavers to be work-ready.
- 72% perceived Further Education (FE) leavers to be work-ready.
- 82% perceived HE graduates to be work-ready.

The Department for Business and Skills 2009 Skills for Growth report highlights and reiterates the importance of increasing the standard and number of technicians within industry,² and increasing the number of formalised qualifications obtainable, particularly through apprenticeships. A major report by Cogent entitled “Skills for Science Industries” published in 2008 highlighted a skills gap or a skills shortage for a number of industries under the STEM umbrella.³ Statistics within the report show that, across all the Cogent sectors, a total of 53% hold qualifications at levels 1, 2 and 3, with 36% holding a level 4 qualification or higher. The pharmaceuticals and oil and gas industries report that a total of 61% and 48% respectively are qualified to level 4 and above.³ Polymers reported the lowest level of level 4 qualified staff, with 15% qualified to this level with a total of 73% qualified at levels 1, 2 and 3. Due to the report not separating the category of “level 4 or higher” into level 4, 5, 6 and 7, it is unknown how many of the “level 4 or higher” are actually qualified to level 5 (Higher National Diploma, or foundation degree level) or level 6 (Bachelors degree) or level 7 (Masters degree) as defined by the NQF. However, this does not detract from the finding that 53% of employers over the STEM sectors defined in the report have staff qualified at levels 1, 2 and 3.³ It is possible to break the skills gap figures down by industry, and the largest skills gap in each STEM sector discussed within the report was at levels 2 and 3.
Another important aspect for the future is that STEM sectors report an aging workforce, with retirements outstripping new employments. By 2022, for all of the industries noted above, the report projects that there will be 145,000 staff retiring and a total new recruitment of 99,600, leading to a gap of 45,400 employees which needs to be addressed. Additionally, the Cogent report documents that there will be an over-supply of 13,000 higher level workers, such as managers and professionals, and shortfall in those designated core workers, technicians or operators of 40,400. The report concludes that there were not significant numbers of non-graduate recruits joining the STEM sectors, which will result in a deficit in the number of core workers at technician level. The authors argue that the focus should be placed on technician- and operator-level roles, with additional emphasis on the upskilling of the current workforce.

2.2 Foundation degrees

In order to address this skills gap, one potential option is the utilisation of Foundation Degrees, which are two or three-year Higher Education qualifications. The Higher Education Funding Council of England (HEFCE) contributed a significant amount of funding toward the development of foundation degrees as well as funding the national body Foundation Degree Forward (fdf). Foundation Degree Forward officially closed on the 31st July, 2011, due to funding cuts from the UK Government. Foundation degrees themselves are recognised higher education qualifications consisting of 240 credits that can play an integral role in upskilling employees to more advanced technical or professional roles within their companies. Figure 2 shows that the foundation degree is a level 5 qualification and is, thus, on the same level as the Higher National Diploma. Foundation degrees can be quite varied in their module structure, content and delivery, although in 2000 guidelines were published in the “Foundation Degree Prospectus”, which outlines essential components for the successful implementation and qualification of foundation degrees:

- Employer involvement.
- The development of skills and knowledge.
- Application of skills in the workplace.
- Credit accumulation and transfer.
- Progression – within work, or to honours degree.
2.3 Progression from apprenticeships

In some sectors it has been noted that there is scope for progression from Advanced Apprenticeships into Higher Education. Research has been carried out by Foundation Degree Forward, as outlined in the report “Features of Apprenticeship Programmes that Support Progression to Higher Education”. This aimed to identify the good practice incorporated within apprenticeship schemes that allowed for continued development and learning in higher education programmes, including Foundation Degrees and Higher National Diplomas (HND) and Certificates (HNC). The research carried out for the above report noted the highest response rate from the Engineering sector, with a potential reason outlined as the “...need for high-level skills and long track record of promoting work-based progression to higher technical and management levels.” Three case studies were analysed for the Engineering sector, two of progression from Advanced Apprenticeships to Foundation Degree in Manufacturing Engineering, with one progression from the advanced apprenticeship to a HNC and HND Engineering. Additionally, the report highlighted five models by which progression can be achieved:

- **End-to-end** – from completed apprenticeship to bespoke Foundation Degree.
- **Integrate** – HE qualification started before completion of Advanced Apprenticeships.
- **Accelerated** – progression to second year of HE course; HE modules incorporated into Advanced Apprenticeships.
- **Higher Apprenticeship** – integrated apprenticeship with HE qualification.
- **NVQ route** – progression through NVQ3 to NVQ4, with professional recognition. Fast-track through degree course.

A white paper published in 2009 entitled “New Opportunities: Fair chances for the future”, outlines the need to provide clear routes for progression for 16-25 year olds such as “diplomas into Apprenticeships, and then from Apprenticeships into further and higher education.” A key objective outlined within the report can be summarised as “raising participation and improving choices for 19 to 25-year-olds.”

2.4 Funding for training

Throughout the time of this project, there have been anecdotal reports that training budgets in industry have been reduced. Annual research is carried out by the UK Commission for Employment and skills, with the reports entitled the “Employer Skills
Survey\textsuperscript{10}. Looking at two reports between 2009 and 2011, the money spent on training increased by approximately £10bn\textsuperscript{5, 11}. As of 2009, it was reported that there was £39.2bn spent in the UK by employers with respect to all aspects of training; this includes the training itself, labour costs and managing the training, with only £2.7bn spent on “other off-the-job training, seminars, workshops, and open and distance learning”\textsuperscript{11}. The results from the survey in 2011 reported that the expenditure on training was £49bn\textsuperscript{5, 12}. As discussed previously, this is an increase of approximately £10bn. It should be noted that approximately 50\% of this expenditure was on staff wages during training, with 8\% as provider fees\textsuperscript{5}. Interestingly, the review differentiates between “on-the-job” and “off-the-job” training. From a work-based learning perspective, as discussed in Section 3.0, these could be argued to stand for “learning at and through work” and “learning for work” respectively. The 2011 report highlights that, of 87,572 employers, 17\% fund on-the-job training, 13\% fund off-the-job training with 29\% of employers funding both on- and off-the-job training\textsuperscript{5}. If the “fund both” figure is ignored, then on-the-job training, or “learning at and through work,” is funded by more employers than off-the-job, or “learning for work”. Interestingly, this can be further broken down by employer size, showing that an increase in the number of staff results in an increase in training opportunities\textsuperscript{5}. 53\% of employers with between 1 and 4 staff provide no training, whereas of employers with between 25 and 99 staff only 7\% do not provide training. Only 3\% of employers with greater than 250 staff provide no training\textsuperscript{5}. It was also noted that the larger the employer, the higher the likelihood of formalised, off-the-job training\textsuperscript{5}. It could be argued that these figures show that there may prove to be difficulty in securing student numbers from Small to Medium Enterprises (SMEs). In terms of a business case, it may be prudent for HEIs to target the larger companies with a work-based learning foundation degree, as these may commit higher numbers of students. However, SMEs make up 99.9\% of UK enterprises, thus playing an important role in the economy, and are a prime target for upskilling\textsuperscript{13}. Perhaps a different marketing strategy is required when focusing on engaging SMEs.

The need for upskilling has been identified by many sector skills councils and governmental bodies and it is duly noted that there are very few STEM-industry-specific courses currently available in further or higher education.
3.0 Work-based learning

It is widely acknowledged that work-based learning strategies are a vital part in the ongoing and future development of the existing workforce. For example, in Europe the “Developing European Work Based Learning Approaches and Methods” (DEWBLAM) project\textsuperscript{14} intended to develop a Europe-wide network with models and approaches of work-based learning within a European consortium of establishments, with the aim of allowing access to Higher Education qualifications for those adults currently in employment, through accreditation of prior and experiential learning.

A link between action learning and work-based learning is provided in a definition by Drestske, who argues that the knowledge required to successfully perform work has to be work-based, knowledge learned in the “midst of action”, whereby the learner is performing the necessary task.\textsuperscript{15} A broad definition of work-based learning is offered in “Work-based learning: A New Higher Education”\textsuperscript{16} where the authors expand upon their definition to include meeting the requirements of learners and the contribution that this learning will have in the development of the organisation in the long term: \textsuperscript{16}

\begin{quote}
“Work-based learning is the term being used to describe a class of university programmes that bring together universities and work organizations to create new learning opportunities in workplaces.”\textsuperscript{16}
\end{quote}

Both Gray\textsuperscript{17} and Seagraves et al.\textsuperscript{18} individually highlight three key elements to work-based learning to which all learners and employees can relate:

\begin{quote}
“A definition for the higher education level could involve any of the following work-based learning types; learning through work, learning for work and learning at work.”\textsuperscript{17}
\end{quote}

A further definition of work-based learning which encompasses foundation degrees is provided by Sodiechowska and Miasch:

\begin{quote}
“.. where students are full-time employees whose programme of study is embedded in the workplace and is designed to meet the learning needs of the employees and the aims of the organisation.”\textsuperscript{19}
\end{quote}
The Learn Direct agency provide further education and training for the existing workforce, with courses designed around the learner’s requirements to fit in around their work-life with their “Learning through Work” programme. With respect to the relationship between work-based learning and organisations and employers Clarke and Copeland state that:

“Work based learning is commonly taken to refer to structured learning opportunities which derive from, or which are focused on, the work role of individuals within organisations.”

This definition provides a foundation for the new learning being based on the requirements of the workplace, through collaboration between universities and employers, whilst incorporating underpinning knowledge and focusing this onto real world, work-related problems. This allows for the development of a combination of the relevant underpinning science knowledge complemented by the learning opportunities available through the workplace.

With respect to pedagogy, the practice of work-based learning can be considered to be the continued lifelong learning adults undergo throughout their lives, following education, in an educational environment. Work-based learning is a widely utilised tool employed by both HEIs and businesses to educate and develop their students or work-force in all three elements of learning for, at and through work, outlined above by Seagraves et al. and Gray. There are many work-based learning pathways and models used throughout the education system as well as in higher education institutions and businesses, as are the means by which the student is engaged and assessed. Using the definition provided above by Gray, the following collection of approaches was compiled to illustrate the three types of learning

**Learning for work**

Learning for work is a broad, umbrella term and arguably encompasses any vocational learning. The learning can take place at an educational institution, at home or through any distance or virtual learning environment. An example of learning for and through work are teacher training courses such as Post-Graduate Certificate of Education (PGCE) or a Graduate Teacher Programme (GTP) routes which involve professional development of a learner as a means of training for a specific job. Teacher training courses are also available as purely work-based programmes, as is the case for the GTP or School-Centred Initial Teacher Training courses, which are learning for, at and
through work. The PGCE route offers work placements to assist in the learning through work, as well as combining principles of pedagogy and classroom management through educational institutions, learning for work, with subject specific work. All routes require each learner to collate a portfolio of evidence throughout their time within the workplace.

**Learning at work**
A common example of learning at work are the well-established on-site company training schemes and programmes which can provide a means of upskilling the existing workforce without the need for lengthy periods of time away from their work. These may be taught by an experienced senior technical expert employee or an external consultant from a specialist company. In general, these courses are seldom formally assessed or given accreditation. An example of an off-site training scheme is the Introduction to Aerosol Technology, designed and run by the British Aerosol Manufacturers’ Association (BAMA) to train and educate industries and employees on aerosol technologies.

**Learning through work**
There are examples of learning through work which involve on-site training courses which can be formally assessed and accredited. Learning through work is learning through the activities involved in a learner’s role and emphasises, for example, applying subject knowledge to a work-based project. An example of learning through and at work could be the high-school student embarking on a two-week work-experience placement, whereby they would be involved, albeit very superficially, in the processes of the workplace, reporting on how they developed over their time there as well as log-keeping. A further example is the long-established sandwich-course observed in higher education, with students spending a year within industry carrying out a significant role within a company. For example, in science-based industries students may have an involvement in the development of a new product or existing product development, observing their theoretical knowledge in a working environment, whilst being assessed as part of their degree course.

Seagraves *et al.* argue that for a learner to benefit from learning at and for work there needs to be a significant reinforcement through work. Overall, the concept of work-based learning aims to add a “layer of experience onto conceptual knowledge”.

This is the key to providing a beneficial learning experience regardless of which work-based model or definition is used, with a marrying of both theory/knowledge and action,
as well as ensuring that the learners’ job requirements are linked to the learning outcomes.¹⁸

3.1 Approaches to work-based learning

There are many recognised courses throughout the UK which involve aspects of work-based learning and there are several universities with established work-based learning departments, with courses which can specifically cater for the individual as well as for their industry. A paper published in 2009 by Lineham and Sheridan delves quite extensively into workplace learning courses offered within Irish third-level colleges (UK HE equivalence), to deliver new provisions for workplace learning programmes.²⁵ Lineham and Sheridan surveyed seven HEIs for a total of 433 courses, of which 221 were designed by the institution alone, 47 as part of a collaboration between the institution and industry and only 10 designed by industry. A study by Siebert et al. has found that learners using a work-based approach learn from their community of practice in their workplace, as well as from their work-based learning peers at the university.²⁶ Rhodes and Shiel aimed to discover how work-based projects promote learning for the worker and their organisation; the research outlined through case studies how work-based projects have been utilised successfully by Northumbria University.²⁷ The same review highlighted principles which are based on those described by Boud and Solomon:¹⁶

1. A partnership between organisation and university to foster learning.
2. Learners are employed/in a contractual relationship with the external organisation.
3. The programme followed derives the needs of the workplace and the learning: work is the curriculum.
4. Learners engage in a process of recognition of current competencies prior to negotiation of programme of study.
5. A significant element of the programme is through learning projects undertaken in the workplace.
6. The University assesses the learning outcomes against a trans-disciplinary framework of standards and levels.

These points were further reinforced by Bragg and Hamm, who identified a set of criteria for the success of work-based learning courses:²⁸
1. Strong programme leadership.
2. Exclusive connections between the programme and its environment (niche market).
3. Frequent and effective communications with local employers.
4. Beliefs about programme excellence.
5. Effective school-based learning component.
6. Adequate financial support.
7. Innovative programme and pedagogical features.

The Higher Education Academy (HEA) Centre for Education in the Built Environment has released a series of guides under the title “Employer Engagement”, sharing guidelines and case studies for the involvement of employers in the design of courses. As part of their report, Williams and Thurairajah show how work-based learning can be delivered in a number of ways, with Figure 3 showing the continuum with two extremities; teacher-centred learning and student-centred learning, onto which a range of work-based learning activities can be plotted.  

![Figure 3](image)

**Figure 3:** The continuum outlining the two extremities of work-based learning. Figure and annotations reproduced from Williams and Thurairajah

Examples 1 and 2 show two variations in the work-based theme, with the emphasis changing from teacher-centred learning (Example 2) to student centred-learning (Example 1); both examples allow for the delivery of courses by blended learning, which is described in Section 3.8.1. In the guidelines set out by Centre for Education in the Built Environment, Example 1 is of a tutor travelling to various employer establishments delivering content by a face-to-face means, but this could readily be adapted for distance learning, which is discussed in Section 3.8.2.
In terms of work-based learning models, one author expands upon Kolb’s early work carried out in developing a “learning style inventory”. The learning style inventory identifies four categories or learning orientations: accommodators, divergers, convergers and assimilators. Accommodators learn best through involvement, whereas assimilators work with theory and ideas; convergers employ a pragmatic approach to the practical application of the theory, and enjoy problem-solving, while divergers learn through reflective practices, observations and rationalisation of their experiences. Raelin developed two work-based learning models focusing on the individual and the collective levels, showing how knowledge and learning can be linked. The matrices are reproduced from Raelin’s “A Model of Work-Based Learning”, as shown in Table 2 and Table 3:

Table 2: Raelin's individual level model of work-based learning

<table>
<thead>
<tr>
<th>Learning</th>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory</td>
<td>Explicit</td>
</tr>
<tr>
<td></td>
<td>Conceptualisation</td>
</tr>
<tr>
<td>Practice</td>
<td>Reflection</td>
</tr>
<tr>
<td></td>
<td>Experience</td>
</tr>
</tbody>
</table>

Similar to Kolb’s learning style theory, Raelin believes that individuals learn through one of the four learning styles. However, using the learning style inventory and the individual model above, Raelin argues that the use of all four learning types results in the “most learning” in a brief period of time. It is possible to overlap Kolb’s learning styles with those in the matrix above: accommodators learn through experience, convergers enjoy experimentation, divergers learn through reflection and assimilators learn through conceptualisation. Raelin further argues that the learning should not be limited to one of Kolb’s styles, that is to say the learner should not be taught purely through theory alone. Building on this use of the learning styles, Raelin further discusses that the tacit learning is enhanced by experimentation and experience, but adding the concept of reflection allows for a more rapid understanding and appreciation of the knowledge and theory. The model above is for the individual, but Raelin also developed a model for a collective level, where learning takes place within the workplace, in the company of others. This is shown in Table 3:
Table 3: Raelin’s collective level model of work-based learning²⁴

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Explicit</th>
<th>Tacit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory</td>
<td>Applied science</td>
<td>Action learning</td>
</tr>
<tr>
<td>Practice</td>
<td>Action science</td>
<td>Community of practice</td>
</tr>
</tbody>
</table>

Applied science is the use of the positivist worldview and the strict application of scientific method; action learning builds upon the concept of active learning, which was described earlier, but aims to allow the learner to merge theory and practice; action science is where the learner actively questions existing knowledge; the community of practice is the involvement of colleagues or fellow learners to assist in the learning of the individual.²⁴

When relating to the individual model of work-based learning, Raelin believes that combining all four learning types described by both Kolb’s model, and the models above, results in the most learning, showing a belief that individuals can fit into one or all of the types.²⁴ This can be related back to the deep-level processing characteristics as discussed earlier:³²

- Students seek to understand the issues and interact critically with the contents of particular teaching materials
- Relate ideas to previous knowledge and experience
- Examine the logic of arguments and relate the evidence presented to the conclusions

It appears that work-based learning could fulfil the above characteristics. By its very nature work-based learning may inherently cause learners to relate ideas to previous and current knowledge and experience, seek to understand the issues and cause critical interaction, combine their learning with their work and thus rationalise the why and how of both their learning and actions.
3.2 Development of work-based learning

Brennan and Little define one way of constructing work-based learning courses:

“Curriculum controlled by higher education institution, content designed with employer – learner primarily full-time employee.”

The courses described by Brennan and Little are designed with input from employers, with the framework arising from the pre-established subject discipline structure, with credits gained from modules within the course and also from accreditation of prior learning, which involves the assessment of learning gathered from work itself. Foundation Degree Forward has published a series of detailed guides relating to all aspects of structuring a work-based learning course as well as engaging with employers; these resources are available online. Two specific guides (Work-based Access to Higher education [Course Development Checklist] and Work-based Access to Higher Education [Guidelines]) relate to the development of foundation degree courses that include work-based learning; the second guide highlights the need for the effective development of work-based learning and work-related skills. The lists below are reproduced from Work-based Access to Higher Education [Guidelines].

Work-based learning skills:

1. Develop solutions to workplace problems drawing on theory and practice.
2. Exploit the workplace as a learning resource.
3. Manage oneself (and others).
4. Reflect on what has been learnt in and from the workplace.
5. Transfer existing knowledge, capabilities and competences to new or different contexts.

Work-related skills:

1. Action planning.
2. Contribute to meetings.
3. Entrepreneurship.
4. Goal setting.
5. Negotiating.
7. Project management.
8. Self-appraisal.
9. Team working.
10. Using, and acting as, a consultant.

The two lists describe different sets of skills; the work-related skills describe transferable skills which are both desirable and advantageous for all employees, whereas work-based learning skills involve the learner drawing upon subject knowledge and theory, combined with their experience, to utilise the workplace in personal development. During course development, care should be taken to include the introduction and, or development of all the aforementioned skills within work-based learning modules, whether they are theory or skills based.

An example of work-based learning found within a STEM industry is that of Shell International Exploration and Production, whose system of producing course learning activities specifically as workplace tasks is analysed by Margaryan et al. The course incorporated work-based learning activities, linking projects to problems encountered by technical staff, with the involvement from supervisors within the workplace as well as experienced contributors. Prior to structuring and developing a work-based learning course or module, design criteria were listed for the blended learning programme by Shell expanding upon Merrill’s First Principles of Instruction:

- Learners are engaged in real-work problems.
- Existing knowledge is activated as a foundation for new knowledge.
- New knowledge is demonstrated to the learner.
- New knowledge is applied by the learner.
- New knowledge is integrated into the learner’s world.

A further objective for Shell was to enhance their e-learning course with an increasingly blended approach, focusing on creating an effective community of learners through collaborative and social learning. From the collaboration between Shell and the University of Twente a list of considerations were developed to assist employers in the application of blended learning from within the workplace environment. The first was that the course should be based upon the First Principles of Instruction as defined by Merrill. Additionally, the course should aim to address actual work-related problems and issues within the course by developing work-based activities agreed upon by both employer and manager/ supervisor. Emphasis should be placed on utilising in-house
tools and experiences to assist in the work-based assignments and projects with involvement of experienced employers to help in knowledge sharing, while also using technology for submission of documents and discussion for peer assessment and assistance.

To summarise, due to the broad nature of work-based learning, the literature advocates an individualised approach for the learner whilst maintaining contact between academy and employer to assist in the development of the learning plan and also satisfying the requirements of the employer. The employer involved should input into the design and outcomes of their learner’s course.26

3.3 Implementation of work-based learning

Lineham and Sheridan summarise key points for both employers and HEIs when considering the implementation of work-based learning modules and courses, as summarised in the following:25 HEIs must ensure that prior learning is recognised as an integral component; strong partnerships with industry and employers should be established with the employer involved in the development of the programme, particularly in the design of work-based projects and assignments; the programmes emphasis should be placed on the development of customised and bespoke courses, with an overall aim to meet the expectations and needs of both employee and employer.25 With respect to employers, they should aim to encourage their employees to engage in skills development, with the allocation of a workplace mentor to assist and aid the learner in their learning process; similarly, the employer must also encourage their employee to take responsibility of their personal professional development; as noted for the HEI above, the employer should assist in the development of work-based projects and assignments with a “sense of purpose”.25 These considerations provide a foundation on which institutions and employers can build during the development of specialised courses and modules.

Seagraves et al. note that in the instances where the learning and job processes are separate and distinct, there needs to be analysis carried out of both the learning and the learner’s job role and processes.18 This is to determine whether the learning has been applied and whether the intended change or intended benefit has actually been manifested.18

20
3.4 Benefits of work-based learning

A paper by Foundation Degree Forward examines the need for developing higher skills in the work force and outlines significant positive outcomes in the successful implementation of foundation degrees. It also defines a list of potential benefits to entice employers toward collaboration with universities in order to train their workforce:

- Better quality recruits.
- Flexible entry requirements.
- Flexible, tailored to your needs.
- Improved workforce performance and productivity.
- Increased employee motivation – higher staff retention.
- Meets skills shortages – grow your own workforce.
- Work-based learning – little time off the job, minimal disruption.
- Projects directly related to your business.
- The employer closely involved in the delivery.
- Potential to accredit company training programmes.
- Extremely good value compared to private sector training.
- Direct links to further qualifications and continuing professional development.

This list is by no means definitive. However, it does provide an enticing range of positive outcomes for employers tempted to develop their workforce with work-based learning courses.

This review of the literature raises a key question; which models of work-based learning are successful? Keeling et al. believe that it is the utilisation of a diverse number of learning approaches and styles, as noted above, that constitutes a successful implementation.

3.5 Accreditation of prior and experiential learning

Even though the continual learning at and through work is considered learning from a theoretical perspective, it is often overlooked because of its informal nature. Boud and Middleton believe that a recognition of this learning would allow for an enhancement in the work and the quality of working life. For adults re-entering education, there is often a wealth of prior experience they can reflect upon and it is becoming more accepted that this experience requires acknowledgement. Hence, a
demand has arisen for Accreditation of Prior Learning (APL) for previously assessed learning and Accreditation of Prior Experiential Learning (APEL) in which the knowledge is gained by experience and presented for accreditation. Systems of accrediting prior learning are established worldwide, with unique acronymic titles depending on the country. It is widely being acknowledged that such recognition of learning steers higher education toward the industrial and business world. However, it should not be used or marketed as a fast-route to a qualification. A survey of 433 courses at seven higher education colleges in Ireland showed that 264 out of 433 courses gave credit and recognition for prior learning, a total of 61%.

There are distinctions between the accreditation of prior learning and the accreditation of prior experiential learning. As mentioned, accreditation of prior learning involves organised learning through which assessment or certification has taken place. The learning through accreditation of prior experiential learning is related to skills, learning and knowledge gathered through experiences in the subjects work, or life, which involves no previous certification. Both systems gather evidence relating to the learning as opposed to the experience. The most common method by which to assess and accredit prior learning is by the employee/learner providing an in depth portfolio of evidence where they demonstrate developed skills and knowledge gained. This process may be easier for prior learning, due to the increased formal nature of certified training courses. The steps required in the development of a portfolio can be based on the both the UK and American accreditation of prior learning models as depicted in Figure 4.
Despite the different terminology regarding the accreditation of prior learning, both the UK and US models were included in Figure 4 to identify how the methodology behind accreditation is very similar, with the end result of being the provision of credit for the student. The book “Good Practice in the Accreditation of Prior Learning” by Nyatanga gives an extensive overview into good practice of the assessment of prior and experiential learning. Seven principles were included in the book, with the first six principles based on the work carried out by Evans:

1. The responsibility should lay with the student in terms of claiming for accreditation of prior learning, with the focus on the student gathering evidence and submitting a portfolio.
2. The accreditation should be related to learning outcomes, and not solely on the student’s experiences.
3. The third principle is perhaps to be expected; learning should be identified and gathered into a portfolio prior to any assessment.
4. Equally, the fourth principle is expected; the responsibility of the assessment is with the academics, and should be carried out by a minimum of two assessors.
5. The evidence that has been submitted must prove that the student has undertaken the appropriate learning and has provided the necessary evidence. At this stage,
the learning may be discussed with the student in order to test their understanding, or provide the student with the opportunity to produce further evidence or work.

6. There should be different academics involved with assisting the student collate their evidence, and a different, unconnected academic to conduct the assessment.

7. The final principle is that of the quality assurance of the accreditation process.

These seven principles provide the basis for a strong accreditation process, and potentially alleviate any poor practice in terms of accreditation of prior learning.

### 3.6 Supplementary delivery modes

There are a variety of different methods employed in the education system, examples include: traditional face-to-face delivery such as lectures, tutorials, workshops; electronic learning through internet-based systems, or through pre-packaged learning courses; distance learning, where teaching materials are posted to the learner who does not learn within a traditional academic location or carried out online. This section focuses on the delivery methods which might be most applicable for work-based learning and foundation degrees.

#### 3.6.1 Blended learning

Throughout the literature, there is no authoritative definition for the term blended learning as it can cover a myriad of combinations of different learning methods and models. A review of the literature and case studies identified eight “dimensions” for blended learning:\(^{46}\)

1. Delivery – different modes, face-to-face and distance education.
2. Technology – mixtures of technologies.
5. Roles – multi-disciplinary or professional groupings.
7. Focus – acknowledging different aims.
8. Direction – instructor-directed vs. autonomous or learner-directed learning.

In the book “Blended Learning: tools for teaching and training” a comprehensive description is provided of blended learning.\(^{47}\) Examples include blending face-to-face with e-learning and combining classroom-based learning with work-based learning.\(^{47}\)
This is expanded upon by Kim, whereby learning is classified into the following main categories: physical-class based or virtual; formal or informal; scheduled or self-paced.\textsuperscript{48} Based on the six parameters defined by Kim, having a physical class-based, formal, course scheduled and class scheduled learning is an example of a traditional degree course. Again, using the parameters of Kim, an informal, class scheduled and course scheduled physical learning could be a non-accredited on-site company training scheme, which does not provide a formal qualification, but does provide the training necessary for the learner to perform their job role.\textsuperscript{48}

A balance must be achieved between teacher-centred learning and student-centred learning, as in Figure 3. Teacher-centred learning pedagogical methods can be considered to be those whereby the educator divulges subject knowledge and content to the learner, for example through lectures. Generally, this includes the more traditional educational approaches. Student-centred learning covers an array of definitions. One is that the learner is involved in directing their own learning; allowing the learners to choose scenarios relevant to their expectations and expected outcomes, often leading to learning within a workplace environment. It is thought that student-centred approaches lead to an increased and deeper understanding.\textsuperscript{49} This shows that there is a link between the learning and the processing level; in the case of deep-level processing, the students relate the theory and ideas to experiences and both first and second-hand evidence.\textsuperscript{50} There is also a belief that using a constructivist learning environment has the potential for high quality learning through deep-level processing.\textsuperscript{51} Constructivism is discussed in more depth in Section 4.1, but the constructivist approach is that learners construct their own knowledge and understanding from their interactions with the world around them.\textsuperscript{52}

Allen constructed a list of issues to be considered prior to developing a course which utilised blended learning. The ones listed here are most relevant to the Working Higher project and current research:\textsuperscript{47}

- Why is there a need to develop this blended learning programme?
- How will the proposed programme meet the aims and objectives?
- Who are the potential learners – numbers, their background, ICT background, entry knowledge and skills, special needs, e.g. related to a disability of language skills?
- How will the programme serve the needs of the learners?
- What are the draft aims and learning outcomes of the programme?
• How will the programme be delivered? Face-to-face and/or e-learning?
• What types of technology will be used, e.g. e-mail, discussion groups, chat rooms, web-based training materials?
• Will synchronous and/or asynchronous interventions be used?
• What will be the balance between practice-based and classroom-based learning?
• Who will be involved in the design and delivery of this programme?
• What underlying pedagogical approaches will be used in the programme?
• Will the learners be involved in negotiating their programme aims and outcomes?
• Will the programme make use of tutor-directed and/or student centred learning?
• What time frame do you have in mind for the programme? Identify the duration of the programme. How much time do you think the learners must invest in the programme?
• How will the programme fit in with other learning and training activities?
• Does this type of programme exist elsewhere?

These questions should be borne in mind by course developers and academic leads when designing a new course. However, it is believed that an experienced course developer will take these factors into consideration prior to submission of the course to the institution’s validation committee.

3.6.2 Distance learning
A simple yet accurate description of distance learning is that which states “Distance learning is any type of education that occurs while location, time, or both separate the participants.” Distance learning can be sub-categorised into two distinct possibilities; synchronous and asynchronous learning: Synchronous learning occurs when both educator and learner interact in real-time; e.g. chat rooms, instant messenger software; asynchronous learning is so defined by the staggered nature by which interaction occurs. With educator and learner provided delayed feedback; e.g. e-mail, discussion forums.

In general, modern distance learning is often technologically oriented, using video, audio and computer technologies. The Open University, founded in 1962, is a leading example of an institution that utilises distance learning effectively in the delivery of higher level qualifications, and they define their teaching as “supported open learning”. Students work toward their degree during their own time although a
timetable and course schedule is provided, with support from tutors and tutorials held at regional centres. Supporting materials are also provided, these include printed materials, books, audio and video technologies, TV programmes, CD/DVD resources, websites and home experiment kits. Assessment is through written assignments and examinations.

3.6.3 Technology-enhanced learning
Owing to the massive technological advancements and increasing popularity in learning via using electronic resources, technology-enhanced learning is rapidly becoming a typical vehicle with which to supplement teaching. Technology-enhanced learning is a tool by which both blended and distance learning are supported. An example of a relatively simple tool is the interactive whiteboard, which provides a versatile means to present and interact with learners inside the classroom. Further examples include simulations, animations, clickers, “Web 2.0” tools such as collaboratively produced Wikis, personal or group blogs and podcasts. As a means to enhance the learning experience, electronic tools can be extremely useful and versatile.

Over the course of the last five to ten years there has been a surge in “Web 2.0” tools available online, e.g. Wikipedia, Facebook, Wikis, Twitter, Blogs, bookmark-sharing tools, RSS feeds. They all allow for the control of information from the masses, drawing upon the “wisdom of crowds”. Alongside this increase in Web 2.0 technologies, an extension to the standard Virtual Learning Environments can be developed, colloquially named “Personal Learning Environments”. The term Personal Learning Environments could arguably be an extension to the Virtual Learning Environments in the sense that learners are given more freedom for discussion and collaboration, maybe allowing for user-generated and user-moderated asynchronous learning.

Technology enhanced learning could also be mentioned under the guise of e-learning which, arguably, is a more accurate method of describing the distance learning capabilities of technology. These include Virtual Learning Environments (VLEs) and virtual communication tools which can be synchronous or asynchronous tools. VLEs can be described as “... computer-based environments that are relatively open systems, allowing interactions and knowledge sharing with other participants and instructors.” Bonk and Kim note that blended learning is a hugely popular method for delivering higher education courses with e-learning increasingly used as a vehicle for educating, with events scheduled virtually rather than within an institution. An important aspect
of asynchronous tools and learning networks is the accessibility of the network by both learners and educators from any location, at any time, provided that the resource is available online. Virtual Learning Environments can be considered as mainly asynchronous tools, but interactive chat room capabilities allow for synchronicity.

In general, e-learning is not favoured by students. The 2008 Review of the Student Learning Experience in: Chemistry by the Higher Education Academy questioned undergraduates of Chemistry from institutions throughout the UK, with less than 8% of students rating e-learning highly for enjoyment and teaching effectiveness. Similarly, a review of the Physics students found that e-learning was not an effective learning experience, with only 44% believing it to be not very effective or ineffective; additionally, 57% found it either not very enjoyable or not enjoyable at all.

3.7 Active learning, learner processing and motivation
George Bernard Shaw, co-founder of the London School of Economics, once remarked that, "If you teach a man anything, he will never learn." An interesting thought in terms of active learning comes from Revans who commented that “there can be no learning without action, and no action without learning”. So, what is active learning? There is not one definition to encapsulate the complexity of the subject, and Prince notes that it is difficult to provide a single definition of active learning, and provides some “accepted definitions”:

“Any instructional method that engages students in the learning process. [...] active learning requires students to do meaningful learning activities and think about that they are doing”.

Weinstein noted the term active learning “means different things to different people”. Bonwell also argues that active learning is more “intuitive” rather than following a definition. It is important that learners are actively involved with the analysis, synthesis and evaluation of their learning as Chickering et al. highlight. They also state that listening alone is not sufficient in the learning process and knowledge creation and state that “learning is not a spectator sport”.

Two strong themes in the discussion of active learning are the ideas of collaborative learning and problem-based learning; work-based learning is seldom discussed alongside active learning. However, this does not mean that work-based learning and active learning are different and distinct entities, as active learning itself is
a broad term that covers a number of learning approaches. The concept of active learning, with its engagement of learners, can be argued to activate deep learning.68

Deep and surface learning appear first in 1976, in a paper by Marton and Säljö, where they describe two distinct levels at which learners process information: “deep-level” and “surface-level” processing.69 Surface-level processing is described as rote learning, with the learner focusing on the text, whereas in deep-level learning or processing the learner focuses on the “intentional content” of the material.69 Beattie et al. characterise deep-level and surface-level based on the findings of four main research groups who worked on the subject. Characteristics of deep-level processing include:32

- Students seek to understand the issues and interact critically with the contents of particular teaching materials.
- Students relate ideas to previous knowledge and experience.
- Students examine the logic of arguments and relate the evidence presented to the conclusions.

Characteristics of surface-level processing include:32

- Learners try simply to memorise parts of the content of teaching materials and accept the ideas and information given without question.
- Students concentrate on memorising facts without distinguishing any underlying principles or patterns.
- Students are influenced by assessment requirements.

A third level of processing was defined by Entwistle.70 Entwistle believed that students can adopt a strategic approach to their learning, utilising and strategically managing their time and learning resources through both surface-level and deep-level processing methods, “in line with the perceived criteria for high grades”.70-71 What makes a student undertake surface-level processing rather than deep-level processing, what are the drivers behind the level of learning? Arguably, it may be due to the teaching styles used, discussed later, or the learner’s motivations.

In 1959 White published a paper entitled “Motivation Reconsidered: The Concept of Competence” that appears to be the basis of discussion of intrinsic and extrinsic motivation. “Intrinsic” itself means belonging naturally, while “extrinsic” means not part of a being’s essential nature. Intrinsic motivation is defined as “autonomous” motivation, and is, arguably, a “natural”, inherent motivation, the drive of curiosity or the pure enjoyment of an individual in performing that activity.72 In
contrast, extrinsically motivated learners engage because of the outcomes of the activity. Examples of extrinsic motivation can include the provision of incentives for productivity, for example a monetary bonus, or outcome-related external motivation such as obtaining high grades or a HE qualification. Jordan describes intrinsic and extrinsic motivation respectively as “interest primarily attached at the activity” versus “interest primarily to the goal”.

Brennan and Little believe that work-based learning may easily activate both deep-level processing and spark the intrinsic motivation of learners. However, Brennan and Little continue to state that learners undertaking work-based learning require both motivation and support; this motivation may prove to be extrinsic.
4.0 Qualitative analysis

An abridged version of the below literature review can also be found in the “Introduction to Qualitative Research” primer published in 2011 by Tom Lemanski and Tina Overton.76 A good starting place can be found in defining both qualitative and quantitative research:

“Qualitative research is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves emerging questions and procedures, data typically collected in the participant’s setting.” 77

“Quantitative research is the means for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured [...] so that numbered data can be analysed using statistical procedures.” 77

The simplistic view of the distinction between the two research types is that qualitative research deals with the collection of non-numerical data. This does not necessarily mean that data cannot be quantifiable in a qualitative research project; surveys and questionnaires may yield quantifiable data. One definition of qualitative research is “… any kind of research that produces findings not arrived at by statistical procedures or other means of quantification.” 78 This is further expanded upon, “it [qualitative research] can refer to research about persons’ lives, lived experiences, behaviours, emotions, and feelings as well as about organizational functioning, social movements, cultural phenomena, and interactions between nations.” 78 This suggests a variety of areas for through which qualitative research can provide insight; however, the authors argue:

“Some of the data may be quantified as with census or background information about the persons or objects studies, but the bulk of the analysis is interpretative.” 78

This interpretability is a defining factor for qualitative research. It is often thought that with qualitative research there is no single method, but a choice of methods appropriate to a variety of different topics and research questions. 79 Rossman and
Wilson describe the use of qualitative methods as providing “richness or detail to quantitative findings (elaboration)”.

4.1 Qualitative worldviews
There are many different schools of thought involved in qualitative research focusing on the methods by which research should be conducted. The worldviews aim to rationalise the “how” and “why” behind different forms of qualitative research. Figure 5 highlights a selection of worldviews.

All these approaches are qualitative in nature but are not necessarily combinable.
Constructivism
Constructivism holds the view that humans generate and construct their own knowledge and understanding from their interactions with the world around them. As an example with respect to science, the approach of a constructivist is that knowledge is constructed by the scientist or researcher. Common approaches in constructivism examine the constructive processes related to reality and deal with the construction of knowledge around the subject.

Guba and Lincoln note that the constructivist worldview holds the belief that the researcher and the reality, or subject of investigation, are linked, thus the outcomes or new knowledge are created by the act of carrying out the research. The methodology behind this worldview acknowledges that the social constructions can only be observed “between and among” the researcher and the respondents or subjects of research.

Advocacy/participatory
Advocacy is a worldview where the research theory includes a political standpoint or political agenda. A key viewpoint relating to advocacy is that the researcher is aiming to conduct the research on and for the subjects involved.

A participatory worldview focuses on the mind of the research subject, which could be argued to be true for all qualitative research, with participatory research focusing on the subjects’ experiences, perspectives and views. It could be argued that all knowledge is participatory.

Pragmatism
In his book entitled Qualitative Research and Evaluation Methods, Patton argues that it is not necessary to use a single worldview or perspective with qualitative research. Patton describes the concept of pragmatism as “… in real-world practice, methods can be separated from the epistemology out of which they have emerged.” An additional way in which pragmatism can be described is by Alvesson:

“Pragmatism has been described as an antitheoretical philosophy, which implies sticking as closely as possible to practical, empirical reality.”

This means that pragmatism itself links theory and praxis.
“The actions taken are purposeful and aim at creating desired outcomes... Hence the knowledge creation process is based on the inquirers’ norms, values and interests.”

The authors discuss that the pragmatic approach is beneficial to “action research”, with two key factors; “... knowledge generation through action and experimentation in context, and participatory democracy as both as a method and a goal.”

Pragmatism can be described as not being restricted by one system of “philosophy or reality”, or even a worldview. This allows for the easy adoption of a mixed-method approach, with the researcher able to use quantitative and qualitative to the benefit of answering the research questions. It is believed that the methods are less important than the problem, and utilising as many methods and approaches as possible allows for an improvement in the quality of results and the conclusions drawn. This is agreed by Creswell, who concludes that pragmatism allows for the use of “multiple methods, different worldviews and different assumptions”, also allowing for the use of both quantitative and qualitative data collection and analysis.

**Positivism**
Positivism holds the view that a scientific approach can be used to understand both the physical world and human interactions. The ideology behind positivism, as described by Smith, is attempting to explain the social world through the methodologies used within the natural science disciplines, with a more strict definition as “an epistemological approach to international relations which implies the legitimacy of certain methodologies or methods of doing “things”.

Positivists hold the belief that reality is driven by natural laws and mechanisms, with the researcher separate to the reality, or subject of investigation, and thus does not influence the natural reality. The methodology behind the worldview is that a theory is proposed and subjected to rigorous empirical analysis, with an aim to minimise external bias and control.

Guba and Lincoln describe the purpose of positivism as to verify hypotheses and theories; whereas postpositivism builds upon the concept of positivism and has the overall aim to falsify aforementioned hypothesis and theories.

**Postpositivism**
Postpositivism was a worldview developed to build on the concept of positivism, and is described in the literature as scientific-method, where the process of gathering data follows the development of theories. Another facet of postpositivism is that the
researcher is influenced by their preconceptions, knowledge and background on the subject of interest. The postpositivists’ or scientists’ philosophy is based on their knowledge and background and this leads to the antipositivist approach; the belief that the scientist plays an active role in the research and becomes a participant and creates the data. This worldview appears to have a large potential influence through bias, as the researcher’s background informs the research.

According to Guba and Lincoln, postpositivism builds upon positivism by proposing that the reality is not fully comprehensible by the researcher due to “flawed human intellectual mechanisms”. The methodology behind the worldview has its basis in falsifying hypotheses, with the research being conducted in a more natural or normal setting, without the manipulation of the external biases and controls, as noted above for positivism.

**Antipositivism**

The beliefs behind the worldview known as antipositivism are that social activities and inputs cannot be examined as one would natural or scientific phenomenon, as described above for postpositivism, but rather must include interpretation of the actions being studied. The antipositivist belief is that the world and any interactions therein are intrinsically complicated, that there is a limit on the researcher’s abilities to fully understand the subject at hand, thus it is not possible to understand reality being studied fully.

**Structuralism**

According to Denzin and Lincoln structuralism is based on language, noting that any system includes “oppositional categories” within the language. This is discussed further by Hammersley, who describes the structuralist argument that the research subjects’ perceptions are affected by a number of factors, for example the universal human mind, culture, the unconscious or society. Building upon this worldview is the concept of poststructuralism, Denzin and Lincoln state that the poststructuralist worldview holds the thought that it is not possible to distil the meaning or intention behind language. Hammersley noted similar, that poststructuralists disagree that there are a set of “underlying forces” behind the emerging patterns and categories behind peoples’ language and action.

**Naturalism**

The view behind naturalism is that the research aims to gather data regarding human behaviour and human nature through the researcher’s actions and interactions with the
subject.\(^4\) Research must thus be carried out in the natural environment to minimise the bias; there must be no inputs or effect from the environment or the researcher that may influence the subject.\(^4\)

### 4.2 The role of the researcher

In qualitative-based research the researcher plays an active role, regardless of how much they attempt to alleviate bias and distance themselves. The researcher begins with a number of preconceptions and ideas, potentially having identified with a particular worldview. The researcher should be acutely aware of the potential for bias, and must actively attempt to alleviate it.

As noted for the participatory worldview above, qualitative research involves participants with a variety of experiences and perceptions which affect the outcomes, and it could be argued that the naturalist approach attempts to alleviate this bias. Naturalism promotes conducting the research within an environment that is natural for the research subject, additionally the researcher must aim to not lead or coerce the respondent into answering how they would like them to answer. For example, removing any questions that appear to be leading toward a particular answer, leaving questions open for interpretation by the respondent.

### 4.3 Grounded theory

In combination with the worldviews discussed above, a method of drawing theory from data was required. Grounded Theory itself is not a qualitative worldview, but rather a theoretical framework that was discussed in 1967 by Glaser and Strauss;\(^7\) but is expanded upon by Strauss and Corbin as “… theory that was derived from data, systematically gathered and analyzed through the research process.”\(^7\) The same authors improve on the above by stating:

> “Theory derived from data is more likely to resemble the “reality” than is theory derived by putting together a series of concepts based on experience or solely through speculation (how one thinks things ought to work).”\(^7\)

Grounded theory is often believed to contradict more traditional research methodology and models, where a research question or theory is developed first and any data collection is carried out to either prove or disprove the original theory.\(^8\) Although grounded theory is frequently used in the social sciences, the approach is not often
adopted in industry or academic science disciplines. The method ensures that theories are developed after the research has been carried out with one aim of potentially alleviating bias (“how one thinks things ought work”), using the data alone to find themes. Grounded theory cannot only be used for qualitative data analysis, but also for quantitative data and scientific method. Interviews are the most frequently used method in grounded theory, and the analysis is based around the “coding” themes that arise during interview.

Coding is a data mining technique employed in all qualitative research; the codes, found amongst the “noise” translate into concepts and then categories. Coding is a lengthy process requiring a serious devotion in time, particularly if the interviews conducted were of significant duration. As noted previously, the coding is carried out to identify emerging themes from the noise. Grounded theory could prove useful in developing theories and looking for trends when comparing interview and questionnaire results with work-based learning models. A description of the coding undertaken as part of this research is discussed in Chapter 5.

Another potential qualitative research method that was considered was critical hermeneutics. Critical hermeneutics deals with the interpretation of interview transcripts in order to reveal the motivation behind what has been said. This could prove useful as part of future work when focusing on the comparisons between industry champion and course developer interview responses, determining whether there is any bias, for example focusing on the HEI’s agenda as opposed to following the needs of employers.

4.4 Tools in qualitative research
There are many methods by which qualitative researchers seek answers to their research questions. Patton argues that there are three types of data collection methods used within qualitative research: 1) interviews; 2) observations and 3) documents. It is also possible to include: 4) focus groups and 5) questionnaires.

4.4.1 Interviews
The interview is a method which employs open-ended questions which aim to elicit in-depth responses from interviewees. Interviews aim to capture the interviewee’s experiences, perceptions, opinions, feelings and knowledge with respect to a particular subject. Data consists of verbatim quotations and sufficient content to be interpretable. Table 4 lists the two main interview styles and the data types obtained:
Table 4: Interview techniques with roles and data collected

<table>
<thead>
<tr>
<th>Interview technique</th>
<th>Type of data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structured Interview</td>
<td>Quantitative data</td>
</tr>
<tr>
<td></td>
<td>Descriptive information</td>
</tr>
<tr>
<td></td>
<td>Trends in sample</td>
</tr>
<tr>
<td>Unstructured interview</td>
<td>Qualitative data</td>
</tr>
</tbody>
</table>

The researcher may be an active participant in the interview process, taking the role of the interviewer, with the subject of the interview known as the interviewee. Structured interviews rely on the researcher having a structured schedule or script to follow, with closed questions. This does not allow for much improvisation and is an approach adopted where the interviewer is not the researcher and thus not able to delve deeper into the interviewee’s responses. Indeed, it could be argued that the interviewer is “blind to things not covered by the schedule” and may not have sufficient knowledge to question around the subject. Arksey and Knight summarise the overall aim for the semi-structured interview, stating that the script is a list of topics used to aid or prompt the researcher in their discussions with the interviewee.

Semi-structured interviews are an integral part of exploratory qualitative research. Johnson (as quoted in a book by Schensul et al.) stated that:

“... exploratory approaches are used to develop hypotheses and more generally to make probes for circumscription, description and interpretation of less well understood topics.”

An unstructured interview does not involve the creation of an interview script, and employs a far more naturalistic approach, with the hope for a more natural ordering of questions, lead by the responses and discussion with the interviewee. With a structured or semi-structured interview, the control lies with the interviewer in terms of questions asked and their order, which is not the case with an unstructured interview with the direction lead by the interviewee’s responses. It is imperative that a recording of the unstructured interview is obtained, for later transcription and analysis.

Closed responses may be obtained to the questions asked, in the form of responses such as “yes” and “no”, which, according to Arksey and Knight, can be categorised and analysed statistically. Closed questions are more commonly used than open questions for interviews, being easier to code and in some respects, easier to
Open questions, due to their non-leading and opinion-inducing nature, allow respondents more freedom in voicing their perceptions. If further clarification is required on a certain answer given by a respondent, a further set of interview questions could readily be produced and a follow-up interview conducted. Another aspect is to determine whether the opinions of the interviewee have altered with time. It is possible to follow a longitudinal series of interviews, with a means of categorising and potentially statically analysing any results through means of coding.

4.4.2 Observations
An extremely useful tool in both quantitative and qualitative research is that of observation. Patton describes the process of observation as:

“Fieldwork descriptions of activities, behaviours, actions, conversations, interpersonal interactions, organisation or community processes or any other aspect of observable human experience.”

Patton believes that observation provides a rich source of data types, consisting of a researcher’s notes, which could prove to be rich and highly detailed descriptions which bear in mind the observation context. A frequently employed method is that of naturalistic observation, which involves the researcher carrying out their observatory activities in the research or cultural environment; it is believed that this participatory observation allows the researcher to be open and inquiry-driven. The data is collected by the researcher, whose role is to act as an active observer, data obtained is in the format of field-notes and the direct writings of the researcher, which are then analysed, perhaps using a structuralist worldview. If a number of subjects are observed then it is possible to code behaviours and themes.

4.4.3 Documents
The title of documents covers a wide variety of material, several of which Patton describes: written documents, publications and reports, letters, artistic works, photographs; written responses to open-ended surveys. The purpose is for the researcher to examine and review the documentation provided, determining whether there are any emerging themes arising from the text. The identification of themes from the text is conducted through coding, as described earlier. Again, it could be argued that the analysis of documents is using a structuralist worldview.
4.4.4 Focus groups

The aim of the focus group is to primarily collect a wealth of qualitative data from a number of participants simultaneously. The researcher can act as either the facilitator and pose the questions to the group, or they can observe the responses and interactions throughout the process.\textsuperscript{105} Consideration must be undertaken by the focus group facilitator to appreciate and utilise group dynamics to allow participants to voice their opinion.\textsuperscript{106} The facilitator must motivate and consider all members of the focus group and encourage even the quiet ones to contribute, in some instances adopting an interventionist style.\textsuperscript{106} The general approach is similar to that of the interview, using a set interview script of open-questions for the respondents to answer. The focus group, due to its dynamic nature, allows for the facilitator to probe into further detail relating to the points that may arise during the session with the participants. A positive feature of focus groups is that they allow for active discussion; everyone can voice their opinion but in doing so allows their opinion to be scrutinised by group members. This highlights a difference between such groups and interviews, the interactions of participants can be observed with respect to different topics and opinions, with focus also on personal experience.\textsuperscript{105}

The analysis of focus group data takes two forms: transcript data can be analysed for themes and undergo coding. The second form is where the researcher acts as the observer and records observation data, such as group dynamics or body language.

4.4.5 Questionnaires

Questionnaires are an additional tool used in human-centric research, and depending on the structure and questions can either provide qualitative or quantitative data. Questionnaires are used to gather the opinions of a larger group of people than would be able to be reached by interview or focus group alone. Quantitative data falls into the following categories:\textsuperscript{107}

- Interval – equally split data, e.g. temperature (Fahrenheit scale). Has natural ordering.
- Nominal – named categories, e.g. sex, colour, home town. No natural ordering.
- Ordinal – generally a ranking, e.g. Likert scale, “rate on a scale of 1-5”. Has natural ordering.
- Ratio – interval data with natural zero, e.g. time, temperature (Kelvin scale). Has natural ordering.
From the above list, nominal and ordinal are categorical data, whereas interval and ratio data is continuous.\textsuperscript{108}

An example of interval data is temperature in both the Celsius and Fahrenheit scales. These are not ratio data due to the lack of a natural zero; even though it is possible to have 0°C it is possible to have values below this zero-point. Equally, the zero-point of Celsius and Fahrenheit differ. Interval data does exhibit a central tendency. The central tendency is based on the Central Limit Theorem, which Rice loosely defines as “... the central limit theorem says that if a random variable is the sum of a large number of independent random variables, it is approximately normally distributed”.\textsuperscript{109} The following simple statistical analyses can be carried out with interval data: calculating the average value of all the data points (mean), calculating the central number in a data set (median) or the most frequent value (mode), correlation, the variation of the data set from the calculated mean (standard deviation), or analysis of variance (ANOVA) tests, which look at the differences of variance between different data sets.\textsuperscript{108}

Nominal data, due to the strict categories involved (examples: male/female; yes/no), does not allow for a huge amount of statistical analysis. However it is useful in providing frequencies within categories or in conjunction with other data types; for example to determine whether this is a significant difference between the opinions of males and females on a particular topic; or whether respondents from one locality have a different perception from another locality. These comparisons can be observed by conducting a Chi-Square test, and determines whether or not two nominal data sets, or variables are statistically independent.\textsuperscript{110} Nominal data can exhibit a central tendency, but only as a mode, which is a calculation of the most frequent response. The following simple statistical analyses can be carried out with nominal data: a mode can be calculated, or a Chi-Square test can be carried out, which aims to look at the independence between separate variables.\textsuperscript{108}

Examples of ordinal data include the Likert Scales; with a respondent asked how much they agree with a specific comment: strongly agree, agree, neutral, disagree, strongly disagree. Similarly, another ordinal scale is produced by scoring a particular attribute on a scale of 1-10, for example an ordering of variables or cases from highest to lowest.\textsuperscript{111} In both instances, the difference between each value is non-quantifiable; if a respondent scores an attribute a 10, this does not denote “twice as good” as when scored 5.\textsuperscript{111} With ordinal data, the median is an important figure, as an average cannot
be taken due to the values not having distinct quantifiable values. The following simple statistical analyses can be carried out with ordinal data: calculation of the median, or a Wilcoxon test, which is used to compare paired data sets for a difference in median values.\textsuperscript{112}

The data which has the most freedom in terms of robust statistical analysis is ratio data. Ratio data is naturally ordered and contains a zero-point and thus, depending on the sample or various inputs, can possess central tendency. As noted above, temperature, in the form of the Kelvin Scale, is ratio data whereas Celsius and Fahrenheit are not. The following statistical tests can be carried out with ratio data: calculation of the mean, median and mode, correlation, standard deviation, analysis of variance (ANOVA).

The analysis types indicated at the end of each discussion paragraph above do not show an extensive list of analyses that could be carried out, and only aims to show how different analyses work for different data types.

\textbf{4.5 Summary}

The above chapters have provided an introduction to the Working Higher project, as well as identifying the need for the project and thus for the research reported in this thesis. An introduction to work-based and blended learning, qualitative research and associated analysis has also been provided. The literature highlighted a variety of approaches to work-based learning utilised by a variety of institutions; it can be argued that there is no common approach to work-based learning.

Active learning and work-based learning are believed to be fundamental to upskilling the existing workforce with the thought that course developers should use Merrill’s First Principles of Instruction:\textsuperscript{39}

1. Learners are engaged in real-work problems.
2. Existing knowledge is activated as a foundation for new knowledge.
3. New knowledge is demonstrated to the learner.
4. New knowledge is applied by the learner.
5. New knowledge is integrated into the learner’s world.

The worldview adopted was pragmatism and grounded theory was the chosen theoretical framework. The pragmatic approach allowed the researcher to develop questions looking at what they believed insightful yet open questions that would allow a grounded theory approach to analysis.
From this literature review, a variety of questions arose relating to the outcomes of the Working Higher project. The following questions were of interest and were attempted to be answered through a variety of means:

- What are students’ and supervisors’ perceptions of work-based learning?
- What are the industry champions’ and course developers’ perceptions of work-based learning?
- Which models of work-based learning are effective?
- What are the barriers to facilitating effective work-based learning?
5.0 Methodology

The aim of this chapter is to provide a detailed description of how the questionnaire and interview scripts were developed. The methodology was designed to answer the following research questions:

- What are students’ and supervisors’ perceptions of work-based learning?
- What are the industry champions’ and course developers’ perceptions of work-based learning?
- Which models of work-based learning are effective?
- What are the barriers to facilitating effective work-based learning?

The research design drew on the qualitative tools discussed in Chapter 4. The methodology in this chapter provides the rationale behind the qualitative research undertaken, as shown in Figure 5.

Table 5: Summary of all qualitative research undertaken

<table>
<thead>
<tr>
<th>Interview</th>
<th>Number of respondents (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry champion interview 1</td>
<td>6</td>
</tr>
<tr>
<td>Industry champion interview 2</td>
<td>5</td>
</tr>
<tr>
<td>Industry champion interview 3</td>
<td>5</td>
</tr>
<tr>
<td>Course developer interview 1</td>
<td>5</td>
</tr>
<tr>
<td>Course developer interview 2</td>
<td>5</td>
</tr>
<tr>
<td>Student interview</td>
<td>20</td>
</tr>
<tr>
<td>Supervisor interview</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total number of interviews</strong></td>
<td><strong>52</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Number of respondents (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot 1</td>
<td>48</td>
</tr>
<tr>
<td>Pilot 2</td>
<td>20</td>
</tr>
<tr>
<td>Final questionnaire, time point 1</td>
<td>28</td>
</tr>
<tr>
<td>Final questionnaire, time point 2</td>
<td>41</td>
</tr>
<tr>
<td><strong>Total number of questionnaires</strong></td>
<td><strong>137</strong></td>
</tr>
</tbody>
</table>

5.1 Ethical considerations

All research that involves human participation requires ethical approval prior to conducting any interviews or administering questionnaires with the required subjects. Ethical considerations in all research focus on a number of aspects: the moral
philosophical position or moral codes; considering and obtaining informed and signed consent of the participants; identification and reduction of potential risks for the researcher and participants; any incentives, financial or other, that may be offered to the participants; confidentiality and data protection; the right of the participant to withdraw from the research with no negative consequence to them and their data destroyed.\textsuperscript{113} The University of Hull’s ethical guidelines were followed and any risks identified and removed where possible. Approval was obtained after all the questionnaires and interview scripts were vetted by the Departmental Ethics Committee.

All participants, industry champions, course developers, students and supervisors, were informed of the ethical guidelines and considerations undertaken prior to their participation. They were informed that all data would be kept on university servers and any quotes used as part of the thesis or any publications would be completely anonymous, neither attributed to themselves or their employer. Each participant was given the opportunity to withdraw from the interview; however, all accepted the terms of study and subsequently signed a consent form. In terms of identifying participants in the written analysis, there was only one concern and that was the potential issues regarding the anonymity of industry champions and course developers. Due to the fact that an individual industry champion and course developer was working at a specific university on a specific sector, this information may be publicly available on an individual’s LinkedIn profile, in trade journals and the Working Higher website. In order to prevent industry champions and course developers being identified in the analysis, any reference to their specialist sector or university was removed from any quotes. All results and quotes were used for research purposes on a purely anonymous basis.

Completed questionnaires were fully anonymous with no identification questions and thus no consent forms were required, as per the University of Hull’s ethical guidelines. All participants were provided with a plain language statement prior to commencing the interview and were informed that they could withdraw at any point and have their data destroyed. All paper and electronic copies are stored in a locked office at the University of Hull and any data analysis carried out and stored on the university’s servers.
5.2 Interview development

There were four distinct groups or stakeholders whom it was deemed important to interview: students, industry champions, course developers and the students’ industrial supervisors. This allowed for the use of in-depth, one-on-one interviews. It could be argued that interviewing the above groups is purposeful sampling; the concept of purposeful sampling is inherent in qualitative research, with sample sizes or indeed population sizes selected purposefully to gather information-rich data.\(^87\) In this case, it was not possible to use anything other than purposeful sampling for the industry champions and course developers due to their small population sizes, in each case the sample size equated to the population size. Interviews were semi-structured to allow for flexibility within the interview agenda, with the collated data coded upon transcription for further analysis. The semi-structured approach allows for, as Miller and Glassner refer to, the inclusion of inter-subjective depth and a shared understanding between the interviewee and interviewer.\(^114\)

Due to the varying backgrounds and experiences of both the industry champions and course developers, the use of semi-structured, open question interview provided a highly effective means of obtaining a wealth of information, completely guided by the interviewees themselves. A pragmatic approach was taken when developing the sections and questions. The interviews were conducted whilst maintaining consideration of the following three guidelines, 1) the interview is collaboratively produced, 2) interviewers are active participants, 3) no one interviewing style is best.\(^115\)

These guidelines have the potential to ensure that the interview data collected is both an accurate and non-biased dissemination of knowledge and experiences from the interviewees. The following steps were followed when designing interviews, whether this was a pilot or a finalised interview script.

1. A number of themes were determined for the interview; dependent on which group were to be interviewed. These were the main overarching themes related to the research questions.
2. A set of questions was developed for each theme. Questions were developed to not lead the interviewees, but to let them discuss any topics they desired.
3. The questions were discussed with the academic supervisor, leading to a collaboratively produced interview script.
4. The interviews were conducted, using the question set as a script, determining the flow of the interview.
If the above steps were used to develop a pilot interview script, then the following points were considered, following transcription of the interview dialogue, with the aim of improving questionnaires:

- Determine if any questions were repeated; it is possible that the interviewee will say “I’m repeating myself here”, which is a good sign that the question leads to the same conclusion as a previous question. These questions were removed.
- If the questions asked did not answer the overarching research questions, then the interview script should be re-evaluated and questions either removed or added as required.

5.3 Questionnaire development

The development of questionnaires followed a similar approach to that utilised when designing interview scripts; the following steps were followed when designing either the pilot of final questionnaires.

1. A number of themes were determined for the questionnaire, in order to determine a number of categories of interest which would be explored by the subsequent questions.

2. A set of questions were developed for each theme. At this point, the format of each question was determined: open; closed; scaled responses, with the rationale behind why the format was chosen decided at this point. Questions were developed in such a format as to ensure that there was no bias introduced, or rather, to not lead the respondent to answering the question as they believe the researcher would like them to.

3. The question set was discussed with academic supervisor and altered as necessary.

4. The questionnaires were distributed and collected.

If a pilot had been developed using the above steps, it was possible that some alterations were required following distribution and analysis. In terms of updating the question set following a pilot, the questionnaire was revised using the following considerations:

- For any open questions, if any themes emerged from the responses, it may be possible to use these themes as choices in closed, multiple choice questions. Where this was applicable, the question was not altered, but the student was given a selection of themes to respond with. However, the option of “other” was
included to allow for students to answer the question in an open manner, if desired.

- As for when developing interview scripts, if the questions asked did not answer
  the overarching research questions, then the question set should be re-evaluated
  and questions either removed or added as required.

5.4 Students

The following three sub-sections outline the methodology behind the data collection
conducted on the students.

5.4.1 Pilot questionnaires

The aim was to question first, second and third year foundation degree students about
their respective courses. The purpose was twofold: to inform the development of work-
based learning in the Working Higher project foundation degree courses; to inform the
development of questionnaires and interviews which were to be used to investigate the
research questions.

The students were drawn from the FdSc Chemical Sciences course in the
Department of Chemistry, as well as those studying one of the four FdEng courses
offered by the Department of Engineering, at the University of Hull. These groups were
identified due to the fact that they were enrolled on established foundation degrees for
the STEM industries, as well as being within the researcher’s host institution. A total of
48 students completed the questionnaire, all of whom were studying through day-
release. A total of 94% (n=45) were male, and 88% (n=42) were aged 18-24.

The intention was that the cohorts of students would provide valuable insight
into the students’ perspectives at the beginning of a degree course and throughout the
later academic years. Their responses informed the design and implementation of the
work-based learning focussed final questionnaires described in Section 5.4.2. Although
not a strict longitudinal study, as this pilot did not follow the same student cohort
throughout their time, the questionnaires were intended to determine how perception
may change year-to-year as the students progress through their course. A copy of the
final questionnaire can be found in Appendix A.

Questionnaires were distributed and collected during December 2009, and were
completed anonymously with the results uploaded to Bristol Online Surveys (BOS)\[116\]
and then exported into IBM’s statistics package, SPSS. Questionnaires were delivered
both online on the BOS website as well as in paper format, with the intention of
encouraging maximum participation. Considerably greater participation was noted when paper surveys were administered with the researcher present in comparison to online. Out of a total of 48 respondents \((n=48)\) who completed the pilot questionnaire, 19\% \((n=9)\) were enrolled on the Chemical Science students and 81\% \((n=39)\) were from the four Engineering degrees. The Bristol Online Surveys website was not used for any subsequent questionnaires, with the raw data input into SPSS for analysis. There were several topics of interest addressed in the pilot question, these were:

Demographic questions: this section aimed to quantify values for the department of study, degree scheme enrolled on and on which year, how the students studied for their qualification, their employer’s industry including their job role and title, gender and age. These questions were asked mainly to provide a background on the students enrolled on the courses.

Expectations: the questions asked in this section were answered via a Likert scale, and aimed to determine how much the students expected their course content to reflect their work. A Likert Scale was used in order to quantify any polarisation in student expectations.

Workload: this section aimed to identify how many hours per week the students spent on a variety of teaching types; lectures, tutorials, workshops etc., with additional Likert questions on their opinion on whether the workload was adequate, too little or too much. Additionally, they were asked whether they would prefer more or less of each of the styles mentioned above. Students were also asked their perceptions of the effectiveness of certain teaching types, and how much they enjoyed them in order to determine the popularity of work-based learning and distance learning for those in employment.

A number of questions were asked where students were asked to relate their course to their current employment. This section aimed to look at whether or not the student had discussed with their employer about the expected outcomes, and how well they believe that their needs were being met.

The pilot questionnaire was intentionally in-depth, and noticeably more in-depth than subsequent questionnaires, as the intention at this point was to determine a broad picture of the current status of foundation degree students. Development of subsequent questionnaires aimed to utilise only the more important questions relating to work-based learning.
A second set of pilot questionnaires were developed using the results from the first pilot; these questionnaires were shorter than the original pilot and more focused around the students’ perceptions of distance learning and work-based learning. A copy of the questionnaires can be found in Appendix B for the first year students and in Appendix C for the second and third year students. One part of the learning from the first pilot was that the questionnaire was too in-depth for subsequent use, and asked too many questions which were perceived as irrelevant by the researcher following completion. The second questionnaire was developed to be much more succinct whilst maintaining the opportunity to collect a broad picture of students’ experiences. A secondary aim of this questionnaire was to provide open-questions about motivations, expectations and support received, to determine whether there were any recurring themes. The idea was to use any emerging themes as the fixed responses for the final foundation degree student questionnaires. The second pilot questionnaire looked at three main areas of interest:

Demographic questions: as for the pilot, it was believed to be necessary to include the department of study, degree scheme, employer’s industry and the student’s current job title and role. New questions were added to the demographic which looked at the highest academic qualification of the students. This was added to determine at which level (as per the National Qualifications Framework) the students’ were currently qualified, to see whether there was a level 4 skills gap. Additionally, student motivations and expectations were added to the demographic section. Any questions relating to age and gender were removed, as they were not believed to add any value; at this point it was believed that no analysis would be required which compared opinions with age.

Distance learning: this section aimed to determine whether or not the students had had any previous experience of distance learning and whether it was an influence on their decision to enrol. Students were also asked the number of hours they believed they would be spending on distance learning, as well as determining what types of support they believed would be beneficial from their employer, the university and the university tutors. These questions were all open in order to allow the students to discuss their expectations freely. Students were given a number of statements regarding distance learning. Due to the nature of the statements this set of questions was answered using a Likert scale, with students provided with a statement to agree with on one side, with an opposing statement on the other side, which they could equally agree
with. The Likert scale was chosen to quantify polarisation in student perception. The questions aimed to determine a number of factors; whether students were worried about the lack of regular interaction and how they can obtain help over their course, whether they were confident, or not, that they could acquire sufficient help from their employer, university and tutors, whether distance learning requires significant changes, whether or not it will save the student time, or take more and whether or not it works well with their schedule and if they can study more and contribute easily to class discussions.

Work-based learning: the questions asked within this section were identical to those noted above for distance learning.

Questionnaires were distributed to students on the FdSc Chemical Science course at the University of Hull and the aim was to compare the results from the first year students with those of the second and third year students. In terms of student demographic, it was observed that the majority were male and were within the age range of 18 to 24 years, exact figures were not obtained as the gender and age demographic questions were removed. The questionnaires can be found for first year students, and second and third year students in Appendix B and Appendix C respectively. The second and third year student question set was altered slightly compared to the questionnaire for the first year students, with the main aim to determine what learning and types of support they had encountered over the duration of their course. A set of statements, in combination with a Likert scale, were also used for second and third year students, however the questions were past tense as opposed to asking about the future perceptions which were predominantly used for first year students.

Both the pilot questionnaires discussed above informed the themes for a number of questions for the final questionnaires discussed in the next section.

5.4.2 Final student questionnaires

Building on the responses obtained for both the first and second pilot questionnaire, a set of questions were developed which focused on the experiences and motivations of the newly enrolled students on the Working Higher-developed foundation degrees. Students from the FdSc Chemical Science course at the University of Hull were also included as the courses followed the same model, philosophy and structure as for the Working Higher developed foundation degrees, with an aim to further understand some of the issues around distance learning and work-based learning. In terms of the student demographics, it was observed that the majority of students were aged between 18 and
24 years, and were predominantly male. However, as for the second pilot questionnaire, gender and age demographic questions were not asked. Students were from a variety of industries and held a number of different roles within their companies; technicians, managers, and one was a director, showing that the course had appeal not only for those at technician level, but for those in more senior roles. The most common qualification level held prior to starting this course was that of level 3, with a few having a level 6 qualification, most notable a Bachelors degree.

The final questionnaire mirrors the second pilot questionnaire quite closely with the major change being the use of closed questions with a selection of response options for respondents to select, as well as statements with a Likert scale. The questionnaire combined both a descriptive and analytical approach in order to produce both quantitative and qualitative information. The response categories chosen were from the themes that arose to the responses to the second pilot questionnaire. The closed questions included an “other” option so that students whose response did not fall into the included themes could add their response in a more qualitative manner; this was not used frequently by the students, as they chose to respond with one of the codes provided. Additionally, building on the format of the second pilot questionnaire, a series of statements were developed with students asked to respond by means of a five-point Likert scale. One purpose of utilising a Likert Scale is to gauge the attitudes of the research subject using a number of pre-ordained statements. These were used to gauge students’ opinions in a quantitative manner on themes such as whether students believe they could, or could not, achieve the same grade in work-based learning as in on-campus methods, and mirrored the statements in the second pilot questionnaire. The intention was that this could provide added insight to the more qualitative results obtained, or be used as standalone data.

The final questionnaire was similar in style to the second pilot questionnaire and consisted of a series of demographic questions, distance learning and work-based learning questions and statements.

Demographic: as for the second pilot questionnaire these questions were open and looked at the host university, name of degree scheme, employer's industry and their current job role and title. As before, the highest academic qualification was asked for, again to determine whether there is a skills gap. This question was closed, with the responses offered being an extensive list of qualifications. Motivations for enrolling and expectations were the final closed questions within this section.
Distance learning: questions were asked on whether students had had any distance learning experience and whether it influenced their decision to enrol. Students were also asked how many hours per week they expect to be spending on distance learning, and if and how they would engage with fellow students. Students were also asked about expected types of support from their employer, university and the tutors. All questions were closed at this point, and the themes which arose from the open questions in the second pilot were offered to the students as multiple choices. A series of statements and a Likert scale were used, as described above for the second pilot questionnaire.

Work-based learning: identical questions were asked for work-based learning as those described in the distance learning section above, and all questions remained closed. Two new questions were added at this point, which asked the students what they believe the advantages and disadvantages of work-based learning were; these questions were open, and allowed students the freedom to describe any advantages or disadvantages they perceived. These were asked as the students had not previously had the opportunity to share their views on the subject of work-based learning. As for distance learning, statements and a Likert scale were used.

The final student questionnaires were distributed by the course developer, or the researcher, either electronically or in paper format to all students on the established foundation degrees at the University of Hull, and to students on the Working Higher foundation degrees through the course leaders at the London Metropolitan University, Manchester Metropolitan University and the University of Hull; questionnaires were distributed at two time points as shown in Table 6 and Table 7. The first time point was after approximately one month after students started the course and was used to determine a baseline in terms of expectations, particularly around support. The second questionnaire was distributed after approximately six months following the start date of the course for the first year students, in the second semester, which allowed the students the opportunity to have undertaken work-based learning activities prior to being questioned as shown in Table 6 below. This also allowed students the opportunity to determine what support is being received from the employer, university and university tutors. The number of student questionnaires was 28, \( n=28 \). A copy of the questionnaire can be found in Appendix D.
Table 6: List of universities, number of students and date questionnaires were distributed

<table>
<thead>
<tr>
<th>University</th>
<th>Date undertaken</th>
<th>Number of students ($n$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Hull</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FdSc Chemical Science Year 2</td>
<td>February 2011</td>
<td>6</td>
</tr>
<tr>
<td>FdEng Process Engineering Management</td>
<td>November 2011</td>
<td>1</td>
</tr>
<tr>
<td>Manchester Metropolitan University</td>
<td>November 2011</td>
<td>9</td>
</tr>
<tr>
<td>London Metropolitan University</td>
<td>March 2011</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>28</strong></td>
</tr>
</tbody>
</table>

The students at London Metropolitan University (LMU) enrolled and began their course in February 2011, while Manchester Metropolitan University (MMU) and the University of Hull’s FdEng Working Higher foundation degree students enrolled and began in September 2011. The University of Hull’s FdSc Chemical Science students had started their academic year in September 2010.

The second questionnaire was distributed in March and April 2012, and a total of 41 responses were obtained ($n=41$). The questionnaire was distributed, collected and analysed at a number of stages, the dates can be found within Table 7 below. A copy of the questionnaire can be found in Appendix E.

Table 7: List of universities, number of students and date questionnaires were distributed, second time point

<table>
<thead>
<tr>
<th>University</th>
<th>Date undertaken</th>
<th>Number of students ($n$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Hull</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FdSc Chemical Science Year 1</td>
<td>March 2012</td>
<td>14</td>
</tr>
<tr>
<td>FdSc Chemical Science Year 2</td>
<td>March 2012</td>
<td>10</td>
</tr>
<tr>
<td>FdSc Chemical Science Year 3</td>
<td>March 2012</td>
<td>3</td>
</tr>
<tr>
<td>FdSc Chemical Science Year 4</td>
<td>March 2012</td>
<td>2</td>
</tr>
<tr>
<td>Manchester Metropolitan University</td>
<td>April 2012</td>
<td>9</td>
</tr>
<tr>
<td>London Metropolitan University</td>
<td>March 2012</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>41</strong></td>
</tr>
</tbody>
</table>

No responses were received from either the University of Kent or the University of Central Lancashire. The University of Kent launched their course on February 2012.
and the University of Central Lancashire had a franchise-model where further education colleges ran the course. Despite a number of attempts made by both the researcher and the academic lead at the University of Central Lancashire, the two further education colleges appeared reluctant to distribute the questionnaires. It should be noted that at the universities where the course developer had an active teaching role they were able to highlight the importance of these questionnaires to students and thus a greater return in responses was noted.

The second questionnaire did not include the Likert questions; the questions in the first time point questionnaire were intended to provide a standalone set of data regarding a student’s concerns and worries at the beginning of their course. The results of the Likert questions informed the development of the interview script for the students and their supervisors and it was intended that any relevant issues would be explored during the interviews.

5.4.3 Student interviews
Interviews were carried out with students on the Working Higher developed foundation degrees and students on other STEM subject foundation degrees, in particular the students on the FdSc Chemical Science at the University of Hull. The student demographic did not alter much compared with the questionnaires described above; the age range was between 18 to 50 years, although the majority were aged between 18 and 30 years, and the majority were male, with students employed through technician level with one or two years of experience, through to managers with a plethora of experience within their sectors and companies.

The full interview script can be found in Appendix K. The interview script was semi-structured and prompts were given to students as and when required during the interview. There were two sections within the interview script, with the first focusing on the demographic of the students, with the purpose of these questions to determine their job title and role, their industry and motivations for enrolling on the course. The second section focused purely on the work-based learning activities the students had carried out during their course. The work-based learning questions focused on the student describing any work-based learning that they had done and determining whether this had any impact on their work processes and whether there may prove to be any long term benefit for themselves and their employer.

Interviews were conducted at least six months following the beginning of the course, in the case of Working Higher foundation degrees. This was to allow students
to have an opportunity to carry out any work-based activities as part of their course. Interviews were conducted either through Skype, telephone or, in the case of Manchester Metropolitan University’s students, face-to-face. Interviews were carried out between April 2012 and July 2012.

5.5 Industry champion interviews

As noted earlier, one of aims was to conduct a longitudinal study of the perceptions of the industry champions, whose role was to bridge the gap between employers and universities and to engage and motivate potential employers. This study was carried out over the course of three interviews spanning 24 months. There are two primary purposes to longitudinal research:120

“Longitudinal research serves two primary purposes: to describe patterns of change and to establish the direction (positive or negative and from Y to X or from X to Y) and magnitude (a relationship of magnitude zero indicating the absence of a casual relationship) of casual relationships.”120

The aims of these interviews were to determine the opinions of the industry champions with respect to work-based learning. The three interview scripts were designed to take an exploratory approach that allows for the construction of theory from data.97, 121

In terms of background, the industry champions were individuals with a wealth of experience within their respective industries. One industry champion was employed on a 0.5 full-time equivalent basis for each of the biosciences, chemicals, petrochemicals and polymers sectors, whereas the nuclear sector employed two industry champions on a 0.3/0.2 full-time equivalent basis. The industry champions had not had any experience of working closely with academics, particularly in a course development role.

The first interview script that was used for all industry champions can be found in Appendix F. This set of questions was considered a pilot to aid in the development of questions for course developers, as well as to improve the question set for the longitudinal series of three interviews. The second and third interviews focused on similar themes to those noted below in Table 8, with the schedules found in Appendix G.
and Appendix H. There were six areas of interest at the first interview time point, with seven discussion areas in the second and third interviews, as shown in Table 8:

Table 8: Interview themes for both industry champions and course developers

<table>
<thead>
<tr>
<th>Interview 1</th>
<th>Interviews 2 and 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Work-based learning</td>
<td>• Work-based learning</td>
</tr>
<tr>
<td>• Benefits of work-based learning</td>
<td>• Concerns/Issues</td>
</tr>
<tr>
<td>• Concerns/Issues</td>
<td>• Attitudes/Motivation</td>
</tr>
<tr>
<td>• Attitudes/motivation</td>
<td>• Case studies/employer contribution</td>
</tr>
<tr>
<td>• Assessment/feedback</td>
<td>• Assessment and feedback</td>
</tr>
<tr>
<td>• Personal development planning</td>
<td>• Personal development planning</td>
</tr>
<tr>
<td></td>
<td>• Management of the Working Higher project</td>
</tr>
</tbody>
</table>

As can be seen in the table above, there are three noticeable changes between the sets of interviews; the first is the removal of the benefits section, with the second the inclusion of questions relating to management. The benefits section was removed as it was anticipated that the perceived benefits of work-based learning would not change over the duration of the industry champions’ contracts. The management section was added to provide lessons learned from the Working Higher project management team, and are thus not discussed within the results section.

Interviews were conducted either through Skype or over the telephone. However, in some instances when project meetings were already organised, industry champions were interviewed face-to-face. This did not alter the structure of the script.

The contract for industry champions began in January 2010 and the group were interviewed at three time-points:

1. At the beginning of their contract. The aim of this interview was to determine their base level of understanding. February 2010. \((n=6)\)
2. Approximately 18 months into their contract, allowing the industry champions time to develop an understanding of work-based learning. May - June 2011. \((n=6, \text{ but } n=5 \text{ were analysed due to recording error})\)
3. After 23 or 24 months of their contract. This was to determine how opinions had changed over time. December 2011. \((n=5)\)

Only five industry champions were interviewed for the third interview, which was due to one industry champion leaving their post prior to this interview point. It
should also be noted that in the second set of interviews, six industry champions were interviewed. However, one interview did not record properly, thus no transcription was possible.

5.6 Course developers
Interviews were carried out with course developers involved in the Working Higher project. Course developers were experienced members of academic staff with experience in both developing and delivering materials and courses within their subject specialism. Course developers were employed for a number of reasons; the experience within the subject of the host university, the experience and influence of the course developer, their positivity and ability to be flexible, while also maintaining an active interest in pedagogy, the STEM subject area and employability.

The aim of the course developer interviews was to determine the baseline level of understanding of work-based learning, and to determine how their views and attitudes changed throughout their time working on the development of their individual foundation degrees. The questions were very similar to those used with the industry champions; the interview schedule can be found in Appendix I. The course developer interviews were carried out in a longitudinal manner. The areas of interest for the course developers were the same as those for the industry champions, as shown in Table 8. During the research, two course developers acquired new posts in different universities and thus new staff were employed. This forced the interviews with the new course developers to adopt a mixed-question approach, with some questions from the first interview script, while others were related to the second script.

Contracts for the course developers began in June 2009 which is prior to the commencement of this research project, and the group were interviewed at two time-points:

1. 16 months from project/contract commencement. September 2010. (n=5, however, n=4 due to a recording error)
2. Approximately 25 months into their contract which allowed the course developers time to develop an understanding of work-based learning. May – June 2011. (n=5)

5.7 Industrial supervisor interviews
A pilot interview was carried out with three employers to determine whether or not the correct questions were being asked. The pilot interview with supervisors included three
sections; demographic, distance learning and work-based learning. The interview script can be found in Appendix L.

Demographic: this section aimed to determine the industry of the student and supervisor, as well as the student’s current job title and role. Additionally, supervisors were asked for their motivations in enrolling their student on the course and their preference for delivery mode.

Distance learning: this section firstly aimed to determine whether or not the supervisor believed that the student was coping with distance learning. Following this, the employer was asked what types of support they were providing for their student, and for any advantages and disadvantages of distance learning with respect to their company, and for their student.

Work-based learning: the first question in this section asked the employer who should be responsible for identifying work-based learning opportunities. This question was asked to see whether or not the employer was willing to assist in the development of work-based learning opportunities, or whether they left this to the student and university. As for the distance learning section, a question was asked on the types of support that the employer provided for work-based learning. Advantages and disadvantages of work-based learning for both the company and the student were also probed.

The responses from these three interviews informed the final supervisor and student interview scripts. Only two of the categories were carried over from the pilot questionnaire, demographic and work-based learning, which is also observed for the student interviews; these are described below.

Demographic: questions were similar to as those in the pilot interview. These covered the type of industry, job role and title as well as the supervisor’s working relationship with the student. They were also asked about motivations for enrolling their student, company preference for distance learning or day release and whether they believe their student is coping with distance learning.

Work-based learning: these questions covered a number of topics. The first was to determine what the supervisor understood by the term work-based learning, as well as whether their student is coping with the work-based learning activities. As in the pilot, the supervisor was asked who they believed should identify work-based learning opportunities and what types of support the employer provides. It was believed to be important at this stage to determine whether any of the work-based learning undertaken
by the student so far had had any effect on any of the employer’s work processes. Therefore, two questions were asked, one relating to whether work-based learning has, or has not, affected any work processes, and whether the activities will have any long term impact for the business. This was to triangulate the responses with the students’ in the search for an effective model of work-based learning. Another three new questions were added at this point which were included to probe whether the employer would like more or less work-based learning on the course, whether they are satisfied with the work-based learning provision and organisation by the university, and what their overall opinion of work-based learning activities are, compared to regular taught modules and activities.

The distance learning section was removed from this interview script; this was because the distance learning questions did not answer any of the overall research questions noted in Chapter 4.

Interviews were carried out with the supervisors of students on the Working Higher developed foundation degrees and on STEM subject foundation degrees. Following the interviews, each student was asked by the researcher to seek permission from their supervisor to pass on their details and ask whether or not they were willing to be interviewed. Supervisors were interviewed after their student had been interviewed. The full interview script can be found in Appendix M.

Six employers were interviewed, there were three from the chemical industry, one from the gas industry, one from polymers and the final from metal packaging. Their relationship with the student was that of being their direct manager for five interviewees, and one was a supervisor. Supervisors’ interviews were conducted at least six months following the beginning of the course in the case of Working Higher foundation degrees, and were conducted either through Skype or telephone between April 2012 and June 2012.

5.8 Summary of interviews

The interviews undertaken were semi-structured although the opportunity to ask additional questions was not required in most instances. However, in several instances the students being interviewed asked “what do you mean by work-based learning?” The response given to the students was to define work-based learning in terms of the definition provided by Seagraves et al. and Gray, “learning through work, learning for work and learning at work”. All the industry champion, course developer, industrial
supervisors and nine student interviews were carried out through Skype or telephone, and face-to-face in the case of the ten students from Manchester Metropolitan University and one from the University of Hull. Permission was obtained by each participant for the interview to be recorded using a digital voice recorder, and a data release form signed. The raw data was subsequently transcribed, where both the interviewees’ and interviewers’ input was included in the transcript. Due to the students being less vocal than the course developers, industry champions and supervisors there were more prompts used during the interviews.

Table 9 below summarises the number of interviews carried out, as well as the approximate length of interviews:

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Number of interviews carried out</th>
<th>Approximate length of interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry champions</td>
<td>16</td>
<td>60 minutes (1.0 hr)</td>
</tr>
<tr>
<td>Course developers</td>
<td>10</td>
<td>50 minutes (0.83 hr)</td>
</tr>
<tr>
<td>Students</td>
<td>20</td>
<td>10 minutes (0.17 hr)</td>
</tr>
<tr>
<td>Supervisors</td>
<td>6</td>
<td>15 minutes (0.25 hr)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>52</strong></td>
<td><strong>29.2 hrs</strong></td>
</tr>
</tbody>
</table>

In terms of the quantity of interviews required for a grounded theory analysis, it is believed that between 30 and 50 interviews are suitable for a PhD research project. However, this source did not specify the length of interview, but the table above shows an estimate of 29 hours of total interview time over the course of 52 interviews.

As discussed earlier with respect to purposeful sampling, the population sizes involved were small. There were only six industry champions seconded to the Working Higher project. Two shared the role on a 0.3/0.2 full-time equivalent basis but following the departure of one, the second industry champion added their 0.2 full-time equivalent workload to their own. There were five course developers at project inception, two departed during the process which lead to two new developers being attached to the project. A total of seven course developers were interviewed overall, five at each time point with only three interviewed twice. The industry champions’ and course developers’ interviews were conducted to answer the following research question:
What are the industry champions and course developers’ opinions of work-based learning?

It is known that there are not many part-time, foundation degree students enrolled on work-based learning courses in the STEM industries. This limited the population size, and it was decided to speak to those enrolled on the newly developed Working Higher foundation degrees, as well as students on the Chemical Sciences degree based at the University of Hull and Manchester Metropolitan University. The student and supervisors interviews outlined were to answer the following research question:

- What are the students and supervisors perceptions of work-based learning?

In combination, each set of interviews may assist in informing which models of work-based learning are efficient.

5.9 Summary of questionnaires

Questionnaires were carried out with a total of 137 students over the course of two pilot and two main question sets. The two final questionnaires were distributed at two time points with students on foundation degree courses and aimed to highlight effective models of work-based learning used within each course. Students were provided with a plain language statement prior to completing the questionnaire, and none withdrew from completing the questionnaire.

Table 10 shows the summary of questionnaires undertaken and the number of respondents for each:

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Number of respondents (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot 1</td>
<td>48</td>
</tr>
<tr>
<td>Pilot 2</td>
<td>20</td>
</tr>
<tr>
<td>Final questionnaire, time point 1</td>
<td>28</td>
</tr>
<tr>
<td>Final questionnaire, time point 2</td>
<td>41</td>
</tr>
<tr>
<td><strong>Total number of questionnaires</strong></td>
<td><strong>137</strong></td>
</tr>
</tbody>
</table>

The student questionnaires were developed to answer the following research question:

- What are the students’ perceptions of work-based learning?
5.10 Analysis and coding

The following two sub-sections outline the methodology behind the analysis and coding of the questionnaire and interview data.

5.10.1 Questionnaires

Analysis of all questionnaires was carried out using IBM’s SPSS statistical software package. SPSS is a software package developed for the analysis of statistical data. Due to the inclusion of both open and closed questions, the open responses obtained required coding and in the case of questionnaires, coding took the format of giving each response a numerical value:

1. Identify common responses, a simple example could be for the question “name of university”, which may yield responses such as “University of Hull”, “Hull”, “Hull Uni” or “Manchester Metropolitan University”, “MMU”, “Manc”. Another example using a more open questions, which may result in a number of different more in-depth themes, is if asked about types of support, students may have responded with “time, days off from work to complete uni work”, “time during the work day for uni work”, “extra day holiday for each day taken for uni work” or “mentoring”, “financial”.

2. In the first example provided above, the responses were assigned a code number of 1, which corresponded to an answer of University of Hull, and Manchester Metropolitan University responses could be assigned the number 2. Any subsequent universities are then assigned an integer value which is not already used by a previous entry. Similarly, in the second example, the expectations could also be coded as 1, 2 and 3 respectively for each theme which arose. For example, any response which discusses time would thus be denoted as 1, anything regarding mentoring is assigned as 2, and financial support is nominated the value 3.

3. The number of times a code was used was calculated, and reported as a frequency.

There was no option to conduct any statistical analysis on the open, or qualitative data other than calculating the frequencies with which the themes were discussed, and no Null of Alternate hypotheses were tested. The closed questions could
again provide a frequency; for example the provided the responses “yes, no, don’t know” results in a count of each, which were analysed and reported as frequencies.

For Likert questions, it is not possible to calculate a mean value or median value since the numbers on the scale are ordinal, and for this research the only calculation was to determine the mode or most frequent responses, which is shown on the frequency graphs in Chapter 6.

The Bristol Online Surveys tool was only used for the pilot questionnaires and was considered to be of limited use; the data was imported from Bristol Online Surveys in an SPSS format for analysis and analysed as described above. Due to the higher participation rate when using paper-based questionnaires it was deemed sensible to use only paper questionnaires when conducting the final questionnaires, with the researcher inputting all the raw data into SPSS.

5.10.2 Interviews

Interview transcripts were uploaded into the NVivo software, where codes and themes were tallied for each question with the frequencies noted. NVivo software is used for the analysis of qualitative data, in particular interviews with open questions. According to Richards, there are five key benefits to using the NVivo software package: 1) managing your data; 2) managing your ideas; 3) querying the data; 4) provide a graphical model from the data; 5) reporting findings from the data. Coding was initially carried out by looking for any relevant or interesting points raised in the questions, with the following steps used when approaching coding:

1. Upload fully transcribed interview scripts to NVivo. As in step 2 above, themes and codes can be assigned to any responses which arise for the question asked, in particular, themes should be assigned if several respondents have discussed the same topic. Look for anything that stands out from the text and provides answers to the question asked.

2. Assign a code for the theme that arose; for example for work-based learning, an example code could be “learning carried out within the workplace”. This overarching theme could appear in a number of different ways; the aim was not to search for the exact phrase, but for responses that imply that work-based learning is learning that is carried out while the learner is within their workplace. It is possible to produce an encompassing theme, which is vague enough to include several different responses; the narrower the theme the harder it may be to find more than one instance within the interview data.
3. Codes were also assigned to topics that arose only once; this was particularly important in the case of industry champions, course developers and industrial supervisors due to the small population sizes. The inclusion of these one-response themes allows for a clearer overall picture of their responses.

5.11 Work-based learning models

Another aspect of this research was to analyse the models of work-based learning that were encountered by the students involved in this study. The work-based learning modules encountered by students included a Business Improvement Techniques module, a Health and Safety module, a module entitled Work-Based Learning and a Work-Based Project module.

Of the modules outlined above three included work-based projects. The project in the Business Improvement Techniques module was related to improving a work-process, and similarly, the Health and Safety project was carried out in the workplace and related to an aspect of health and safety in the students’ workplace. The Work-Based Project module was assessed entirely through a project carried out in the workplace and related to the students’ employment. The Work-Based Learning module involved a work-related and work-negotiated assignment; the assignment involved the construction of a case study relating to the student’s company on an aspect of health and safety. The modules are described in more detail in Section 7.4 in which they are linked to the student interviews in order to determine which models are effective.

In terms of determining whether these models are successful there are two main outputs that can be considered:

- Student performance: what was the average percentage mark received for the project? What was the average percentage mark received for the module? Were the percentage marks for the work-based learning activities within the students’ average mark range?
- Process improvement: has the project had a positive or negative impact on any of the employer’s work processes? Will there be a long term impact for the employer from the work-based learning activities undertaken?

The first question was answered using the average grades that the students obtained for the activities and modules described above, this involved speaking to course developers and acquiring anonymous data regarding the grades obtained. The
second question was more qualitative, and was asked during the student and industrial supervisor interviews to determine whether or not that had been any benefit.

5.12 Summary

This chapter acknowledged the ethical considerations behind the research as well as the rationale behind the development of the methodology and the design and analysis of both questionnaires and interview scripts. The data obtained is presented and discussed in the subsequent chapters.
6.0 Results
This chapter focuses on the results of the qualitative studies undertaken. The format of this chapter follows that of the methodology, presenting analysis of the results from the student study, followed by the industry champions, course developers and, finally, the industrial supervisors.

6.1 Student questionnaires
The following section discusses the results obtained from the two pilot questionnaires and the two final questionnaires.

6.1.1 Pilot 1
Question 1. Department of study. Question 2. Name of degree scheme. Question 4. How are you released for your course?

A total of 48 students completed the questionnaire, with 19% (n=9) from the Department of Chemistry at the University of Hull and the remaining 82% (n=39) from the Department of Engineering at the University of Hull. 100% were part-time, day-release students, studying either the FdSc Chemical Science, or one of the four FdEng foundation degrees offered at the institution.


A total of 54% (n=26) were first year students, the remaining 46% (n=22) were split equally between second and third year students. 94% (n=45) were male and 88% (n=42) were aged between 18 and 24.

The results for this pilot questionnaire are discussed by question number. Subsequent sections in this chapter are structured by question number in ascending order, as in the questionnaire script, followed by the full set of results. A description of how the pilot questionnaires informed the final questionnaire can be found in Section 5.4. The questionnaire can be found in Appendix A.

Students’ perception of skills development and expectations:
Question 9. In terms of skills, please list any that you would expect to develop through this course, which would benefit your role within the workplace.

The skills outlined by respondents fell into two categories; transferable skills and subject specific knowledge.
Questions 10 to 13 were designed for first year students only and were answered by 29 respondents. Questions 14 to 17 were for second and third year students, and were answered by 22 respondents. Responses shown in the questions are shown as per the cohort of 48 respondents.

(First year students) Question 10. To what extent do you think that the content of taught modules is going to reflect the everyday problems and projects that you face at work?

A total of 40% ($n=19$) students believed that the content of modules would reflect their work challenged to some extent, while 4% ($n=2$) expected significant overlap. 13% ($n=6$) believed that the taught content would not reflect very much of their work, or not at all, 2% ($n=1$).

(First year students) Question 11. To what extent do you expect the laboratory skills developed to reflect those which are required in the workplace?

A large proportion of students, 29% ($n=14$), responded with not applicable. Of the remaining students, 25% ($n=12$) believed that the laboratory skills would reflect, to some extent, or very much so, with those required in their employment.

(First year students) Question 12. To what extent do you expect to be learning through work itself?

Of the respondents, 48% ($n=23$) expected to be learning through work. Only 10% ($n=5$) expected very little learning through work, or none at all.

(First year students) Question 13. To what extent do you expect the modules taught to be delivered by distance learning methods, or e-learning?

Of those who did respond, 38% ($n=18$) expected modules to be delivered to some extent via distance, or e-learning.

(Second and third year students) Question 14. To what extent do you think that the content of taught modules reflects the everyday problems and projects that you face at work?
A number of respondents, 13% \((n=7)\), thought that the taught content did not reflect their everyday problems very much, while 15% \((n=7)\) did not believe that the taught content reflected their workplace problems at all.

(Second and third year students) Question 15. To what extent have the laboratory skills you’ve gained reflect those required in the workplace?

23% \((n=11)\) responded with not applicable. Only 10% \((n=5)\) believed that the laboratory-based skills reflected those required at work to some extent; 10% \((n=5)\) believed that there was a minimal link, and 2% \((n=1)\) thought there was no connection.

(Second and third year students) Question 16. To what extent have you been taught through work itself?

A total of 25% \((n=12)\) of students believed that they had been taught through the medium of work to some extent; while 2% \((n=1)\) believed that they had been taught significantly through work.

(Second and third year students) Question 17. To what extent have modules taught been delivered by distance learning methods, or e-learning?

17% \((n=8)\) noted that modules had been taught to either some extent, or very much so, through distance or e-learning. However, a larger proportion, 27% \((n=13)\), noted that modules had not very much, or not at all, being delivered through the methods listed above.

**Workload:**

Question 18. How many hours per week do you spend on:

The number of hours per week was dependent on teaching method, the modal results for each teaching method were: 29% \((n=14)\) spend 6 hours per week on lectures; 69% \((n=33)\) spend 1 hour per week in tutorials; 35% \((n=17)\) spend 0 hours per week in laboratory class, although 6% \((n=3)\) spend 2 hours, and 2% \((n=1)\) spend 5 days per year in laboratory class; workshops were not frequently encountered, 44% \((n=21)\) responded that they spend 0 hours per week in workshops; 44% \((n=21)\) spent 1 hour per week on work-based learning and 27% \((n=13)\) spent 0 hours e-learning.

Question 19. How many hours per week do you spend on non-timetabled, independent study?
The number of hours which students spend on independent study varied hugely. A small number of students, 8% \((n=4)\), did not study outside the prescribed, timetabled hours. 2% \((n=1)\) spent over 25 hours per week studying. The largest proportion of students, 50% \((n=24)\), spent between 4 and 10 hours on their independent study.

Question 20. How do you find the overall workload?

The responses obtained from students are shown in Figure 6. The majority of students, 65% \((n=31)\), believed the workload to be about right; although 33% \((n=16)\) believed that the workload was too high.

![Figure 6: Perception of overall workload](image)

Question 21. Would it be more attractive to you if the course was delivered by a distance-learning approach (e.g. e-learning, virtual learning environments, asynchronous/synchronous discussions) with more independent study?

The majority, 58% \((n=28)\), of students did not believe that a distance learning approach, with an increase in independent study, would appeal to them. 25% \((n=12)\) responded that they did not know.

Question 22. Would you prefer more or less of the following delivery methods:

The responses for delivery methods can be divided into two categories. The teaching methods students would like the same quantity or more include: tutorials; laboratory work; workshops; work-based learning; e-learning. Only lectures fell into the category where students would prefer the same quantity, or fewer.
Question 23. Would you like to add any comments regarding the workload or any of the teaching methods mentioned above?

A total of 11 comments were received. The comments are reflected in question 28, discussed below.

**Perceptions of teaching methods:**

Table 11 and Table 12 show how effective and enjoyable students perceived various teaching methods employed within higher education.

Question 24. How effective at helping you learn do you find the following teaching methods?

**Table 11: Table to show how effective students perceived various teaching methods**

<table>
<thead>
<tr>
<th>Method</th>
<th>Very effective</th>
<th>Fairly effective</th>
<th>Not very effective</th>
<th>Ineffective</th>
<th>Not applicable</th>
<th>No response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>10</td>
<td>60</td>
<td>8</td>
<td>21</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tutorials</td>
<td>33</td>
<td>56</td>
<td>2</td>
<td>6</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Laboratory work</td>
<td>10</td>
<td>23</td>
<td>8</td>
<td>0</td>
<td>2</td>
<td>56</td>
</tr>
<tr>
<td>Workshops</td>
<td>15</td>
<td>25</td>
<td>4</td>
<td>2</td>
<td>52</td>
<td>2</td>
</tr>
<tr>
<td>Problem classes</td>
<td>15</td>
<td>42</td>
<td>6</td>
<td>0</td>
<td>33</td>
<td>4</td>
</tr>
<tr>
<td>Group projects</td>
<td>21</td>
<td>29</td>
<td>13</td>
<td>6</td>
<td>27</td>
<td>4</td>
</tr>
<tr>
<td>Independent study</td>
<td>17</td>
<td>73</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Work-based learning</td>
<td>19</td>
<td>44</td>
<td>15</td>
<td>13</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>e-learning</td>
<td>4</td>
<td>40</td>
<td>13</td>
<td>0</td>
<td>42</td>
<td>2</td>
</tr>
</tbody>
</table>
Question 25. How enjoyable do you find the following delivery methods?

Table 12: Table to show how enjoyable students believed varied teaching methods were

<table>
<thead>
<tr>
<th>Method</th>
<th>Very enjoyable</th>
<th>Fairly enjoyable</th>
<th>Not very enjoyable</th>
<th>Not enjoyable at all</th>
<th>Not applicable</th>
<th>No response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>4</td>
<td>52</td>
<td>23</td>
<td>21</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tutorials</td>
<td>4</td>
<td>75</td>
<td>13</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Laboratory work</td>
<td>8</td>
<td>29</td>
<td>0</td>
<td>0</td>
<td>63</td>
<td>0</td>
</tr>
<tr>
<td>Workshops</td>
<td>10</td>
<td>21</td>
<td>2</td>
<td>2</td>
<td>54</td>
<td>10</td>
</tr>
<tr>
<td>Problem classes</td>
<td>4</td>
<td>46</td>
<td>13</td>
<td>0</td>
<td>35</td>
<td>2</td>
</tr>
<tr>
<td>Group projects</td>
<td>23</td>
<td>29</td>
<td>17</td>
<td>6</td>
<td>23</td>
<td>2</td>
</tr>
<tr>
<td>Independent study</td>
<td>6</td>
<td>48</td>
<td>35</td>
<td>6</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Work-based learning</td>
<td>10</td>
<td>52</td>
<td>15</td>
<td>17</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>e-learning</td>
<td>6</td>
<td>31</td>
<td>10</td>
<td>0</td>
<td>50</td>
<td>2</td>
</tr>
</tbody>
</table>

Question 26. Focusing on e-learning, would you prefer more or fewer modules delivered in this way?

A total of 31% \((n=15)\) of students would prefer the same quantity of modules delivered through e-learning; 23% \((n=11)\) would prefer less e-learning and 13% \((n=6)\) would prefer more.

Question 27. Focusing on work-based learning, would you prefer more or fewer modules delivered in this way?

Figure 7 shows that 48% \((n=23)\) of the respondents preferred no change in the quantity, and 21% \((n=10)\) would have preferred more; a total of 69% \((n=33)\) would have preferred the same quantity or more.
Figure 7: Students’ preference for more or less work-based learning

Question 28. Would you like to add any comments regarding the workload or about any of the types of teaching mentioned above?

Even though there were participants from each year of the foundation degree, the majority of comments were received from second and third year students. This group of learners would have encountered most of the different types of learning outlined in the questionnaire.

“If there were to be more work-based learning modules – I feel a greater communication needed between university & the workplace in order to make sure the correct material was being studied.”

“The work-based learning sections should take more consideration of the workload at your job, as during your day to day activities there tends to be more important things to be doing. There is barely enough time in the day to complete normal working activities without worrying out work-based learning which I find a waste of time anyway.”

“I feel the work based learning assignments given to us are often too much and require too many hours work with very little support from
both the uni and my employer. They are often quite difficult and hard to gain valuable marks from.”

The above quotes highlighted two issues perceived by students regarding work-based learning; communication between the university the employer, and consideration by the university of the workload associated with work-based learning.

The comments from three respondents show that they might not understand the term work-based learning:

“Don't use work-based learning - learned techniques needed as been there three years.”

“Don't see the point in work-based learning, that's for work.”

“Work-based learning is generally a waste of time and doesn't take into account how busy you are at working doing your actual job and daily routines.”

It appears that several students believed work-based learning to be a time consuming exercise, completely separate from their actual role, with no attempt made to incorporate both their learning and their work.

**Perception of the relation of the course to their current employment:**

Question 29. Has your employer discussed with you their expectations and expected outcomes from the course?

A slim majority of 52% (n=25) had not discussed expectations and outcomes with their employer.

Question 30. Has your employer discussed with the university their expectations and expected outcomes from the course?
38% \((n=18)\) of students believed their employer had not discussed the outcomes with the university; 35% \((n=17)\) did not know.

Question 31. How well are the needs of your employer met by the overall objectives of this course?

Figure 9 shows whether the students believed the needs of their employer were being met by the course. A total of 57% \((n=27)\) believed that their employer’s needs were met well or very well.
Question 32. How well do you feel that these needs are being met during the course?

Figure 10 shows the student perception regarding whether the employer’s needs are being met during the course.

![Figure 10: Student perception of whether the employer’s needs were met during the course](image)

Question 33. How would you rate the relevance of the course to your current role within your industry?

As shown in Figure 11, 54% \((n=26)\) of students believed that their course was relevant to their current role, whilst 42% \((n=20)\) believed it was either not very relevant or completely irrelevant. The remaining 4.2% \((n=2)\) did not know; these responses were from first year students, whom, when the research was undertaken, were seven or eight weeks into their course. These results can be categorised to each department; 67% \((n=33)\) of students from the Department of Chemistry believed that the foundation degree was relevant to their employment. In the Department of Engineering, views seemed to be divided more evenly; 51% \((n=20)\) of students believed the course was relevant, whilst 44% \((n=17)\) did not.
Question 34. How would you rate the relevance of the activities in this course to problems that you would encounter in your workplace?

Figure 12 shows that 44% (n=21) of students thought that the activities on the course were fairly relevant or relevant to problems encountered within the workplace, although 35% (n=17) of students reported that they were not very relevant.
Question 35. To what extent does the course content help you address problems that are encountered in your workplace?

![Bar chart showing the extent to which the course content helps address problems at work.](chart13.png)

Figure 13: Does the course content help address problems at work

Figure 13 shows that 54% \((n=26)\) of students report that the course helped them to address problems in the workplace to some extent, or very much so.

Question 36. To what extent do the skills and techniques taught in laboratory classes match the skills required in your workplace?

Figure 14 shows the students’ perception of the relationship between taught skills and techniques and workplace requirements.

![Bar chart showing the perceived extent to which laboratory skills match the required skills.](chart14.png)

Figure 14: Perceived extent to which laboratory skills matched the required skills for the students' workplace
Question 37. How often do you find course activities utilise your prior knowledge or experience?

Figure 14 shows that students believed that their prior knowledge and experience was activated and utilised throughout their course.

![Bar chart showing the frequency of students believing that course activities utilise their prior knowledge or experience.]

Figure 15: Students' perception on the utilisation of prior knowledge and experience

Question 38. In terms of skills taught on the course, how often do you have the opportunity to practice any skills in the workplace that have been newly acquired?

Figure 16 and Figure 17 show the frequency with which students had the opportunity to utilise new skills and knowledge within the university and workplace respectively.

![Bar chart showing the frequency of students having the opportunity to practice university-taught skills in the workplace.]

Figure 16: Frequency of opportunity to practice university-taught skills in the workplace
Question 39. Are you given credit on your course for prior learning and experience?

The majority of students, 65% (n=31), did not know whether or not there was an opportunity for the accreditation of prior learning or experience. However, 33% (n=16) believed that they were not given credit, or there was no opportunity for accreditation.

Question 40. Are you engaged in any personal development planning?

Within their employment, 52% (n=25) of students did engage with personal development activities, whereas 38% (n=18) did not. For those who engage with personal development at the university, the numbers were divided equally, with 44% (n=21) engaging, and 44% (n=21) not engaging.

Question 41. If you answered yes to the above, please specify by which means the process is being captured.

There were two main examples of personal development planning discussed by students: portfolios of evidence, as stated by 25% (n=12); and appraisals, stated by 8% (n=4).

Question 42. Do you have any additional comments regarding the relationship between your employer/industry and the university/course itself?

A total of seven comments were received. Four comments were related to perceived irrelevancies in the topics in relation to the student’s workplace. The comments shown for question 43 below are identical to two received for this question.

Question 43. Please write any further comments you may have below.
In this section students reported that course content was not always relevant to their role in their specific industry.

“It is useful to have a degree in chemistry but in industry most of the topics taught are not useful in the workplace.”

“In lab classes, the techniques taught are not used in industry because industry strives to be more automated as this is quicker and more cost effective.”

6.1.2 Pilot 2
The following section presents two sets of results; the second pilot questionnaire for first year students, and the second pilot questionnaire for second and third year students. The results were analysed separately, but are reported below together for easier comparison; the specific student year groups are included in brackets before each question. The questionnaires can be found in Appendix B and Appendix C.

The questions are reported by theme primarily, and then by year group. The demographic questions are discussed first and these questions were asked to both year groups and thus their answers are combined. The questions on distance learning are reported after the demographic section and is divided so that the first year student responses are shown first, followed by the second and third year student data. The final section discusses the results obtained on work-based learning, and follows the same format as the distance learning section, and is divided by the student year group.

Demographic information:
The ten first year students were studying the University of Hull’s FdSc Chemical Science by distance learning.

For the second and third year students, a total of ten students completed the questionnaire were from the University of Hull’s FdSc Chemical Science studying by day-release, 30% (n=3) of students from the second year and 70% (n=7) from the third year. The industries in which the students were employed are shown in Figure 18.
Figure 18: Employers of all students who completed the questionnaire

The current job roles in which the students were employed are shown in Figure 19.

Figure 19: Current job roles of all students who completed the questionnaire
Students were asked for their highest academic qualification prior to starting the course; the conglomerated responses for all students are shown in Figure 20.

![Figure 20: Highest qualification held by students who completed the questionnaire](image)

For first year students, 90% \((n=9)\) held a level 3 qualification, with the remaining 10% \((n=1)\) holding a level 6 qualification. Similarly, 90% \((n=9)\) of all second and third year students held a level 3 qualification, with the remaining 10% \((n=1)\) holding a level 6 qualification.

(All) Question 6. What were your motivations for undertaking this course?

Motivations for taking the course were broken down into two main categories for first year students; employability/career progression \((n=5)\) and to improve chemical knowledge \((n=7)\). Two students cited both of these as their motivations.

For second and third year students, motivations were broken down into five categories: employability/career progression, improved chemical knowledge and a work requirement all cited by one student each. Acquiring a higher education qualification was cited by two students, with more money being the motivation noted by three students.

(All) Question 7. What do you expect to get from this course?

When the first year students were asked what they expect to gain from their course responses were split in to two main categories; increased chemical knowledge highlighted by 90% \((n=9)\) and with the remaining 10% \((n=1)\) stating the expectation of entry on to the BSc course.
The expectations discussed by second and third year students were split into five main categories. Seven students cited that their main expectation was gaining a foundation degree qualification, with the second most common expectation, cited by three students, was that of an increased knowledge of chemistry to help with their job. Improving job prospects, more money and entry to the BSc were all cited once each.

(First year students) Question 8. Do you have any experience of distance learning?
(First year students) Question 9. Has the distance learning delivery mode influenced your decision to enrol?

Only one (10%) student had experienced distance learning before, and this was on the NEBOSH NGC (National Examination Board in Occupational Safety and Health, National General Certificate) course. In terms of whether distance learning influenced their decision to enrol, 50% (n=5) of students stated that it had. 30% (n=3) students stated that their employer was not enthusiastic about releasing them via the day-release program, stating that carrying out a degree via distance learning was their employer’s decision. One student stated that the development of self-motivation was their reason for enrolling on a distance learning program.

(First year students) Question 10. How many hours a week do you expect to be spending on your distance learning course?

Students were mostly agreed upon the amount of time that they believed that they should be spending on distance learning each week, as shown in Figure 21.

Figure 21: Expected number of hours per week to be spent on distance learning
(First year students) Question 10a. Do you anticipate being able to engage with your fellow students and if so, how?

80% (n=8) of students believed that they would be able to engage with their cohort. None believed that they wouldn’t be able to engage. In terms of how, the responses were split into two categories: electronically (forum, email, phone) which was stated five times, and face-to-face engagement, (during study group meetings, at work) was also mentioned by five students.

(First year students) Question 11. What kind of support do you believe would be helpful from your employer?

The most prominent type of support desired by first year students was time, mentioned by 80% (n=8), as shown in Figure 22.

![Figure 22: Type of help desired by students from the employer](image)

During the subsequent interviews students mentioned that they had been provided with time during the working day for study, which showed that this expectation was being delivered on.

(First year students) Question 12. What kind of support do you believe would be helpful from the university?
Nine students responded to this question. As shown in Figure 23 the type of support which received the majority of responses was “More workshops/open days at university” with 50% \( (n=5) \) of the total number of respondents.

![Bar chart showing the type of support desired by students from the university.]

**Figure 23:** Type of help desired by students from the university

(First year students) Question 13. What kind of support do you believe would be helpful from your university tutors?

Only nine students answered the question. 70% \( (n=7) \) of the respondents believed that an increase in contact time would be useful support from university tutors, while 10% \( (n=1) \) believed that better communication tools would be beneficial. 10% \( (n=1) \) believed that the current level of support was adequate.

A set of statements with Likert responses were provided to the students, with the results shown in Table 13. There was an opposing statement at either side of the table, with the Likert Scale asking which statement they agreed with most. \( SA = \) strongly agree, \( A = \) agree, \( N = \) neutral. In this instance, all ten students responded to the questions; from this point the values reported for the Likert questions are percentages.
<table>
<thead>
<tr>
<th></th>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.</td>
<td>Not having regular interaction with other students and staff does not worry me.</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>20.</td>
<td>I am not worried about how I can obtain help during your course.</td>
<td>25</td>
<td>50</td>
<td>25</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>21.</td>
<td>I am confident that I will get sufficient help from my employer.</td>
<td>50</td>
<td>25</td>
<td>25</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>22.</td>
<td>I am confident that I will get sufficient help from my university tutors.</td>
<td>25</td>
<td>75</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>23.</td>
<td>I believe that I can learn the same amount in a distance learning module as in an on-campus module.</td>
<td>25</td>
<td>0</td>
<td>50</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>24.</td>
<td>I believe that I can make the same grade in a distance learning module as in an on-campus module.</td>
<td>0</td>
<td>25</td>
<td>50</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>25.</td>
<td>Distance learning requires significant changes in learning styles by a student.</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>26.</td>
<td>Distance learning saves me time compared to on-campus methods of study.</td>
<td>25</td>
<td>0</td>
<td>50</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>27.</td>
<td>Distance learning works well with my schedule.</td>
<td>25</td>
<td>75</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>28.</td>
<td>Distance learning enables me to study more frequently than on-campus methods.</td>
<td>0</td>
<td>25</td>
<td>75</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>29.</td>
<td>It is easy to contribute to class discussions in a distance learning module.</td>
<td>0</td>
<td>50</td>
<td>25</td>
<td>25</td>
<td>0</td>
</tr>
</tbody>
</table>
(Second and third year students) Question 8. What types of learning have you encountered on your course?

Three students did not respond to this question. One student responded with “presential learning”. It was believed that the student was talking about face-to-face learning, though the term was not frequently discussed in the literature. Due to the course being delivered through traditional academic methods, the usual teaching methods were highlighted by students: lectures, tutorials and teaching labs. Three students were aware of the work-based learning component of their course, with three also aware of being taught through distance learning means. Self-study and group work were also mentioned.

(Second and third year students) Question 9. What types of support have you encountered for your course from your employers?

Only five students responded to the question; 20% (n=2) of the overall number of respondents stated financial support, 20% (n=2) stated time to study, and 10% (n=1) said access to materials and subject experts.

(Second and third year students) Question 10. What types of support have you encountered on your course from the university?

The most frequently encountered types of support are shown in Figure 24.

Figure 24: Types of support encountered from the university

88
(Second and third year students) Question 11. What types of support have you encountered on your course from your university tutors?

Only six students responded to the question; 40% (n=4) of the total number of respondents had encountered academic support, 10% (n=1) had encountered email support, and 10% (n=1) had encountered extra seminars.

(Second and third year students) Question 12. How do you engage with your fellow students?

It appeared that there was confusion relating to what this question was asking for. It was intended to ask “by which methods do you engage with your fellow students?”, whereas students understood the question as “how well do you engage or get on with your fellow students?” The response “well” was noted by 50% (n=5).

The most popular form of engagement was through email, noted by three students, followed by phone or text conversations cited by two students. One-on-one meetings, discussions, and seeing their cohort weekly were cited by one student each.

(Second and third year students) Question 13. Did you feel as though these (distance learning) modules suited your learning style?

70% (n=7), believed that distance learning suited their learning style, 20% (n=2) believed it did not, and 10% (n=1) stated “possibly”.

(Second and third year students) Question 14. Would you prefer paper based or online learning and assessment?

Paper was the most popular format as stated by 60% (n=6) of students, whereas 30% (n=3) preferred online assessment, 10% (n=1) believed either was suitable.

(Second and third year students) Question 15. What types of support did you encounter for distance learning?

Only seven students responded to this question, who stated that they had encountered six types of support, as shown in Figure 25.
Figure 25: Types of support encountered for distance learning

(Second and third year students) Question 16. What type of support do you believe would improve your experience of distance learning?

Only eight students responded to this question. Figure 26 shows the types of support which students believed would improve the distance learning experience.

The most prominent response was more time at work; which was an expectation mentioned by first year students. During the subsequent interviews, students did note
that they were allowed time during the working day, but would have preferred more time at work.

(Second and third year students) Question 17. Would an increase in the amount of distance learning be beneficial for you?

Students were quite negative when asked about an increase in the quantity of distance learning. 90% (n=9) of students believed that having an increase in the amount of distance learning would not benefit them, with the remaining student not answering the question. One respondent cited time constraints for not wanting an increase. It was also noticeable that, through the handwritten nature of the responses, how strongly respondents feel on this issue. One example is “NO!”.

Table 14 show the results obtained for the distance learning related Likert questions for the second and third year students; all ten students responded at this point.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.</td>
<td>In a course with both on-campus and distance learning methodologies, I learn better through the distance learning portion.</td>
<td>10</td>
<td>0</td>
<td>30</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>19.</td>
<td>I prefer distance learning modules to on-campus modules.</td>
<td>0</td>
<td>0</td>
<td>30</td>
<td>10</td>
<td>60</td>
</tr>
<tr>
<td>20.</td>
<td>I believe that I can learn the same amount in a distance learning module as in an on-campus module.</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>21.</td>
<td>I believe that I can make the same grade in a distance learning module as in an on-campus module.</td>
<td>0</td>
<td>0</td>
<td>30</td>
<td>10</td>
<td>60</td>
</tr>
<tr>
<td>22.</td>
<td>I would benefit if there were more distance learning modules.</td>
<td>0</td>
<td>10</td>
<td>30</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>23.</td>
<td>Distance learning requires significant changes in learning styles by a student.</td>
<td>10</td>
<td>80</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>24.</td>
<td>Distance learning saves me time compared to on-campus methods of study.</td>
<td>0</td>
<td>0</td>
<td>40</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>25.</td>
<td>Distance learning works well with my schedule.</td>
<td>0</td>
<td>20</td>
<td>10</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>26.</td>
<td>Distance learning enables me to study more frequently than on-campus methods.</td>
<td>0</td>
<td>10</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>27.</td>
<td>It is easy to contribute to class discussions in a distance learning module.</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>28.</td>
<td>I would like to have more modules taught using the distance learning methodology.</td>
<td>0</td>
<td>0</td>
<td>30</td>
<td>40</td>
<td>30</td>
</tr>
</tbody>
</table>
(First year students) Question 14. Is this your first experience of work-based learning?
Nine students responded to this question. The majority, 70% \((n=7)\), had not undertaken work-based learning previously.

(First year students) Question 15. How many hours a week do you expect to be spending on work-based learning that is applicable to your qualification?
Six students responded to this question. 20% \((n=2)\) expected to be spending between 30 and 39 hours on work-based learning per week, with 10% \((n=1)\) expecting 10 and 19 hours, and 10% \((n=1)\) expecting between 0 and 9 hours. 20% \((n=2)\) respondents were unsure of the number of hours they would be required to work on work-based learning. Three responses obtained were “All of in” and “all of it” (twice); these were uncharacterised due to the uncertainty regarding the response.

(First year students) Question 16. What kind of support do you believe would be helpful from your employer?
It should be noted that for the question 16 and questions 17 and 18 below, several students simply responded with “see question 11, 12 or 13” for the answers. This may show that several students did not believe that different support mechanisms were required for distance learning and work-based learning. In this case, all variations of support related to time were grouped within one category labelled “time”, with the full set of types of support shown in Figure 27.

![Figure 27: Type of help desired by students from the employer](image-url)
(First year students) 17. What kind of support do you believe would be helpful from the university?

Seven students responded to this question. Time was once again a prominent response, stated by 20% (n=2), and was coded as “more contact time”. The full set of results is shown in Figure 28. 10% (n=1) mentioned the possibility of an “Equipment loan if required”; it was unclear whether this meant from the university to aid in work-based learning at the workplace or vice versa. However, it would be sensible to assume that the student means from the university to the employer.

Figure 28: Type of help desired by students from the university

(First year students) Question 18. What kind of support do you believe would be helpful from your university tutors?

The most prominent answer was more workshops or open days at the university; it was not explained how this may assist in work-based learning. “E-bridge”, the University of Hull’s virtual learning environment, was also stated by 20% (n=2) of students; however, no explanation was given as to how the university tutors could support work-based learning through E-bridge. Four students referred back to their answer to question 13. The results are shown in Figure 29.
The first year students who responded to the questionnaire had not undertaken any work-based learning modules so only three students responded; the results shown below are analysed for the entire number of respondents, where \( n=10 \). The results for the Likert-based statements are shown in Table 15.

Table 15: Percentages responses for work-based learning statements for first year students

<table>
<thead>
<tr>
<th></th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>30. Work-based learning requires significant changes in learning styles by a student.</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>31. Work-based learning saves me time compared to on-campus methods of study.</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>32. Work-based learning works well with my schedule.</td>
<td>10</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

(Second and third year students) Question 29. Would you prefer more or less modules delivered via the work-based learning methods that you’ve encountered?

Nine students responded to this question. 70% \((n=7)\) of the total number of respondents would prefer fewer work-based learning modules in their course. Only 10% \((n=1)\)
would prefer more, while another 10% (n=1) believed the current amount to be sufficient.

(Second and third year students) Question 30. How well thought out and planned do you believe the work-based learning module to be?

Figure 30 shows that students were generally very positive about the planning behind work-based learning modules.

![Figure 30: Student perception of planning work-based learning modules](image)

(Second and third year students) Question 31. How has your university supported you in your work-based learning?

This question was intended to mean “in what ways has your university supported...”. Of the eight students who responded to the question, only one student answered as intended, highlighting “By email + face to face if need be”. However, six respondents answered as if the question asked “is your university supporting...” and “how well is your university supporting...”: this elicited responses such as: “Minimal”, “Fairly well” and “Yes”. The responses were summarised and split into three categories as in Figure 31; these were designated “minimal support”, “ample support” and “fair support”, reflecting the students’ responses.
(Second and third year students) Question 32. How has your employer supported you in your work-based learning?

There was some confusion with this question and it was believed the questions were read to mean the following:

- “In what ways has your employer supported...”
- “Is your employer supporting...”
- “How well is your employer supporting...”:

Responses were coded into the categories as shown in question 31. The responses are shown in Figure 32. It is important to note that employers appeared to be providing either minimal support or no support for work-based learning. One student had written “NOT AT ALL!!”
(Second and third year students) Question 33. Do you believe that your employer and the university identified all possible work-based learning opportunities?

The responses to this question were split into university identified and employer identified. Two assumptions were made when categorising responses:

- If a response was “no” for the overall question, this was taken to mean that the student believed both university and employer did not identify all possible work-based learning opportunities.
- If the response was “yes” it is believed that this means both university and employer did identify all possible work-based learning opportunities.

The university was believed to have identified all work-based learning opportunities by 40% ($n=4$) of students, and, only 10% ($n=1$) believed the employer identified all work-based learning opportunities. One student highlighted that the “employer takes no part in this project and I identified the most relevant project myself.”

(Second and third year students) Question 34. How do you believe work-based learning provision could be improved in your course?

There was a poor response rate for this question. The two responses obtained were for “better communication” (specifically through email) and “visit to place of work”.
Table 16 shows the percentages obtained for the work-based learning related Likert questions for the second and third year students respectively. A total of ten students responded to the Likert questions.

Table 16: Percentages for work-based learning statements for second and third year students

<table>
<thead>
<tr>
<th></th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>35. I would benefit if there were more work-based learning modules.</td>
<td>0</td>
<td>10</td>
<td>50</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>36. Work-based learning is advantageous to me.</td>
<td>0</td>
<td>20</td>
<td>50</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>37. Work-based learning requires significant changes in learning styles by a student.</td>
<td>10</td>
<td>80</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>38. Work-based learning saves me time compared to on-campus methods of study.</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>39. I find work-based learning projects integrate well into my every day work.</td>
<td>0</td>
<td>0</td>
<td>30</td>
<td>70</td>
<td>0</td>
</tr>
<tr>
<td>40. I believe that my work-based learning is well supported by my employer.</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>20</td>
<td>70</td>
</tr>
<tr>
<td>41. I believe that my work-based learning is well supported by the university.</td>
<td>10</td>
<td>30</td>
<td>40</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>42. I would like to have more courses taught using the work-based learning methodology.</td>
<td>0</td>
<td>0</td>
<td>30</td>
<td>40</td>
<td>30</td>
</tr>
</tbody>
</table>

6.1.3 Final questionnaires

As discussed in Chapter 5, two questionnaires were delivered to students on the Working Higher foundation degrees, and the Chemical Science foundation degree at the University of Hull. The University of Hull’s FdSc Chemical Science foundation degree was developed with the same structure and philosophy as those developed under the Working Higher project. This section focuses on the results of the first and second time point questionnaires.
6.1.3.1 Time point 1

The following results are from the questionnaires completed by students on the FdSc Polymer Technology at London Metropolitan University (LMU) \((n=12)\), FdSc Chemical Science at Manchester Metropolitan University (MMU) \((n=9)\) and the FdEng Processing Engineering Management \((n=1)\) and FdSc Chemical Science \((n=6)\) at the University of Hull (total \(n=7)\) on science and engineering foundation degrees which include work-based learning. There were a total of 28 responses. The questionnaire can be found in Appendix D.

Question 3. Type of industry

Figure 33 shows the variety of industries in which the students were employed; there was a relationship between the course studied and the industry in which the students were based. For example, the Polymer Technology course had a total of 67\% \((n=8)\) of students questioned from the polymers industry, with 25\% \((n=3)\) in petrochemicals and 8\% \((n=1)\) from medical supplies.

![Figure 33: Employers of foundation degree students](image)

Interestingly, Manchester Metropolitan University’s Chemical Science foundation degree had 33\% \((n=3)\) of respondents stating that they were from the polymers sector. This may have been due to the broad nature of “Chemical Science” which attracts employers and students from many sectors. The polymers sector was the
most highly represented, with 12 respondents from the industry across the three universities.

Question 4. Current job title and role

Job roles were varied and yielded some interesting results as shown in Figure 34. London Metropolitan University in particular proved interesting; 33% \((n=4)\) of respondents on the course were in either managerial \((n=3)\) or director \((n=1)\) positions. Manchester Metropolitan University also had 22% \((n=2)\) of respondents citing their job role as managers. The remaining job roles were the standard STEM roles: technicians, engineers, QC chemists, formulators. One interesting student was enrolled on the FdSc Chemical Science at the University of Hull. The student cited their role as a Human Resources Administrator. This showed that these courses had appeal to different levels and areas within the industries.

![Figure 34: Student job role and title](chart.png)

Question 5. What is your highest academic qualification to date?

Figure 35 shows the highest academic qualification held by students enrolled. Grouping qualifications using the National Qualifications Framework and the Qualifications and Credit Framework, as in Figure 36, showed that the highest level qualification achieved by students was level 3.
Question 6. What are your motivations for undertaking this course?

Based on the questionnaires conducted previously, motivations fell into several distinct categories. These were used as the basis for the coding of the results: improve theoretical knowledge; improve career prospects; access to higher education; work requirement. Figure 37 shows the results obtained:
Question 7. What do you expect to get from this course?

Similarly, questions were coded for the expectations: improve theoretical knowledge; improve career prospects; foundation degree qualification; access to higher education. Results can be found in Figure 38:
Question 9. Did the distance learning delivery mode influence your decision to enrol?

The reasons given here were themed into two categories; flexibility and work-based learning. The flexibility of distance learning was discussed by four students as stated below:

“Can do from work.”

“Wouldn’t want to study full time at the moment (enjoy my job too much) so part time or distance learning were the only feasible options.”

“Flexible time to suit.”

“The format.”

One student stated that “the fact that it is work related and the projects would benefit my workplace + myself made the course very desirable”. Overall, 46% (n=13) students stated that the distance learning mode did influence their decision, with 39% (n=11) stating that it didn’t. The remaining three 11% (n=3) did not know.

Question 10. How many hours a week do you expect to be spending on your distance learning course?

Figure 39 shows the number of hours per week which students expected to be carrying out distance learning.

![Figure 39: Expected number of hours per week on work-based learning](image)

Figure 39: Expected number of hours per week on work-based learning
Question 11. Did you anticipate being able to engage with your fellow students and if so, how?

71% \((n=20)\) of students believed that they would be able to engage, while 18% \((n=5)\) believed that they would not be able to. 7% \((n=2)\) responded that they didn’t know whether they would be able to engage or not. Students were also asked how they anticipated being able to engage with their fellow students. From the pilot study, several categories were noted: practical sessions; email; social media; through the block release sessions; through the day release sessions; no engagement; other engagement. Figure 40 shows the engagement types and frequencies:

![Figure 40: Expected types of engagement](image)

Students believed that they would be primarily engaging with their fellow students during the practical sessions and via email and social media.

Question 12. What kind of support do you believe would be helpful from your employer relating to distance learning?

From the pilot questionnaire there were seven categories of support that students expected from their employer. These results are shown in Figure 41:
Figure 41: Expected types of support from the employer

Question 13. What kind of support do you believe would be helpful from the university relating to distance learning?

Several types of support were identified by the students as being expected from the university, with frequencies shown in Figure 42.

Figure 42: Expected types of support from university
Two students selected other; the comments received were “Fellow peers” and “Materials from student intranet”; neither comment fell into the categories provided.

Question 14. What kind of support do you believe would be helpful from your university tutors relating to distance learning?

Frequencies of responses are shown in Figure 43.

Figure 43: Expected types of support from university tutors

Help with course related issues was the most frequently desired type of support. As anticipated, there were no students who expected no support from the university and none of the respondents indicated additional expectations.

Question 15. Is this your first experience of work-based learning as part of a formal academic qualification?

The majority, 64% \( (n=18) \), had not experienced work-based learning before. A total of 29% \( (n=8) \) have had previous work-based learning experience and were asked to specify where they have previously undertaken work-based learning:

“Currently studying ILM level 5 coaching and mentoring.”

“MEng BA Manufacturing Engineering (company projects).”

“ONC day release.”

“HNC Project Design.”

“NVQ Level 2 Laboratory Operations.”
“NVQ L3 and BTEC both involved some work based activities as part of the qualification.”

The previous work-based learning experience comes from a number of differing levels of qualifications; interestingly, two of the courses were non-STEM specific, with work-based learning undertaken during coaching and mentoring qualifications as well as during project design/project management courses.

Question 16. What do you believe the advantages of work-based learning will be?

Students at London Metropolitan University were not asked to identify advantages and disadvantages, as the questionnaire was slightly altered prior to sending to students at Manchester Metropolitan University and the University of Hull. Themes that arose included:

- Put learning into practice (4)
- Help from experienced, professional colleagues (1)
- Financial (2)
- Improved understanding (1)
- Gaining experience (6)
- Time management skills (2)
- Transferrable skills (1)

The most frequently mentioned advantage was that of gaining experience, with responses such as “at the end of my course I will have gained a qualification and also actual experience in my line of work. Both of which are essential to progressing my career” and “means that you can get more experience”.

The second most frequently discussed theme was that of putting the academic learning in practice in a work environment and, indeed, vice versa:

“*The knowledge and skills you can apply from your studies.*”
“*Will gain relevant experience to help with course topics.*”
“*It allows you to be able to apply subject learning to your working environment and helps to further understanding of learning modules within the course and apply these to everyday tasks.*”
Transferrable skills and time management skills were also mentioned, so the respondents do have awareness of their own personal and professional development combined with the subject and work-based knowledge that they will acquire.

Question 17. What do you believe the disadvantages of work-based learning will be?

- Lack of time (14)
- Narrow focus (1)
- Longer to achieve qualification (2)
- Lack of support (2)

The most common theme from the responses was lack of time. Combining work-based learning with their occupational role they highlighted that time management would be crucial. Two responses showed that students believed they would take longer to qualify, while there was also a concern about the lack of support. One student was concerned that adding too much work-based learning may narrow the focus of the qualification, “leaving the curriculum narrow and lacking in an overall understanding of the subject.” It should be noted that a far wider range of advantages were highlighted by respondents than disadvantages.

Question 18. Please state how many hours per week you expect to be spending on work-based learning that is applicable to your qualification?

Figure 44 shows the number of hours that students expected to spend on work-based learning.

![Figure 44: Expected number of hours per week on work-based learning](image)
Question 19. What types of support do you believe would be helpful from your employer relating to work-based learning?

Figure 45 show the frequencies obtained for desired the types of support for work-based learning from the employer.

![Bar chart showing types of support from employer for work-based learning]

54% \((n=15)\) of respondents believed that time from their employer for their work-based learning would be beneficial. This was noted by the students during the pilot questionnaires. The second most frequently highlighted type of support was help with course related issues, with 47% \((n=13)\) of responses. Interestingly, one student had no expectation from their employer with respect to work-based learning.

Question 20. What types of support do you believe would be helpful from the university relating to work-based learning?

Figure 46 show the frequencies obtained for the desired types of support for work-based learning from the university:
The main type of support students wanted from their university was help with course related issues. One student had no expectation from the university in terms of work-based learning. Three students had other expectations; however, only one explained what they would like: “Appreciation of shift work, sometimes unable to be in work mon-fri 9-5pm.”

Question 21. What types of support do you believe would be helpful from your university tutors relating to work-based learning?

Figure 47 show the frequencies for different types of support from the university tutors:
No student highlighted that they had no expectation from their university tutors.
Three respondents highlighted that they would like other help. “Use of facilities” was the only relevant response, with the other two being “New student” and “From my peers”, which could not be coded. It was not known what these respondents meant by these comments.

Table 17 shows the responses to the Likert questions related to distance learning and work-based learning respectively. A total of 27 students completed the Likert questions. However, the results are analysed as per the total number of students who completed the questionnaire, which was 28, thus the total percentage for each question does not equal 100.
Table 17: Percentage responses for distance learning statements for all students

<table>
<thead>
<tr>
<th></th>
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<th>SA</th>
<th>A</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.</td>
<td>Not having regular interaction with other students and staff does not worry me.</td>
<td>11</td>
<td>32</td>
<td>18</td>
<td>36</td>
<td>0</td>
</tr>
<tr>
<td>23.</td>
<td>I am not worried about how I can obtain help during my course.</td>
<td>14</td>
<td>36</td>
<td>21</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>24.</td>
<td>I am confident that I will get sufficient help from my employer.</td>
<td>42</td>
<td>25</td>
<td>21</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>25.</td>
<td>I am confident that I will get sufficient help from my university tutors.</td>
<td>25</td>
<td>57</td>
<td>11</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>26.</td>
<td>I believe that I can learn the same amount in a distance learning module as in a university-based module.</td>
<td>11</td>
<td>14</td>
<td>46</td>
<td>18</td>
<td>7</td>
</tr>
<tr>
<td>27.</td>
<td>I believe that I can make the same grade in a distance learning module as in a university-based module.</td>
<td>11</td>
<td>32</td>
<td>42</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>28.</td>
<td>Distance learning requires significant changes in learning styles by a student.</td>
<td>25</td>
<td>61</td>
<td>7</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>29.</td>
<td>Distance learning saves me time compared to university-based methods of study.</td>
<td>7</td>
<td>25</td>
<td>36</td>
<td>25</td>
<td>4</td>
</tr>
<tr>
<td>30.</td>
<td>Distance learning works well with my schedule.</td>
<td>18</td>
<td>40</td>
<td>32</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>31.</td>
<td>Distance learning enables me to study more frequently than university-based methods.</td>
<td>14</td>
<td>40</td>
<td>40</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>32.</td>
<td>It is easy to contribute to class discussions in a distance learning module.</td>
<td>4</td>
<td>34</td>
<td>48</td>
<td>0</td>
<td>12</td>
</tr>
</tbody>
</table>
Question 33. Why don’t you believe that you learn the same amount in a distance learning module?

Seven responses were obtained for this question:

“Time spent on working is broken up rather than all at once.”
“Reading and listening.”
“Integration with tutor + students is an integral part of the learning process.”
“Being on campus day in, day out, you will invariably interact with tutors and course material on a more frequent basis.”
“Face to face, response to questions from student is instant. People learn differently, personally I prefer lectures and face to face.”
“Due to work load, life and study split, also lack of tutoring on subjects not previously dealt with.”
“Difficult to balance working lifestyle and course work efficiently.”

The comment regarding integration with tutor and fellow students showed that one student, despite being open to distance learning, believed that it would be more difficult to integrate into a learning community where both their tutors and fellow students would be, and worried that this might affect the learning process. One other student believed that distance learners were disadvantaged due to a lack of frequent interaction with course tutors, and showed an awareness of their personal learning style.

Interestingly, the responses obtained from the students studying at Manchester Metropolitan University were different to those from the other two universities. Manchester Metropolitan University’s students were worried that there may be issues with respect to their work-life balance, which was not mentioned by students from the University of Hull or from London Metropolitan University.
Question 34. Why don’t you believe that you will achieve the same grade in a distance learning module?

Six students responded to this question, their responses were:

“More intense course when at uni.”
“The method of learning.”
“I did.”
“Not having the above.”
“Face to face, response to questions from student is instant. People learn differently, personally I prefer lectures and face to face.”
“Cannot dedicate all of my time to the course due to other commitments and priorities.”

One student highlighted that they believed the course to be more “intense” when studying physically at the university. The comment “not having the above” can be attributed to the student who believed that integration with tutor and students was integral to their learning process. One response was repeated from the previous question, highlighting a preference for face-to-face and more traditional learning methods. As for the previous question, one student explicitly noted that they cannot dedicate “all” of their time to the course; this response was obtained from the student who believed it was difficult to balance their working lifestyle and course effectively.

The Likert style work-based learning questions were answered by $n=24$ respondents, with the remaining four choosing not to answer the question. As for Table 17, the results are analysed as a percentage of the total number of student who completed the questionnaire. The results are shown in Table 18.
Table 18: Percentage responses for work-based learning statements for all students

<table>
<thead>
<tr>
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<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.</td>
<td>Work-based learning requires significant changes in learning styles by a student.</td>
<td>16</td>
<td>52</td>
<td>16</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>36.</td>
<td>Work-based learning saves me time compared to university-based methods of study.</td>
<td>13</td>
<td>24</td>
<td>37</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>37.</td>
<td>Work-based learning works well with my schedule.</td>
<td>8</td>
<td>52</td>
<td>24</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>38.</td>
<td>I believe that I can learn the same amount in a work-based learning module as in a university-based module.</td>
<td>8</td>
<td>32</td>
<td>32</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>39.</td>
<td>I believe that I can make the same grade in a work-based learning module as in a university-based module.</td>
<td>13</td>
<td>24</td>
<td>41</td>
<td>13</td>
<td>8</td>
</tr>
</tbody>
</table>

Question 40. Why don’t you believe that you learn the same amount in a work-based learning module?

Six responses were obtained for this question:

“Because I think work-based allows you to learn more and is much more applicable to my actual job! (A good thing!)”

“Support of questioning person related to work-based learning.”

“With work-based learning, there is an occupational role to always consider and so your efforts are not solely focused.”

“Work is an unpredictable environment, no allocated time to carry out uni work.”

“Due to work load, life and study split, also lack of tutoring on subjects not previously dealt with.”

“Difficult to balance working lifestyle and course work efficiently.”

“Time and workload constraints.”

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The first response was given by a student who agreed with the statement “I do not believe that I could learn the same amount in a work-based learning module as in a university-based module”. The response showed that the student believed work-based learning to be a very effective learning method and allowed the student to learn more. Five comments above showed that students had an awareness of their personal time commitments, stating that this might prove an issue determining how much they can effectively learn from work-based learning activities. There was a worry that there may not be time provided by their employer for them to carry out their work-based learning activities, or that their occupational commitments may hinder their learning activities.

Question 41. Why don’t you believe that you will achieve the same grade in a work-based learning module?

Four students responded to this question. Three students repeated their answers to question 40.

“I think I actually perform better in work-based learning (because I did during my engineering degree). Again - a good thing!”

“Work is an unpredictable environment, no allocated time to carry out uni work.”

“Cannot dedicate all of my time to the course due to other commitments and priorities.”

“Time and workload constraints.”

As above, one student had agreed that they “do not believe they could learn the same amount in a work-based learning module as in a university-based module” but discussed that they believed they can achieve a better grade. Three of the responses were repeated from the previous question.

6.1.3.2 Time point 2

The following results are from the questionnaires undertaken in the second semester, approximately six months after the first year foundation degrees began their courses. The questionnaire can be found in Appendix E. A total of 41 students completed the questionnaire at this time point. The demographic for the students was very similar to that in Section 6.1.3.1, with questionnaires distributed to students at the same universities as previously, on the same degree schemes. Students were also from a
broad variety of industry sectors and were employed in a variety of roles, as noted at the first time point.

Question 5. Please state how many hours per week you spend on distance learning that is applicable to your qualification?

The number of hours students spend on distance learning that is applicable to their qualification was split almost evenly; 49% \((n=20)\) spent between 0 and 9 hours and 51% \((n=21)\) spent between 10 and 19 hours on distance learning per week.

Question 6. What types of support have you received from your employer relating to distance learning? Question 7. Has your employer provided the support you expected of them?

In terms of support received from their employers for distance learning, the results are shown in Figure 48:

Figure 48: Types of support have you received from your employer relating to distance learning

When asked if their employer had provided the types of support expected, 68% \((n=28)\) said yes, 24% \((n=10)\) said no, and 7% \((n=3)\) did not know. This shows that the majority of students’ employers were providing the desired support.

Question 8. What types of support have you received from the university relating to distance learning? Question 9. Has your university provided the support you expected of them?
Types of support received from the university are highlighted in Figure 49:

![Diagram showing types of support](image)

Figure 49: Types of support received from the university relating to distance learning

In terms of whether the university provided the support expected, 78% \( (n=32) \) said yes, 5% \( (n=2) \) said no, with 17% \( (n=7) \) not knowing. In comparison to question 7, there was a ten percentage point increase (from 68% to 78%) in the number of students who believed that the university provided the expected support when compared to the employer.

Question 10. What types of support have you received from your university tutors relating to distance learning?  Question 11. Have your university tutors provided the support you expected of them?
Types of support received from the university tutors are shown in Figure 50:

When asked whether the tutors had provided the support expected, 85% \((n=35)\) said yes, 12% \((n=5)\) said no, with 2.4% \((n=1)\) not answering the question.

When comparing the employer, university and university tutors in terms of support; in each case the majority of students believed that they have provided the expected support. However, comparing responses to the last three questions, fewer students believed that employers were providing the expected support when compared to either the university or the tutors.

Question 12. Please state how many hours per week you spend on work-based learning that is applicable to your qualification?

It should be noted that the questionnaire informed the students to complete questions 12 to 18 only if they had carried out work-based learning during their course.
The number of hours students spent on work-based learning per week is shown in Figure 51.

![Figure 51: Number of hours spent on work-based learning per week](image)

35 of the 41 respondents obtained answered this question. Interestingly, 3% \((n=1)\) and 9% \((n=3)\) of the respondent set of 41 students spent between 20 and 29, and 30 and 39 hours on work-based learning respectively. This may show that four students believed that the majority, or all, of their work activities fall under the remit of work-based learning.

Question 13. What types of support have you received from your employer relating to work-based learning?  Question 14. Has your employer provided the support you expected of them?

Types of support received for work-based learning from the employer are shown in Figure 52:
Of the 34 students who responded when asked whether the employers had provided the support expected, 62% \((n=21)\) said yes, 29% \((n=10)\) said no, with 9% \((n=3)\) not knowing.

Question 15. What types of support have you received from the university relating to work-based learning?  
Question 16. Has your university provided the support you expected of them?

Types of support received for work-based learning from the university are shown in Figure 53:
34 students responded when asked whether the university had provided the support expected, 85% \((n=29)\) said yes, 6% \((n=2)\) said no, with 9% \((n=3)\) not knowing. Question 17. What types of support have you received from your university tutors relating to work-based learning? Question 18. Have your university tutors provided the support you expected of them?

Types of support received for work-based learning from the university tutors are shown in Figure 54:

![Figure 54: Types of support received from university tutors for work-based learning](image)

As before, 34 students responded to this question. When asked whether the university tutors had provided the support expected, 88% \((n=30)\) said yes, 6% \((n=2)\) said no, with 3% \((n=1)\) not knowing, 3% \((n=1)\) did not answer the question.

Similarly to the distance learning questions 6 to 11 it was possible to compare the students’ perception of whether they had received the expected types of support related to their work-based learning activities. The majority of students believed that their employers, university and university tutors had provided the support that they had expected. However, as for the support for distance learning, it was notable that fewer students perceived that employers were providing the expected support when compared to the university or the tutors.
6.2 Student interviews

In addition to the student questionnaires a short interview was developed, as outlined in Section 5.4.3. The interview script focused on work-based learning aspects of the students’ courses, primarily the activities they had undertaken and whether these had had an impact on work processes, as well as students’ perceptions of work-based learning in general. The interview script can be found in Appendix K.

The interview data for the students, industry champions, course developers and industrial supervisors is reported in this chapter through the themes which arose, the themes are reported as a bullet point list. The list comprises of the theme on the left hand side, with the number of respondents who discussed the theme in brackets to the right. The total n for each theme cannot be more than the total number of respondents for each interview, although the total n for each question can be higher than this value as respondents’ answers may fall under more than one theme.

A total of 20 students were interviewed; the demographic for the student interviews was very similar to that of the student questionnaires. Students worked for a variety of industries and ranged from technician and chemist level to managerial level.

Question 3. Are you studying through distance learning or day-release?
The majority, 80% (n=16) of students interviewed were studying through distance learning, with 20% (n=4) studying through day-release.

Question 4. What were your motivations for enrolling on this course?

- Get a degree (2)
- Improve career prospects (4)
- Improve subject knowledge (5)
- Opportunity was offered to student (2)
- Personal development (1)

Question 5. Please describe any work-based learning that you’ve done during your course.

- Accreditation of prior learning (1)
- Belief that all course learning is work-based learning (7)
- Work-based project (Business improvement, health and safety) (7)
- Work-based project (scientific) (8)
- Work-related project (literature based) (4)
Eight students had carried out scientific work-based projects, with seven having carried out a business improvement, non-scientific work-based project and four noting a literature-based project. There was a theme noted by seven students, who shared a belief that their course learning, their lectures, their learning in their laboratory sessions were work-based learning.

Question 6. Have you used anything you’ve learned on your course in your work environment? Have you implemented it into how you work?

- Knowledge has been helpful (7)
- No (10)
- Yes (7)

Interestingly, the main theme which arose was that students had not used any learning in their work environment at the time of interview. However, seven students (35%) had used their learning in their work environment and believed that the knowledge had proved helpful, which shows that there has been valid learning through the work-based activities.

Question 7. How has the work-based learning that you’ve done impacted positively or negatively on your work?

- Impact on students’ understanding (12)
- Mixed (1)
- Negatively (5)
- No impact (4)
- Positively (11)

Two themes arose which showed that the students were very positive regarding the impact of their work-based learning. Students highlighted that the work-based learning had impacted on their understanding of their work processes, and that it had had a positive impact on their work.

Only five students believed that the impact was negative. This was primarily due to workload and time issues:

“Erm... negatively I’d say, at work we got, we don’t have enough time for like, it’s hard to get everything done.”
"Time. It does tend to eat away at your time quite a lot, [...] my manager’s flexible to an extent and he’s very understanding in what we’re doing, but at the same I have to be quite apologetic to him because I’ve had to take quite a bit of time out of some days...”

Four students believed that there had been no impact at this point; all four students noted that the work-based activities had not had any negative impact, but were unsure on whether it had truly had a positive impact.

Question 8. Have you used anything you’ve done at work to fulfil any of your course requirements?
- No (9)
- Unsure (1)

Question 9. How has your supervisor or employer supported your work-based learning?
- Financial (4)
- Independent learner (1)
- Mentor (8)
- No mentor (7)
- No Support (2)
- Paid for additional support (3)
- Staff giving help with course content and projects (6)
- Time during the working day (10)
- Time off when required (2)
- Training week (1)

The interviewed students discussed a variety of types of support provided by their supervisors or employers. The most common type of support was that of the student being allowed time during the work day to carry out their course learning. The second most frequently discussed type of support was that of mentorship, with eight students having been provided with a mentor. However, seven had not been provided with a mentor. Two students highlighted that they had been given no support by their supervisor, which was worrying. A lack of support from employers was also noted during the questionnaires.

Question 10. Was this support adequate? Would you have preferred more or less?
• Adequate/about right/good (12)
• Employer needs to be more understanding (of workload, time, etc) (1)
• More (6)
• More support from university (3)

The majority of students believed that the support from their employers had been adequate; a view that was mirrored the results obtained from the questionnaire data where the majority believed that the employer had provided the necessary support.

Question 11. Are you and your supervisor pleased with the work-based learning provision provided by your university?

• Little more direction (2)
• No (2)
• Yes (17)

Question 12. Did the work-based learning help to make the course more relevant to what you do at work; did it help you better understand what you were doing at work?

• No – irrelevant to job (1)
• Yes (3)
• Yes – greater understanding or appreciation (13)
• Yes – putting theory into practice (8)
• Yes – real world scenarios (1)

As noted in question 7 where students assessed impact in terms of their understanding and appreciation of work processes, a similar theme arose for this question. Overall, the majority of students were hugely positive about the impact of work-based learning in terms of making their course relevant to their job role.

“Yea definitely, I think I understand that the process that I haven’t been, because we’ve got a manufacturing, we do lots of different processes and I’ve been involved in my role in some of the ones we’ve been having specific problems with, erm, and some other areas that I will work on in the future that I’ve not had to be involved in, but it’s nice now that I have been acknowledged so when the time comes I will certainly feel, because there’s people who’ve been working here a long, long time who understand it
better than me so coming in quite new it’s good that I now have the confidence that I do understand the basics of the process, and I can you know, converse with them properly.”

“Yeah definitely, because I have been able to erm, look at the real-world scenarios erm, and it’s not all just theory based, you know, I can go to work and try and look at things and apply things in real life definitely.”

Question 13. Were the outcomes of your work-based learning beneficial to your employer?

- Might be, in the future (1)
- No (2)
- Slightly (1)
- Unsure (2)
- Yes (14)

In question 7, where students were asked whether their work-based learning had impacted on their work the students believed that it had impacted positively, as well as impacting on their understanding. Question 13 was linked to question 7, and shows that the students believed that the outcomes were equally positive for their employer.

“Yea because as I understand more about what I’m doing then the customers on the sites will appreciate that and then obviously that’ll probably get back to them, it’s all, I wouldn’t say word of mouth but we get a reputation for being a good company, if there’s a person that ruins it, I’m just glad it’s not me.”

“I’d say so yes, because I think that they now can realise that there are people that do have the knowledge and skills and so on if things do start to become a bit, erm, difficult for them they can ask other people to come into different areas and they know you’re at a level where you can pick up the work, and although you might not fully understand you’ve a good knowledge so that they can be carrying on at a later date.”
Question 14. Do you believe there will be any long-term impact for yourself and your employer from this work-based learning?

- No (3)
- Yes (14)

The above two questions show that the majority of students believed that their activities had provided a positive impact for their employers, as well as sharing a belief that there will be a long term impact for themselves and their employer.

Question 15. Did you encounter any problems with the work-based learning that you’ve done so far?

- Course progresses slowly (2)
- Different learning style (1)
- Difficulty self-motivating (1)
- Employer not giving sufficient help (1)
- Encouraging colleagues to help (1)
- Miscommunication from university (2)
- No problems (9)
- Not learning for a number of years (2)
- Take note of people’s learning level (2)
- Workload issues (2)

A large proportion of students had not encountered any issues. Those that had encountered issues indicated miscommunication from the university, workload issues and that the students had not learned for a number of years. A number of themes were individually related to the student themselves; that work-based learning was a different learning style to those encountered previously and that they had difficulty being self-motivated. One student mentioned that their employer had not provided sufficient help, and one student also mentioned that they were not able to encourage their colleagues to assist in their activities. It should be noted that none of the issues discussed were directly due to the content of the work-based activities.

Question 16. What is your opinion of the work-based learning and work-based activities compared to more traditional taught modules and activities?

- Can work and learn (1)
• More motivation for work-based learning activities (6)
• Needs to be a balance (2)
• Putting theory into practice is hugely beneficial (9)
• Regular methods, not putting theory into practice (4)
• Should be more work-based learning (1)
• Work-based learning activities split up the learning (4)
• Work-based learning benefits your employer (1)
• Work-based learning difficult if employers don’t support (1)
• Work-based learning makes you think more, onus on self (3)
• Work-based learning more structured, easy to follow, easy to get help (1)
• Work-based learning not as good a use of time as regular methods (1)

There were a large number of themes which arose when students were asked for their perception of work-based learning compared to traditional learning activities. The most frequent theme was that putting theory into practice was hugely beneficial with four students specifically stating that traditional teaching methods do not allow for the application of theory in a work environment. One student believed that full-time students were thus disadvantaged due to not being able to apply their learning. The next highest response was from students stating that they had more motivation to carry out work-based learning, as it was more relevant to their day-to-day role. Four students noted that work-based learning activities “split up” the learning, providing new and fresh activities which interested the students.

In terms of negative perceptions, in an earlier response one student noted that work-based learning was difficult if the employer did not provide sufficient help, and this was mirrored here by one respondent. Another student believed that work-based learning was not as good a use of their time as regular teaching methods; this student carried out a work-based project which would have been carried out as part of their work duties, regardless of enrolment on the course. There was a perception held by this student that the activity was not beneficial, as it was not aligned to their learning, nor something different from their work role.

Question 17. How would you judge that you’ve succeeded in your work-based learning activities?

• Benefits to company (1)
• Grades (8)
• Noticeable improvement during appraisal (1)
• Personal development, improved competencies (4)

In terms of their work-based activities, the majority of students believed that grades were the best method to judge their success. The next highest theme was that of their personal development.

6.3 Industry champion interviews

The following section focuses on the results obtained from the series of three interviews undertaken by industry champions.

6.3.1 Industry champion interview 1

Results below are shown by restating the question, followed by the themes that arose, with the number of responses for each shown in brackets. The interview script can be found in Appendix F.

Question 1. What do you understand by the term work-based learning?

When industry champions were asked about their understanding of work-based learning it was clear that they were coming from an actively-practicing perspective as opposed to from a theoretical or academic point of view. There were a variety of themes that emerged when coding the transcripts:

• Academic content from external sources (1)
• On the job (6)
• Practical application of theoretical concepts (4)
• Understanding work requirements (1)
• Vocational Context (2)

Each of the six industry champions believed that work-based learning has some aspects of “on the job” activities. From their experiences and understanding they believed work-based learning to be learning that is carried out actively within a workplace, as well as applying subject knowledge to practical application. Industry champions also noted that work-based learning involved a focus on the practical applications of theoretical concepts; this itself builds upon the “on the job” aspect.

Question 3. From your perspective, what benefits are there are for sending a student on a course containing work-based learning?
The main theme that developed from this question was that of the application of learning to a real project; this builds upon the idea of practical application of theoretical concepts. One industry champion believed that this can thus lead to the development of the employee in terms of subject and specialised knowledge as well as transferable skills, focusing on the added value for the employer and employee.

The theme “right behaviours/professional competencies” was discussed by one industry champion. This industry champion believed that work-based learning provided an experiential, hands-on learning, in a specific environment and with their colleagues.

Question 4. What are the advantages to the employer of work-based learning?

- Business improvements (2)
- Easier to encourage students to undertake a work-based learning course (1)
- Employer input into foundation degree (1)
- Individual performance improvement (3)
- No loss of student through day release (3)
- Relevance to employer (2)

Alongside an improvement in individual performance, the most frequently discussed advantage to employers was that of the learning taking place within the workplace, allowing their employee to remain on-the-job whilst working toward their academic qualification. Both topics were discussed by three champions.

One industry champion discussed how the employees conduct their work-based learning activities within the workplace environment, and are thus available for other tasks. Three industry champions highlighted that increasing the productivity of the workforce was a vital aspect of work-based learning, believing it allowed for the development of a more productive member of staff. Improvements to the performance and motivation of staff can lead to business improvements, as mentioned by two industry champions.

Question 5. What are the disadvantages to the employer of work-based learning?

Industry champions were less in agreement on the disadvantages of work-based learning, citing a number of reasons that are themed below:
• Course costs (2)
• Don’t understand the foundation degree (1)
• More demanding to employers (3)
• Not fully aware of curriculum (1)
• Onus to develop relevant work-based learning (1)
• Taught irrelevant material (1)
• Time required for study (1)
• Too much work-based learning (1)

Two disadvantages appeared to be reiterated by the industry champions; time and resources. One industry champion expressed concern that their staff may be taught inappropriate and irrelevant material that did not apply to the business requirements and goals.

Question 6. Why do you think work-based learning can be relevant to students based in the STEM industries?
• Can see theory put into practice (4)
• Increased job satisfaction (1)
• Reinvigorated, more marketable (1)
• Relevant to all industries (1)
• Up to date theory and practice (1)
• Utilising hot topics (1)

Question 7. How could work-based learning provision be improved through higher education for STEM subjects?
• Connection between university and employer (3)
• Establish good course (1)
• Keeping up to date with hot topics (2)

Question 8. Do you believe that crediting students for previous attainment and work should provide some weighting toward the final qualification?
• No (1)
• Yes (5)

Question 9a. What issues do you believe may arise during course development for employers?
• Gathering interest (1)
• Not understanding the qualification (3)
• Not understanding the future need (1)
• Talking a different language (1)
• Time and resources (1)

Question 9b. What issues do you believe may arise during course development for course developers?
  • Different schedule; shift from academic timetable (1)
  • Shift from traditional academic content (2)
  • Understanding employers’ needs (3)

The main concern that industry champions believed would be most prevalent for course developers in the university was that of understanding employers’ needs. Two industry champions believed that the adoption of work-based learning may be too different from traditional academic methods currently used within the universities.

Question 9c. What issues do you believe may arise during course development for industry champions?
  • Designing modular content (1)
  • Enabling discussions between university and employers (2)
  • Gaining employers’ interests (3)
  • Managing employers’ expectations (1)
  • Understanding and distilling employers needs (2)

Question 9d. What issues do you believe may arise during course development for the employees/prospective students?
  • Gathering students’ interest (3)
  • Making course and modules student-relevant (1)

Question 10a. What issues do you believe may arise during the implementation of the foundation degree for employers?
  • Changing work priorities (1)
  • Commitment to sending students (1)
  • Continuous input (2)
  • Marketing strategy (1)
Question 10b. What issues do you believe may arise during the implementation of the foundation degree for course developers?

- Accreditation of prior learning or work-based learning (1)
- Changing work priorities for the employer (1)
- Lack of students (1)
- Marketing the qualification (1)
- Struggle to understand employers (1)

Question 10c. What issues do you believe may arise during the implementation of the foundation degree for employees/students?

- Distance learning (1)
- Insufficient evidence that qualification can deliver to gain interest (1)
- Lack of interaction (1)
- Learning opportunities available in current job role (1)
- National coverage, consistency of experience (1)
- Student availability (1)
- Travel (1)
- Will not affect students (1)

One industry champion believed that there may be a lack of case studies or qualitative and quantitative evidence relating to the course, and that this may hinder interest and commitment from employers.

Question 11a. What issues do you believe may arise following graduation from the foundation degree for employers?

- Does it deliver on employers’ needs? (2)
- Not understanding the qualification (1)
- Unable to reward newly qualified staff member (1)

The most prominent response was that of questioning whether or not the course delivers on the outcomes expected by industry. This appeared to be quite an important issue; having a low quality course that does not deliver on the learning outcomes or on the proficiency outcomes expected by the employer, may see student numbers drop following course evaluation by employers.
Question 11b. What issues do you believe may arise following graduation from the foundation degree for HEIs?

- Franchising (1)
- Need feedback for validation of quality (2)
- Retention of students (1)

The issue of course evaluation, as noted in the previous question, was important for both employers (to evaluate whether sending more students on the course is worthwhile) and universities to ensure that the course was set at the right level, with students learning and benefitting.

Question 11c. What issues do you believe may arise following graduation from the foundation degree for students/employees?

- Does not deliver (1)
- Not recognised qualification (1)
- Opportunities for professional recognition (1)
- Opportunity to continue to BSc (3)
- Reward (1)
- To stay or not with the employer (1)

In the first theme listed above the industry champion showed a concern that the foundation degree may not deliver on any initial promises, and that the employer may be dissatisfied in the students’ progress and development.

Industry champions believed that the opportunity to do a further qualification may prove to be an issue for several reasons; the employer may not being able to commit funding for a second qualification:

"... they may have been, appetites wetted where they want more, they want to go on to BSc courses and their employer may say “Oh sorry, can’t, no we, you’ve got to deliver the investment we’ve both made, we’ll consider that next year”, so the, sort of re-motivated they may want more immediately and that’s not always going to be doable."

Another issue highlighted by one industry champions was that of the student being unsure of what their progression route from the foundation degree should be;
another industry champion thought that the student may not be able to commit to another course due to a number of considerations:

“I think for them it will be this question of do they go on to do another course of study and how easy will that be for them, how long will it take, how well will it be structured, what exactly is the progression mechanism and again how much will it cost all of those things.”

Question 12. Who might be best to arbitrate in remedying any problems that may occur between the HEI and employer?

- Employers and universities together (3)
- Industry champions to facilitate (4)
- Sector Skills Councils (3)
- UK Physical Sciences Centre (2)

Question 13a. What benefits do you believe will arise from qualifying employees through the foundation degree for their employer?

- Business improvements (2)
- Improved industry competitiveness (1)
- Increase in competence (2)
- Motivation (2)
- Progression from apprenticeships (1)
- Recognition of skills (1)

Question 13b. What benefits do you believe will arise from qualifying employees through the foundation degree for the industry as a whole?

- Common learning across industry (1)
- Increased competitiveness (2)
- More flexible approach to learning (1)
- More highly skilled employees (5)

Five industry champions believed that there would be a benefit of having employees who are more highly skilled than previously. This theme was important and can be related back to the Leitch Review of Skills as there will be more staff trained to level 4.¹
Question 14a. What benefits do you believe will arise for the employee upon completion of this course in terms of subject knowledge of relevance to the employment?

- Benefits employers’ goals and objectives (2)
- Greater job satisfaction (1)
- Improved career prospects (3)
- Increased chemical and practical knowledge (5)

Question 14b. What benefits do you believe will arise for the employee upon completion of this course in terms of transferable skills?

- Apply learning to workplace (1)
- Better interaction with work environment (1)
- Communication skills (2)
- Confidence (2)
- Increased employability (2)
- Team working (1)

Question 15. What do you believe the current attitude toward the foundation degree is within industry?

- Varies (1)
- More open to vocational training (1)
- Negative (4)
- Not really knowledgeable (2)

No industry champion specified that there was a positive view of foundation degrees in industry and it must be noted that five industry champions believed the current view of foundation degrees to be negative:

“I would say if you talked to people about foundation degrees they just view it as a diluted down degree, or you know, HNC-type qualification under a different name. I think it’s a lack of understanding, that’s all.”

This could show that a significant level of marketing is required in the future, informing all industries of the nature of foundation degrees.
Question 16. How do you think that the Working Higher project will further enhance industries’ attitudes toward foundation degrees?

- Involving industry in development (6)
- Meeting future needs (1)
- Noticeably increase skills of workforce (1)
- Understanding what an foundation degree is (1)
- Use of industry champions a good idea (1)
- Will raise the profile (3)

Industry champions believed that involving industry in the development of the Working Higher foundation degrees would improve the attitudes of industry. Half of the industry champions believed that the Working Higher project would raise the profile of foundation degrees with industry.

Question 17. Who do you believe should take responsibility for assessment of student’s work completed at the University?

At this stage industry champions had not had much interaction with academia in terms of the rules and regulations. It was hoped that asking questions relating to the responsibility of assessment of work-based and academic work would raise some interesting points. Responses fell within the following themes:

- Partnership between university and employer (3)
- Students (1)
- University (4)

The most prevalent response, by four industry champions, was that the university assesses the work undertaken at university, with two industry champions aware that assessment falls under the remit of the university. Three champions agreed that there was the potential for a joint initiative between both university and the employer, while no industry champion believed that work undertaken at university should be assessed solely by employers.

Question 18. Who do you believe should take responsibility for assessment of student’s work completed within the workplace?

- Partnership between university and employer (2)
- Employers (4)
Four industry champions stated that the responsibility of assessment should lie with the employers; only two industry champions believed that the responsibility should be with the university and two stated that both could potentially play a role. At this stage of the project, it was noticeable that industry champions had varied experiences of university protocol. However, some industry champions did note that assessment falls under the university’s responsibility; with an understanding that this is to control and monitor the standards of learning to ensure that the academic rigour is maintained. However, some industry champions also believed that workplace activities should be assessed by workplace assessors, supervisors or mentors.

Question 19. How much interaction should there be between HEI and employer to ensure student is progressing well?

- 100% support from university and employer (2)
- Don’t pester employer (1)
- Regularly (4)

Industry champions thought that there should be full support from both university and employer for the student, with regular interaction between the two or three parties to ensure adequate progression. One industry champion believed that interaction should be iterative, depending on a variety of factors that can affect all three parties involved, and should be organised between the stakeholders. Another industry champion highlighted that the process should begin with frequent progress meetings, tapering down to become less frequent as the student becomes more accustomed to their work-life balance.

Question 20. How do you believe students should be encouraged to monitor their personal development throughout the course, both in terms of their academic and work related course material?

- Communication between university and employer (1)
- Employers performance management system (3)
- Evidence gathering (1)
- Feedback to and with mentor (1)
- Self reflection (2)
Question 21. What forms of personal development planning are currently used in industry?

- 360 assessment (1)
- Buddy and mentor scheme (1)
- Personal reflection (1)
- Work-based learning, vocational appraisal done monthly or two monthly (1)
- Yearly or six monthly appraisals, performance management (6)

All of the industry champions highlighted that employers actively performance manage their employees through means of annual or bi-annual appraisals. Industry champions described these appraisals as structured processes which involve the employee and employer discussing the employee’s aspirations and how to meet them.

Question 22. Do you think these could be used to monitor student progress?

- Potentially, but aware it is non-standardised (1)
- Yes (5)

Each industry champion stated that they believed the aforementioned performance management systems could be used to monitor a student’s progress during the foundation degree. One industry champion discussed that there was no standardisation across the personal development schemes, which might prove to be an issue. The employer may have a system currently in place to appraise the progress of employees in education or training.

6.3.2 Industry champion interview 2

The six industry champions who engaged with the first interview agreed to the second interview. Only five interviews were transcribed as the sixth recording was too distorted and unclear for accurate transcribing and was not included in the analysis below. The interview script can be found in Appendix G.

Question 1. Work-based learning, how has your opinion changed, if at all?

- Same (3)
- Changed (2)

Initially, industry champions were quoted from their previous interview, regarding their definition of work-based learning. As expected, there were only two responses or themes for this question. In most cases, the industry champions had had experience
working with training and development during their careers, and therefore, should have
an understanding of work-based learning from an employers’ perspective.

Question 2. Are you happy with the way work-based learning is being implemented
within your sector foundation degree?

- Yes (4)
- No (1)

Four industry champions believed that their sector’s foundation degree would
implement work-based learning well, while one industry champion believed that this
success was directly due to their own input. Another industry champion was very
critical about their strand’s work-based learning and stated that there was nothing novel
being delivered in terms of work-based learning at the university they were working at,
and that the course developer was using the department’s current model. This industry
champion suggested that work-based learning should be used in every module.

Question 3a. What issues have arisen during course development for employers?

- Buy-in, commitment (1)
- Content (1)
- Cost (1)
- Distance learning (1)
- No detailed course development (1)
- Step-on, step-off (1)

No theme was more prominent than any other, with each champion citing a different
issue. This was expected, due to each industry champion working alongside a different
university to develop their sector foundation degree. It could be argued that each issue
discussed shows issues specific to each provider and that it is difficult to generalise
when designing new or novel provision.

One example was the issue of step-on, step-off points, where students were able
to leave the course with a certain number of credits and a distinct qualification. This
could include, for example, finishing the course at the HNC level, or continuing for the
HND qualification; this issue was specific to one provider. For the STEM sector there
were clear points for progression for staff and one of these was following a Higher
National Diploma course. The higher education provider had to tackle this issue,
knowing that potential students may well leave the course at the end of any academic
year, prior to completion of the full foundation degree.
Perhaps surprisingly, “cost” was only cited once as an issue for employers. Only one champion believed this to be an issue, despite the fact it could easily apply across all sectors. One industry champion stated that there had been no detailed course development to date, a symptom of not having hired a designated full-time course developer and a lack of understanding of how academics work.

Question 3b. What issues have arisen during course development for course developers in the HEI?

- Different sized modules (1)
- No detailed work into programme (1)
- Resource - Providing expertise (1)
- Resource - To develop the course (1)

The main issue that industry champions highlighted was that course developers may have issues with resource in terms of having the necessary staff for both the development of the course and providing the expertise during the teaching of the course.

Question 3c. What issues have arisen during course development for you as an industry champion?

- Getting industry's response (1)
- Identifying business need (1)
- Not actively involved with the university (1)
- Not many (1)
- Time spent organising meetings etc (1)

The theme of “not many” issues was due to the confidence of the industry champion and their belief that the course was well matched to the needs of employers. One industry champion believed that not having an active involvement with the university was an issue:

“I haven’t really been that actively involved with the university, it frustrates me, but at the same time, I mean, the reason it frustrates me is that I should have been more actively involved, but I think somewhere I’ve been deliberately left out because of the kind of university link.”
This is quite a serious concern; the industry champions had responsibility for employer engagement and setting up programme specifications. If they were not allowed this opportunity to be involved it is clear that frustrations will occur and employers’ needs may not be met. It was not known why this industry champion believed they were excluded from working with the university.

The themes of “getting responses” and “time spent organising meetings” were received from one champion. They stated that finding out exactly with whom to speak was difficult, and chasing that person or persons and organising meetings also proved difficult. Interestingly, industry champions believed that the course developers would have fewer issues and concerns than both employers and themselves. Does this show more of a vested interest toward the employers and less sympathy with academia?

Question 4. What issues do you believe may arise with your remaining time as an industry champion?

- Commitment from employers (1)
- Project doesn't produce a product (1)
- No clear direction (1)
- Promotion of the course (1)
- Sustainability of the course (1)

Again, there was no theme discussed that was more prominent than any other. This could show that the industry champion role was highly dependent on the sector specialism and the university they were contracted to, as well as the working relationship between industry champion and their course developer at the host institution.

Question 5. What, if anything, has hindered your ability to raise demand among employers?

- Difficulty networking - large number of companies (1)
- Finding the right person to speak with (2)
- Nothing to show employers (1)
- Time (1)
- Too many similar initiatives (1)
- University has no credibility in subject (1)
Two of the above themes related to networking, that of having such a large number of companies to speak with (or having very few or no contacts) and having difficulty finding the right person to speak with. One industry champion stated that the “Operations Manager/Director” or the “Human Resources Manager/Director” were the people to speak with, they were the main decision makers for sending the students on higher education courses or training. One industry champion did not agree that these were always the best people to speak with:

“But I think that is the main thing, is making sure that we speak to the right people, speaking to those at top level isn’t always the way.”

Question 6. What, if anything, has hindered your ability to ensure your sector foundation degree meets industry demand? And do you believe that the needs of industry will be met by your sector foundation degree?

- Commitment from university (2)
- Defining Bioscience (1)
- Defining business skills modules (1)
- Difficult to speak with all employers (1)
- Flexibility to cover supply chain (1)

The only theme given by more than one industry champion was that of commitment from the university, which was quite a large concern. A lack of commitment from the university means employers’ needs were not being listening to, which negates the bespoke foundation degree or employer-facing provision concept.

Question 7. In what ways have industry champions acted as mediators between academia and industry?

- Consultation with industry (1)
- Feeding employer needs back to university (1)
- Helping industry understand the academic side (1)
- No real mediation (1)

Between the industry champions, they all highlighted the important factors associated with employer engagement, primarily the two-way communication pathway between the employers and the academics, being able to articulate industry’s requirements back to academia.
Question 8. Do you believe that your employer engagement work has helped improve industry’s understanding of foundation degrees and if so, how?

- Yes (5)

And how?

- Through improved awareness and understanding of HE and industrial activities, and what HE can do for industry (1)
- Through improved awareness and understanding of foundation degrees (3)

Question 9. How easy has it been to obtain case studies from employers?

- Difficult (2)
- Difficulty is confidentially (3)
- Lot of case studies available (3)
- More guidance required from project management (2)
- Straightforward (2)

Question 10. How do you envisage this material being used in the program and do you believe this will be carried out effectively?

- Business improvement module (1)
- Relation to their work environment (2)
- Unsure until detailed modules are created (1)
- Used in individual modules and topic areas to bolster module content (3)

Three industry champions thought that case study material would be used within individual modules and topic areas with an aim to provide context to the academic subjects. It was believed that this could provide relevance to students’ work environments, showing not only positive and good practice, but also negative aspects.

One industry champion noted that it may benefit the business improvement module somewhat, helping students to identify business improvement projects. All industry champions were in favour of the incorporation of case studies into the course with their inclusion providing a valuable tool in designing sector-specific, context-driven, work-related learning.

Question 11. After learning about academic protocol, who do you believe should assess students’ work completed at the university?

- Partnership between university and employer (3)
University should assess university directed and related work (2)

Question 12. After learning about academic protocol, who do you believe should assess students’ work completed in the workplace?

- Partnership between university and employer (3)
- University (1)

Despite the theme that both the university and employer should be involved with assessment, there was an understanding by industry champions that the final assessment should lie with the university:

“I think the best situation is where the university and employer have got joint involvement in the assessment, and okay at the end of the day the university is making the award, they will have the final say.”

“Well, I think the university does have the responsibility to ensure the kind of academic standard, and therefore the academics clearly need to be involved, but I also do think there’s an opportunity for employers to be involved.”

Question 13. After working with academic leads, who do you believe is best placed to deliver personal development planning to the students?

- Employer (2)
- Joint between university and employer (2)
- Lifelong process (1)
- University (1)

Several industry champions noted that personal development planning is a lifelong process and that employers have established systems; the foundation degree is simply a small part of an individual’s personal development and career development.

If there was the potential for the personal development plan to be assessed then two industry champions argued that there should be a joint approach between the university and the employer. It was apparent that the majority of industry champions believed personal development planning to be part of lifelong learning and is more easily lead by students’ individual employers, with the university helping with the assessment of, or helping to plan alongside the employer.
6.3.3 Industry champion interview 3

This set of interviews concluded the longitudinal study relating to industry champions, with an initial interview at the beginning of their contract, one after 18 months and this final set at the end, after 24 months. The interview script can be found in Appendix H.

It should be noted that industry champion 5 began one month later than industry champions 1-4 but was interviewed at the same time. Additionally, industry champion 6 had terminated their contract in July 2011 and did not take part in this interview time point and, due to a recording error, their interview was not included in the second time point analysis. Industry champion 2 had originally begun their contract working with one course developer who left the university and thus a different course developer was put in charge of the project. This second course developer had a different mindset than the first, and was more open to e-learning and novel pedagogic techniques. Similarly, industry champion 3 had worked with a course developer who left the project and was replaced with a senior lecturer with more experience with work-based learning.

Question 1. For your sector foundation degree, has the work-based learning been designed around sector-specific learning? Have employers been listened to?

- No (1)
- Yes (4)

The majority believed that the work-based learning had been designed around their industry and that employers had been listened to. However, one industry champion did not believe so, adding that the university had developed nothing novel or different to their current courses.

Question 2. What are employers’ attitudes to the work-based approach of the foundation degree?

- Indifferent (1)
- Positive, interest (4)

Overall, from their employer engagement activities, industry champions stated that employers showed a positive interest in work-based learning. Only one industry champion believed that employers were indifferent to work-based learning.

“Yea, so from the employer engagement work, I found employers to be genuinely interested in that approach, because they saw that it
could be a way of er, enhancing the education and skills of their workforce without having to release them for large periods of time.”

“I think they, the feedback has been very positive from employers, with regard to work-based learning, because it means that they don’t have to release these students to college to complete that part of the programme, so the feedback has been very good. Also, the fact that they can work on live projects and they’ve also seen that as benefit, and almost it’s a win-win situation between the student and the company.”

Question 3. From your discussions with employers in your sector, what support do you believe employers are likely to give to their employees with work-based learning?

- Assessment, yes (1)
- Depends on quality of work-based learning (1)
- Mentoring (4)
- Variable amounts (1)

The most frequently discussed type of support was mentoring, with one industry champion noting that every student enrolled on their sector foundation degree had a mentor. This was positive, with employers informed of the importance of mentoring from the point of enrolling a student. When comparing this to the themes which arose during the student interviews, eight students had been provided with a mentor and seven had no mentor.

Question 4. What are the barriers to employers providing support to work-based learners?

- Buy-in from work supervisors (1)
- Financial constraints (1)
- More established work-based learning (1)
- Not understanding the course (1)
- Structured mentoring (2)
- Time constraints (4)
- Uncertainty (1)
Interestingly, there were a total of seven potential barriers highlighted by industry champions, with only two having more than one response. Four industry champions believed that the main barrier to successful support was that of time constraints on the employer, the students’ supervisor, and colleagues.

Question 5. Do you believe there will be a legacy of work-based learning development in your subject area within the university hosting your sector foundation degree?

- Hope so (2)
- No (1)
- Unsure (2)
- Yes (2)

Responses were split for this question: two were positive that there would be a legacy within the universities; the industry champions who believed so had worked with two course developers who maintained an interest in pedagogy and have bought in to the process of providing work-based learning. Two industry champions also hoped so, but only one was negative regarding a legacy.

Question 6. Anything you’d like to add or share on the subject of work-based learning?

- All about building relationships (1)
- University not doing enough (1)
- Universities should share best practice and engage with FE providers (1)
- It’s what industry want and need (1)
- Work-based learning is very important (3)

Three industry champions believed that work-based learning is very important and there was an appreciation for the activities and learning involved, with one specifically stating that work-based learning is what industry want and need.

“Just how important it is to actually incorporate it into the whole programme.”

“Well, I guess it goes back to the fundamental, in many ways I think this is the most important part of the foundation degree.”

“Well, from my experience of delivering vocational qualifications, I think it’s an excellent approach for the [STEM-specialist] sector particularly, erm, because employers don’t like to release their,
their workers from the workplace too much so it provides an advantage to employers from that perspective, but also it gives the student the opportunity to work on real live projects within the workplace, which can provide benefits to both the student and the company.”

One industry champion was critical of higher education’s perception of work-based learning, believing that higher education is not doing enough to promote and design bespoke work-based learning. Additionally, there was a perception from one industry champion that higher education should share their work-based learning best practice with further education colleges, with the aim of providing franchised colleges the best tools and methods to successfully implement work-based learning and activities.

Question 7. Were “work-based learning” and the “bespoke, industry-led development” the focal point of your employer engagement?

- Employers want to see quality product (1)
- No product, difficult to sell (1)
- Sort of (1)
- Yes (4)

Question 8a. Did your sector have, and utilize, an employer reference or employer steering group? If so, were these useful?

- Sort of (1)
- Yes (4)

Question 8b. Did they commit any students?

- No (2)
- Yes (2)

Four industry champions stated that they did use an employer steering group, but looking at responses it was not as simple as that: two industry champions did utilise a group of employers for directly feeding into their curriculum. One industry champion engaged with an advisory council, using them to align the foundation degree with the higher level apprenticeship. Two industry champions believed that their employer reference groups did provide students.
Question 9. Do you believe there will be a legacy of utilizing employer reference groups at the host institutions?

- Cannot answer (1)
- Maybe (1)
- Should do more with employers (1)
- Yes (3)

One industry champion noted that the university had built strong relationships with some employers and this will aid in moving forward with the foundation degree into the future.

Question 10a. In terms of recruiting students for the first academic year of the foundation degree, do you believe the employer engagement was unsuccessful?

- Unsure (1)
- Successful (1)
- Unsuccessful (4)

Question 10b. If not, why not?

- University not serious about course (1)
- No course to show them (2)

When the industry champions began their employer engagement there was no course outline or documents for employers to review, evaluate and potentially commit students to. This was a reiteration of an answer from an earlier question, stating that there was difficulty ensuring employer buy-in when there was no product or visible representation of the course. Part of the issue may be attributed to the timescales of the project. The industry champions were seconded to the project for two years and it was anticipated that there would be a year of course development, with the courses launched after that year. This would have meant that the majority of employer engagement and course development would have taken place perhaps allowing for an easier recruitment of students. The industry champion who believed it was successful stated:

“I think without the employer engagement, we wouldn’t have, obviously, we wouldn’t have had the numbers on the Working Higher foundation degree.”
Question 11. What would you suggest could be done differently to recruit learners to the first year of a new, bespoke course?

- Clearly defined marketing strategy (1)
- Fit programme into progression routes (2)
- More attractive pricing strategy (1)
- Raising the profile of the course (2)
- Show that you’ve listened to employers (1)
- Targeted marketing (2)

Question 12a. Do you believe that the developed foundation degrees having a lasting legacy within your industry sector?

- Hope so (1)
- May do, eventually (1)
- No (1)
- Yes (2)

Question 12b. If not, why not?

- Because of Higher Level Apprenticeships (3)
- Poor awareness of programme and progression route in industry (1)

Industry champions discussed the growing popularity of higher level apprenticeships and they were aware that these could provide a future upskilling opportunity for the sector workforce. One of them believed that the legacy of the Working Higher project and work-based foundation degrees would be through higher level apprenticeships, not the foundation degrees.

Question 13. Is there anything you’d like to add about employer-facing Higher Education?

- All about building relationships (1)
- University needs to be responsive (1)
- Need to learn from this exercise (1)
- Tremendous opportunity (3)

One industry champion highlighted that universities need to be responsive to employers’ needs:
“I think it’s building the relationship with, and ongoing visits to the employers and their learners, as the, so the learners sign up for three years there’s a lot of scope, I think there should be at least one visit a year by somebody from the HEI or from the provider.”

The industry champion above highlighted that there should be at least one face-to-face visit by a representative of the university to the employer at least once a year.

6.4 Course developer interviews

The following section focuses on the results obtained from the two interviews conducted with course developers.

6.4.1 Course developer interview 1

Course developers were interviewed using an interview script similar to that used for the first industry champion interview, as described in Sections 5.5 and 5.6. The interview script can be found in Appendix I.

Question 1. What do you understand by the term work-based learning?

- Authentic assessment (1)
- Learning through medium of work (1)
- Learning within the workplace (2)
- Misunderstood term (1)
- Who controls the agenda (1)
- Work related learning (1)

Course developers discussed work-based learning as learning through the medium of work and learning within the workplace. This can also be work-related learning. One course developer believed work-based learning to be a very misunderstood term, highlighting the term authentic assessment:

“Work based learning is probably, in my opinion, one of the most misunderstood concepts of words going. Because if you look back to the original concept of foundation degrees ten years ago, where the university validated the award at a college. At the time, colleges got the view that what work-based learning was, was students learning at work, it’s not, that’s totally incorrect.”
Question 2. Why do you think work-based learning can be relevant to students based in the STEM industries?

- Combines academic rigour with a foundation for skills development (1)
- Gives student control (1)
- Opportunity for student to apply knowledge in workplace (1)

Similarly to the industry champions, one course developer believed that it was important for students to have the opportunity to apply knowledge back in the workplace.

Question 3. How could work-based learning provision be improved through higher education for STEM subjects?

- Higher education could be better organised (1)
- Tackle employability agenda (1)
- Two way relationship (1)
- Utilising natural relationships (1)
- Working Higher reputation (1)

Question 4. Do you believe that crediting students for previous attainment and work should provide some weighting toward the final qualification?

- Depends (3)
- Yes (2)

One course developer believed that, in theory, accreditation of prior learning or accreditation of prior experiential learning is acceptable in university-validated qualifications, as shown in the quote below:

“The accreditation of prior learning is perfectly acceptable on any qualification, subject to the rules and regulations of any university.”

This was an important point, and it was believed that there was a requirement for quality assurance around this aspect. Another course developer discussed the difficulty of accrediting competencies and work, especially if there was evidence that it had been carried out by the student as part of a team. The developer concluded by stating that accreditation of prior learning and accreditation of prior experiential learning have their place and there are many valuable forms of learning that can be attained in industry:
“And, however, there is no doubt that some experiences within industry are valuable learning tools, it’s a case of how to phrase a module in such a way that it can advantage of that.”

The final point identified the problem the majority of universities may face; mapping across prior learning to learning outcomes within the modules.

Question 5a. What are the advantages to the HEI of work-based learning?

- Dissemination of expertise throughout student cohort (1)
- Engaging employers, real partnership (2)
- Universities needing less resources (1)
- Student centred approach (1)

Question 5b. What are the disadvantages to the HEI of work-based learning?

- Higher risk (1)
- More bureaucratic (1)
- A poor external perception of work-based learning (1)
- Poor management (1)
- Time consuming (1)

Question 6a. What are the advantages to the student of work-based learning?

- Learning relevance to their work (2)
- More motivated (1)

Two course developers believed that having learning that is relevant to the students’ work is a major advantage. This was a view shared by both course developers and industry champions.

Question 6b. What are the disadvantages to the student of work-based learning?

- Difficultly with independent learning (1)
- Miss out on the ‘student experience’ (1)

Question 7a. What benefits do you believe will arise for the employee upon completion of this course? Question 7b. In terms of subject knowledge of relevance to the employment? Question 7c. In terms of transferable skills?

- Employability (2)
- Employee able to apply knowledge to practice (1)
One theme noted was that of employability; in this instance, two course developers believed that the employee or student would be more marketable and employable following their graduation, and subsequently may move on from their current job role as part of their personal career progression. There was an understanding that despite employability being a benefit for the employee, it may not be too appealing for the employer.

Question 8a. What issues do you believe may arise during course development for employers?

- Cost (2)
- The employers will expect too much (1)
- Not meeting every employers’ needs (1)

The final theme of “not meeting every employers’ needs” was related to the gathering of intelligence prior to developing the course. The course developer believed that:

“Another one is that sometimes we find that the intelligence we’ve received from industry is not as thoroughly encompassing as we’d hoped; we only find this out later. We can invite people to steering groups, to represent very large factions and they all come and talk and help you, but the difficulty is you don’t really know how much of what they’re saying is reflected within the middle management level with different locations in a larger industry. So, one of the problems that we’ve come across is that what we then produce, with the employers, to produce something that’s ideal for them, only really fits a number of different places, but not the whole of the country’s industry.”

This theme was more prominent in the second set of course developer interviews, that is not being able to address all the requirements and desires of every individual employer.

Question 8b. What issues do you believe may arise during course development for course developers in the HEI?

- Bureaucracy (2)
- Demonstrating academic rigour (1)
• Fitting everything into one course (1)
• Meeting employers' needs (1)
• Utilising employers' expertise (1)

Bureaucracy was highlighted by two course developers as an issue for universities, with the main issue being the rules and regulations of individual institutions.

Question 8c. What issues do you believe may arise during course development for employees/prospective students?

• Doesn't apply at this stage (1)
• Limited (1)
• Students' needs kept at forefront (1)

9a. What issues do you believe may arise during the implementation of the foundation degree for employers?

• Lack of flexibility (2)
• Having appropriate mentors (1)

Two course developers believed that flexibility in the course delivery may cause two issues for the employer: for example, if their employees were required on-site for an intensive period of work, they may not be able to carry out any coursework and may fall behind.

Question 9b. What issues do you believe may arise during the implementation of the foundation degree for HEIs?

• Ensuring high academic quality (1)
• Having the adequate resources (2)
• Regulations (1)

One course developer discussed issues related to franchising the course in terms of geography, as well as the monitoring and controlling of quality across a range of providers. The same course developer also noted that developing the course itself required resources which they had been given by their host institution, whereas a second developer noted that more specialist modules may require the use of staff from other departments within the university.

Question 9c. What issues do you believe may arise during the implementation of the foundation degree for students/employees?
• Students not designated ample time by their employer, to devote to course (1)

Question 10. Who might be best to arbitrate in remedying any problems that may occur between the HEI and employer?

• Arbitration not a good idea (1)
• Central mediator (1)
• Individual employers (1)
• Unsure (1)

One course developer believed that arbitration wasn’t the correct terminology in the case of this project. No industry champion challenged the use of the word “arbiter”, but it must be noted that mediator was used in lieu of arbiter for interviews which took place following the above discussion. One suggestion that arose was of having a central mediator. It was unsure whom the course developer had in mind for this role.

Question 11. What do you believe the current attitude toward the foundation degree is within industry?

• Foundation degrees becoming more familiar and accepted (1)
• Varies (2)
• Would prefer Higher National Certificate/Diploma approach (1)

The themes which arose for this question were slightly more positive than the themes which arose from the industry champion interviews. One industry champion and two course developers believed that the view from industry was varied; some employers felt positively regarding foundation degrees, and some were negative. Four industry champions believed that the perception of industry was negative, which was not the case for course developers, none of whom believed it was completely negative.

Question 12. What are the current attitudes towards foundation degrees within higher education?

• Gradually improving (2)
• Post-92 - more accepted (1)
• Pre-92 – poor (1)

Question 13. How do you think that the Working Higher project will further enhance both industry’s and higher education’s attitudes toward foundation degrees?

• Hopefully positively (1)
Question 14. Who do you believe should take responsibility for assessment of student’s work completed at the University?

- University should assess (2)

This view was shared by the industry champion, who stated that the university should take responsibility, and have the final say in the assessment. However, three industry champions believed that there was the potential for the university and the employer to share the assessment burden.

Question 15. Who do you believe should take responsibility for assessment of student’s work completed within the workplace?

- Partnership between university and employer (1)
- University should assess (1)
- Unsure on assessing competencies (1)

As for the previous question, course developers believed that students’ work completed at the workplace should be assessed, in-part, by the university.

Question 16. How much interaction should there be between HEI and employer to ensure student is progressing well?

- Successful progression requires strong communication (1)
- The more the better (1)

The first course developer did not quantify an amount of interaction, but did believe that successful progress of the student relies on good communication between the university and the employer.

Question 17. How do you believe students should be encouraged to monitor their personal development throughout the course, both in terms of their academic and work related course material?

- Employer lead personal development planning (1)
- Individualised personal development (1)

There was no unanimous decision on who should take the lead for personal development planning, although two important issues were raised. Within universities, there was an understanding that engagement with personal development planning was low despite it being a requirement that all students have the opportunity to engage with
it, whereas at work, professional and personal development planning was and is part of an encouraged continuous professional development (CPD) process.

6.4.2 Course developer interview 2

This set of interviews was conducted approximately 24 months into the course developers’ contracts. Three of the course developers had not been interviewed previously. Two of the course developers who were interviewed at the first time point (course developers 1 and 2) moved on from the role and thus were replaced. The new course developers were interviewed with a slightly altered interview script, for example, to determine their definition of work-based learning. The interview script can be found in Appendix J.

Question 0. What do you understand by the term work-based learning?

At this point, a quote was chosen from the previous interview outlining the course developer’s original work-based learning definition. This could only be done for course developer 3; as for course developer 4 and 5 as 6 and 7 this was their first interview.

- Application of knowledge in the workplace (2)
- Depends on the phrase (1)
- Relating to workplace (1)
- Spectrum of activities (1)

Two developers believed that work-based learning was the application of knowledge in the workplace alongside reflective practice. A second course developer was responsible for the “depends on the phrase” theme, “relating to the workplace” and “spectrum” comments. The comment below was made in relation to how work-based learning definitions change alongside the phrase used, for example work-related learning:

“... sometimes it’s work-related learning, and the title of it, erm, work-related to me means it’s probably not at work but related to work, know what I mean, so I think work-based learning the way it sounds to me as a definition is that it’s learning done in the workplace.”

Question 1. How has your opinion changed, if at all?
There were a number of discussions when course developers were asked this question, but very few responded outright that their opinion had changed (with a yes or no).

- Continuing learning process in the workplace (1)
- It keeps changing (yes) (1)
- Learning in a job environment; learning on job (1)
- Spectrum of activities (1)

One course developer believed that their definition was constantly changing and it should be noted that a change of definition was not viewed as negative, as the course developer was learning more about the nuances of work-based learning and how to modify and develop learning outcomes, modules and project toward their learners, the employers and for the university itself.

Question 2. How are you going to implement the work-based learning, and how are you going to ensure that it works?

- Alongside a work-placed mentor (1)
- Open-ended work-based project (1)
- Relate learning to their work (1)
- Relevant to learner and employer (1)
- Through further education colleges (1)

As noted previously, each course developer worked within a different institution with their own rules and regulations and each developer had their own understandings and preconceptions of work-based learning. It was not surprising that there were a number of work-based learning methodologies being utilised.

Question 3a. What issues have arisen during course development? For yourself as a course developer?

- Employers wanting a more specialised course (1)
- Having an external academic lead, not from the host university (1)
- Recruiting students (1)
- Course development started too late (1)
- New developer, heard opposing view from industry champion versus what had already been developed (1)
- University not ready for flexible learning (1)
As for the previous question, these responses occurred only once each, perhaps indicating the disparity between universities in terms of their experiences and methods. The comment below was coded within the “employers wanting a more specialised course” theme:

“I think they’re thinking in principle it’s a good idea and then they want to see more and more of the detail, but much of the time I think, they want to apply this to more specialized positions [...] what we’re trying to deliver is a broad-based level of knowledge that we can then build on in the workplace but some employers then start to think that it’s irrelevant to what their staff are doing, so I think that’s quite a challenge.”

This theme of employers wanting a highly specialised course appeared as an issue numerous times throughout this set of interviews.

The theme above of “heard opposing view from industry champion versus what had already been developed” was by a new course developer who had replaced the original developer contracted to the university. The new course developer noted that what was developed was different to what the industry champion believed had been developed. This prompts the recommendation for active two-way communication between course developers, employer engagers and industry, and it was and is equally important that the course developer actively listens to the industry intelligence to ensure that the needs of the employers are being met.

Question 3b. What issues have arisen during course development? For employers?

- Lack of flexibility from university (1)
- Changing language from employer to university (1)
- University structure and rules awkward to an outsider (1)
- Employers unsure of course suitability in terms of content (1)
- Employers wanting a more specialised course (2)

Wanting a more specialised course was an issue for employers, industry champions and the course developers, as they may try to appease individual employers. Additionally, there was an awareness that, to those not embedded within higher education, there might be a lack of understanding of the language used in universities. Allowing the industry champions and employers to aid in producing course documentation may prove
beneficial, but there should be awareness that the language should be that used by the university and academia in general in order to pass validation. This leads on to the next theme, that the “university structure and rules are awkward to an outsider”. The different language and the rigidity of the university’s regulations may make it difficult to produce a bespoke course. Maintaining communication pathways with employers or industry champions may resolve this.

Question 3c. What issues have arisen during course development? For industry champions?

- Impossible to appease all employers’ needs (2)
  - (Employers wanting a more specialised course)
- Needed educating about university processes (1)
- Not understanding why universities take so long to do anything (2)

As for the question above, “impossible to appease all employers’ needs” appears as a theme, albeit slightly different; the general idea is the same:

“... it is impossible to pick up everybody’s [employers’] needs and we just need to be honest up front.”

Question 4. What issues do you believe may arise with your remaining time as a course developer?

- Developing enough materials in time (2)
- Ensuring course is valued by the learners and employers (1)
- No-one developing materials (1)
- Registering students and launching the course (1)
- Timescales (3)

The most frequently discussed issue was that of timescales, specifically not having the time to produce enough materials.

One issue highlighted above was that there was nobody developing materials. The course developer in this instance was the sole individual developing materials as the recruitment of additionally developers had not been completed at the time of the interview.

Question 5a. What, if anything, has hindered your ability to ensure your sector foundation degree meets industry demand?
• Not listening to industry (1)
• Too many specialised roles, not being able to satisfy all requirements (3)
  o (Employers wanting a more specialised course)

As noted earlier, there were issues regarding the specialisation that employers may desire.

Question 5b. And do you believe that the needs of industry will be met by your sector foundation degree?

• Hope so, think so (2)
• No - but does meet gold standard (1)
• Yes (2)

There did appear to be positivity that the needs of employers and respective industries would be met. Two course developers believed that the needs would be met, with two others hoping so, or thinking so. Only one course developer did not believe that the needs of the industry would be met, but did believe that their course had met the Gold Standard, as defined by the Sector Skills Council Cogent.

The two course developers who believed that the needs of industry will be met highlighted a caveat. They believed that they had met the requirements of the industries in terms of the general, broad-base of knowledge required for their disciplines, but they were also acutely aware that they could not, or had not, guaranteed every niche role and requirement will be fulfilled.

Question 6a. What issues relating to work-based learning, do you believe can arise for yourselves?

• How effective the work-based learning is (1)
• Rigorously testing individual student’s level of understanding (1)
• Producing a national programme (institution used to local provision) (1)
• Need to negotiate a support structure with the employer for the student (1)
• Remote course management of franchise colleges (1)

No theme was more prominent than any other. One course developer believed that there may be an issue around how effective their developed work-based learning is:

“I think the one for ourselves there is this question of how effective it is in the companies involved, I mean we can do our best in terms of assignments and in terms of assessing the work that’s been done,
but there’s still a big gray area because at one extreme you don’t know if student has done work themselves and the other extreme is you don’t know how deep, you can’t fully know how deep the level of understanding is from the work that has been submitted.”

Question 6b. What issues relating to work-based learning, do you believe can arise for employers?

- Employers need to understand the relevance behind specific set work (1)
- Time; learning will impinge on the student’s work time (2)
- Time; employer unable to allow student time during working day for their learning activities (2)
- Work-based learning irrelevance to job (1)

The theme of time arose a total of four times, but in two differing contexts: the student’s work-based learning impinging on their job, and the employer not being able to find time for the student to devote to their work-based learning.

Question 6c. What issues relating to work-based learning, do you believe can arise for students?

- Difficulty managing time (1)
- Lack of workplace support (2)
- Time; lack of, learning will impinge on student’s work time (1)
- Students need to negotiate their learning with their employers (1)

It is imperative that employers or the student’s direct supervisor have bought into the whole work-based learning process and are supporting the student. Time was highlighted in two separate themes: course developers believed that the student may have difficulty managing their time and that the student may not have ample time for both their job and study commitments throughout the working day.

Question 7. Do you believe that your employer engagement work has helped improve industry’s understanding of work-based learning and foundation degrees, and if so, how?

- No (1)
- Unsure (1)
- Yes (3)
Three course developers believed that the employer engagement work undertaken had improved the understanding held by employers regarding work-based learning and foundation degrees.

“I think they understand what we’re trying to do erm, you know, again, they want to be able to experience what that’s like by putting learners on the programme, but I think they do understand what it is we’re trying to achieve here and I like to think I’ve spoken to a couple of people that think this is a really good idea for young people leaving school who want an alternative pathway.”

“I think where I have been able to speak to them they have been happy with the approach and the emphasis on work-based learning that’s been good from their point of view.”

Question 8. How do you envisage case studies being used in the program?

- Don’t have any case studies (1)
- Examples of good practice (1)
- For problem solving, later on in course (1)
- Showing a process (1)
- Tie in theory and knowledge (1)
- Unsure how they’ll be used (1)

One course developer intended to use the case studies as both an example of problem solving, and for outlining processes, tying theory and knowledge while also sharing examples of good practice. However, at the point of interview, one developer admitted that they were unsure how case studies would be used.

Question 9. Do you believe employers should be involved in the assessing the students and if so, how?

- No (2)
- Yes (3)

During the first interview only one course developer believed that the employers should be involved with assessment. At this interview point, three course developers believed that employers should be involved. In terms of how the employer could be involved, one course developer highlighted the idea of a “critical friend”:
“What I see perhaps as a better role would be the expert critical friend. The concept that you would ask the employer certain questions and ask you know, well, what was their mark, what their advice was, you know, strengths, weaknesses, opportunities. [...] but we should be thinking “well there are systems there, let’s start using them, let’s use them for feedback”, and if you had a system where you can ask an employer “how did he do in that” or whatever, and then get so and so and so and so and so, so and so and in a week, so and so and so etcetera, etcetera and actually utilize that and feed into the assessment process.”

This is agreed upon by two more course developers. One course developer discussed how the employer could be involved with the formative assessment of students’ work, rather than being involved with the more formal summative assessment.

“I’m not sure they can be involved actually with the assessment process, to great extent, we’ve got formative assessment and summative assessment, formative assessment yes they can be involved in that and they ought to be involved in assessing how the student is developing and so certainly when it comes to project work and the work-based learning element I think they can be more involved in trying to assess and thereby also encourage the students as they go along.”

Question 10. Who do you believe is best placed to deliver personal development planning to the students?

- Employer (1)
- Employer and university (2)
- Student (1)
- Student, employer and university (3)

6.5 Industrial supervisor interviews

This set of interviews was carried out with six industrial supervisors; and took place following a set of three interviews which were used as a pilot. The results of the pilot interview are not shown here. The interview script can be found in Appendix M.
Question 1. Type of industry

- Chemicals (3)
- Gas (1)
- Metal packaging (1)
- Polymers (1)

Question 2. Current job title/ role of student

- Assistant Chemist, Process Support (1)
- Process Support Technician, Process Support (1)
- Product Engineer (1)
- Senior technician, product development (1)
- Technician, Analytical team (1)

Question 3. What’s your working relationship with the student? (e.g. direct supervisor, manager, mentor)

- Manager (5)
- Supervisor (1)

Question 4. What were your motivations for enrolling your employees on this course?

- Always upskilled workers in this way (1)
- Improve knowledge (2)
- Student request – benefit their personal development (2)
- Student’s personal development (3)

The main motivation noted by supervisors was that of developing their employee to personally and professionally, both in terms of transferrable skills and to improve their knowledge, noted by two supervisors. Interestingly, two students had requested a place on the course as part of their personal development.

Question 5. Does your company have a preference for distance learning or day release, and why?

- Distance learning (1)
- No preference (5)

Question 6. Do you feel as though your employee is coping with distance learning?
Question 7. What do you understand by the term work-based learning?

- Combination of study and work-experience (1)
- Learning through work (2)
- Putting learning into practice, designed for particular industry (1)
- Work-based projects, related to learning (1)
- Work-related projects at university (1)

A variety of themes were recorded for supervisors’ understanding of work-based learning; the only theme mentioned more than once was “learning through work” by two supervisors. However, it could be argued that the themes “putting learning into practice” and “work-based projects related to learning” could fall under this category. Through speaking with supervisors, it was believed that they do have an understanding and appreciation of work-based learning and any associated activities.

Question 8. Do you feel as though your employee had coped with their work-based learning?

- Yes (6)

Question 9. Who do you believe should identify work-based learning opportunities?

- Employee (2)
- Employer and employee (3)
- Employer, employee and university (1)

In terms of identifying work-based learning opportunities, the majority of supervisors believed that the onus should be on themselves and their employee, in one case, including the university on the partnership. There was an appreciation that the university should provide guidelines relatively early in the course to allow for any projects to be aligned with learning outcomes and the business objectives.

Question 10. What types of support have you given your employee for their work-based learning?

- Colleagues willing to help (3)
- Financial (1)
- Mentor (3)
• No mentor
  o [Supervision as normal]
• Paid for private tutoring
• Prompts for direction
• Regular meetings
• Time off during the working day when required
• Time off when required

The types of support and the number of different types discussed by supervisors were varied, which was positive. The three most frequently highlighted types of support were those of workplace mentors provided by three supervisors, time off during the work day when required, and that the students’ colleagues were aware of the project and were available to assist as required. There were several types of support noted by supervisors that were anticipated by industry champions, namely financial support, mentoring and time off as and when required. In addition to the formal support types, employers noted that they prompted their students in terms of work-based project ideas and areas of interest, as well as the student having a selection of accessible colleagues who have been prompted to assist if and when required.

Question 11. Has the work-based learning affected your work processes?
• No – part of normal work projects
• Yes – actively helped work processes
• Yes – increase responsibility on students
• Yes – through their personal improvement

Supervisors were mostly optimistic that there had been a positive impact on their work processes, but not simply through process improvement activities. Three supervisors were encouraged in seeing their students’ personal improvement, relating to an increase in confidence and ability, and in one case highlighted above, allowed for an increase in student responsibility over processes. One supervisor was less positive, but did not describe a negative effect; the supervisor noted that the project was not specially designed for the student for the course, but the project was one due to be completed by the student as part of their job role.

Question 12. Do you believe there will be any long-term impact for the business from the work-based learning undertaken?
Depends on project outcome (1)
Yes – due to process improvements (2)
Yes – due to students’ personal development (3)

In terms of long-term impact for the business the same trend was noted as for the previous question; the main positive impact will be realised through the students’ continuous personal improvement and development. Two supervisors believed there would be a long term impact due to process improvements.

Question 13. Would you like more or less work-based learning in the course?
- Current level adequate (4)
- More (2)

From the sample of the industrial supervisors interviewed, not one would prefer to see a reduction in the amount of work-based learning on the course.

Question 14 Are you satisfied with how work-based learning has been organised?
- No - due to miscommunication issue (1)
- Yes (5)

The previous two questions showed that there was a general satisfaction regarding the work-based learning activities undertaken by the students thus far. Five of the six supervisors were pleased with the organisation and four believed that the current level was adequate, with two supervisors wanting more. Only one supervisor was dissatisfied with the organisation of the work-based learning; this was due to a miscommunication on behalf of the university which adversely affected the supervisor’s two students, requiring them to carry out more work when the guidelines were eventually received.

Question 15. What is your opinion of the work-based activities in comparison to regular taught modules and activities?
- Applying your learning is beneficial (4)
- Beneficial looking at different areas, not just specialist subject knowledge (1)
- Both have their place (1)
- Employer benefits hugely from work-based learning (1)
- No comment (1)
- Work-based learning is essential (1)
In terms of supervisors’ perceptions of work-based learning, the main theme which arose was that the application of learning was hugely beneficial, with four highlighting such a benefit.

### 6.6 Work-based learning models

The results obtained by students for the work-based learning activities are shown in Table 19.

**Table 19: Average percentage mark obtained for work-based learning modules**

<table>
<thead>
<tr>
<th>HEI</th>
<th>Module</th>
<th>NQF Level</th>
<th>Percentage mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manchester Metropolitan University</td>
<td>Health and Safety and Function Skills module</td>
<td>Level 4</td>
<td>73%</td>
</tr>
<tr>
<td>University of Hull</td>
<td>Work-based learning module</td>
<td>Level 5</td>
<td>74%</td>
</tr>
<tr>
<td>University of Hull</td>
<td>Work-based project</td>
<td>Level 6</td>
<td>62%</td>
</tr>
<tr>
<td>University of Hull</td>
<td>Business Improvement Techniques module</td>
<td>Level 4</td>
<td>74%</td>
</tr>
</tbody>
</table>

These results show that the students were submitting work at a high level; the standard for the level 4 modules were within the first class classification, and within the 2:1 classification for the Work-based project module which was at level 5.

### 6.7 Summary

This section reported the results from the student questionnaires and interviews, the industry champion and course developer interview themes and, finally, the supervisor interview themes were highlighted. The subsequent chapter will summarise the key themes that emerge from the analysis and will focus on new insight gained into work-based learning and employer engagement.
7.0 Discussion
This chapter summarises the main findings from the research and attempts to answer the four questions identified in Section 4.5:

- What are students’ and supervisors’ perceptions of work-based learning?
- What are the industry champions’ and course developers’ perceptions of work-based learning?
- Which models of work-based learning are effective?
- What are the barriers to facilitating effective work-based learning?

The second two questions allow for the identification of good-practice in terms of work-based learning development. This chapter also expands on the results, to analyse models of work-based learning encountered by students, and to develop a novel matrix that can aid in the visualisation and conceptualisation of work-based learning activities. In this chapter, the students and supervisor results are shown together due to their natural grouping as the consumers of work-based learning. The course developers and industry champions are similarly linked as they can be considered to be the providers of work-based learning.

7.1 How do students and employers perceive work-based learning?
The questionnaires and interviews provided the students’ perceptions of work-based learning, how they implemented their work-based learning activities and whether the work-based learning had had any impact on any work processes.

The students enrolled on the courses were employed in a variety of job roles at different levels within a range of industry sectors. A minority of students had had previous experience of work-based learning, which was gained from a variety of qualifications at different levels on the National Qualifications Framework, as shown in Section 6.1.3.1. Two of the courses were non-STEM specific, with work-based learning undertaken during coaching and mentoring qualifications and project design or project management courses.

In terms of distance learning a small number of students believed that they would not be able to engage with the other students who were enrolled on the course. Why was this? This may show that there may have been a lack of understanding about the programme, or a lack of understanding about distance learning.
Interestingly, when students were asked what types of support for distance learning would be helpful from the university; the most common response was “more workshops/open days at university”. This showed that students, even though they were enrolled on a distance learning course, would prefer more face-to-face interaction.

In terms of their perceptions of work-based learning, students highlighted that there was a huge benefit in putting theory into practice, which was a definition and benefit also provided by the industry champions and course developers; overall, students were positive that work-based learning is beneficial. In terms of work-based projects, students believed it was easier to carry out a project which has relevance to their day-to-day role.

In terms of negative perceptions, one student noted that work-based learning activities and projects can be difficult if the employer does not provide sufficient support, with one student believing work-based learning is not a good use of time, whereas regular taught methods and activities are. Another factor stated was related to the students’ workload:

“I feel the work based learning assignments given to us are often too much and require too many hours work with very little support from both the uni and my employer. They are often quite difficult and hard to gain valuable marks from.”

The quote above suggests a necessity for the course developer to take into consideration that their learner is also an employee who is paid by their employer to do a specific job. Developing lengthy work-based learning assignments may require massive amounts of time and resource from the student which may not be realistic given their work provisions. However, courses within the higher education sector are developed so that 1 credit equates to 10 hours of student work, thus the number of hours per year that each student should be committing to their course related activities and learning is ten times the number of credits; in the case of a foundation degree course, 80 credits per year translates to 800 student hours. Both the student and supervisor should be made aware of this credit to workload ratio and recognise the workload that they are committing to; they should not consider work-based learning to be a less time intensive option than classroom-based or online activity. Initially, a large majority of students believed or expected that a lack of time would be a disadvantage of their work-based learning activities. Once students had encountered work-based learning activities, the
majority of them stated that they spent between 0 and 9 hours per week on work-based learning and that their supervisors provided ample time for these activities. However, a minority of students believed that the work-based learning had impacted negatively due to it taking too much of their time while at work. One student, who was at a management level, noted that, due to their role involving large amounts of off-site work and travel, it was difficult for them to complete the work-based learning activities. This shows that if work-based learning has been developed well, it does not demand too large a portion of the students’ time and allows the student to conduct their work-based learning and their job activities in parallel, although this may be dependent on the student’s level within the company.

On the topic of the number of hours spent on work-based learning, an interesting result was noted from a minority of students who stated that they spend between 20 and 39 hours per week on work-based learning. Does this show that the students believed that the majority or all of their work activities fall under the remit of work-based learning? This might mean that the students believed that they were constantly learning, or it could show that work-based learning was not defined clearly to the students. It may be beneficial to ask these questions as part of any future work around work-based learning for the STEM industries, in particular, to aid accreditation of prior learning opportunities and the identification of STEM-knowledge related work-based projects.

It appeared that several students believed work-based learning to be a time consuming exercise which is completely separate from their actual role, with no attempt made to incorporate both their learning and their work.

“Don't use work-based learning - learned techniques needed as been there three years.”

“Don't see the point in work-based learning, that's for work.”

“Work-based learning is generally a waste of time and doesn't take into account how busy you are at working doing your actual job and daily routines.”

This reiterated a key challenge, described in a 2006 report by Nixon as “Overcoming the language barrier” with the aim to “...establish a shared
understanding of the particular area of focus from both an institution’s and employer’s perspective, irrespective of the terms used”. If the work-based learning activities are negotiated by the student, their supervisor and the academic lead prior to commencement of the learning activities, then this leads to an individualistic approach to both the learning outcomes and business-related outcomes. This may relieve some of the issues highlighted above. In all the work-based learning projects encountered during this research, projects were identified by the student and supervisor, and thus projects with a business case and relevance to the company were carried out and the majority of students and employers were positive about the work-based learning undertaken.

During the first pilot questionnaire several students shared the following perceptions:

“It is useful to have a degree in chemistry but in industry most of the topics taught are not useful in the workplace.”

“In lab classes, the techniques taught are not used in industry because industry strives to be more automated as this is quicker and more cost effective.”

This perceived irrelevance of particular knowledge was also discussed by one industry champion. This linked to a prominent theme which arose from the course developers, that of not being able to make the course too bespoke or specific for particular employers; universities aim to provide a broad foundation of knowledge in a discipline which may result in students perceiving some irrelevance, depending on their job role and associated activities. The majority of students appeared to be very focused on their current job role, and did not appear to place a great emphasis on their broader education and development. This observed direction of the students’ focus may prove useful in marketing the course to prospective students in terms of developing industry-specialist knowledge, to aid them specifically in their current role, or for a career within their particular industry. In terms of reducing this perceived irrelevance, industrial supervisors believed that the identification of opportunities for work-based learning should be a joint effort between themselves and the employee. This allowed for the inclusion of projects which had a strong business case which would benefit the company. Two supervisors believed that the employee alone should identify the
projects, in order to assist in their professional development and independent learning. This view was also shared by one student.

Supervisors believed that work-based learning is learning through work, whereby the student puts theory into practice. Supervisors were positive towards work-based learning activities and believed that the application of the learning to the workplace was beneficial to the student and there were no perceived irrelevancies with the topics being taught or activities undertaken. Supervisors appeared to have the clear perception of learning associated with work-based learning, and they also appeared to be the most content with the courses and the work-based learning activities undertaken by the students. In terms of marketing courses which include significant work-based learning, the industrial supervisors may not prove to be a barrier, although it may be prudent to highlight case studies and good work-based learning practices and projects to ensure significant interest from the supervisors of potential students.

There were a number of types of support provided by employers to their employees, which is very positive. Most students were provided with a mentor; in one case where mentorship was not explicit, the work-based project was a normal work activity so the supervision provided was as the employee would normally received. The second student who did not have a mentor had specifically told their employer that they did not desire mentorship, believing that the course should involve independent learning.

Not every student interviewed had their respective mentor interviewed. One student who was interviewed was not content with the support received from their employer, and as their supervisor was not interviewed there was no supervisor perspective. It was informally observed that this student had a number of colleagues also enrolled on the same course, who were equally poorly supported. Despite all the students offering their supervisors the opportunity to be interviewed, it is possible that only those who had an active interest in continued professional development and pedagogy participated.

7.1.1 Questions raised from students and supervisors results
The discussion of the results for both the student and supervisors raised a number of questions, which could potentially inform future work:

- A number of students believed that they would be spending between 20 and 39 hours per week on work-based learning, does this show that students believed
that most, or all, of their work activities fall under the remit of work-based learning?

- Do students believe that they are constantly learning while working?
- Was work-based learning not defined clearly to the students?
- In terms of distance learning several students believed that they would not be able to engage with their student cohort. Why was this? Does this show that there was a lack of understanding about the programme, or a lack of understanding about distance learning?

### 7.2 Industry champions’ perceptions of work-based learning

Industry champion views of work-based learning have, for the most part, remained the same over the course of their secondment, with their initial ideas reinforced. They believed that work-based learning was the inclusion of learning and activities while “on the job”, which involved the “practical application of theoretical concepts”. According to the industry champions, this application of knowledge was one of the key benefits for enrolling a student on a work-based learning course, while also providing added value for the employer through business improvement and an improvement in the employee’s performance. Through the student and industrial supervisor interviews, it is possible to conclude that these benefits were realised through the work-based learning activities undertaken; the learning and projects did provide benefits to active work processes and improve students’ understanding of the background science behind the processes.

Overall, industry champions were positive about the concept of work-based learning, believing it to be a very important practice, and by the end of their secondment, there was an overall belief that employers would be open to, and positive toward, work-based learning activities.

In terms of course development, in a number of instances there was one course developer tasked with designing the modules, generally in conjunction with their designated industry champion. Industry champions expressed concern that if the developer changed then a new course developer may bring different pre-conceived ideas to the programme. They may focus less on employer engagement and be less open to incorporating employers’ and industry champions’ suggestions in terms of making the course bespoke, instead focusing on the development of traditional learning material. This could occur for example where an HEI ignores the requirement for flexible delivery for the learners, previously identified as a requirement by the industry
champions from their employer engagement. This is another issue that needs addressing; if there is the commitment to developing a course focused on a specific industry’s requirements then it is imperative that the employer engagement feedback is heeded and reactively incorporated. A lack of commitment from the university means employers’ needs may not be listened to, which negates the bespoke foundation degree or employer-facing provision concept. If the course developers ignored any industrial input, the newly developed foundation degree may not differ from any other foundation degree or course marketed toward the same sector. Over the course of the project there was an observed link between the positive perceptions of the course of industry champions, and subsequent benefits it may provide for employers, when there had been no change of course developer or academic lead during the industry champions’ consultancy period. Only two course developers remained the same throughout the project. Even though the population size was small this observation could indicate that, when developing a bespoke course with employer engagement, building a relationship between the employer engager and the course developer proves important in ensuring that the needs of the employer are met. However, it should be noted that in their last interview the majority of industry champions believed that the work-based learning had been designed around sector-specific learning, with employers having been listened to.

In terms of bespoke course development, one industry champion stated that they were unsure whether the needs of industry had been met. If the employer engager was unaware of whether or not the needs of employers would be met, it may be not possible for them to effectively market the programme to any employers they hold discussions with. This can be related to the sustainability of the course. If the needs of employers are not met throughout the students’ time on the course, then it is possible that individual employers may stop enrolling further students onto the course.

The issue most frequently highlighted by industry champions was that the time commitment of the employer would present a barrier to supporting their work-based learners. For the employer there is an additional time cost; the learner may require time for their studies but, additionally, the mentoring role may take up to one day per month, or more, which the employer may consider to be lost productivity. An additional point was raised regarding having a structure in place for mentoring to avoid inactivity on behalf of the mentor. Having an inactive mentor may prove to be not beneficial for students or the employer as a whole. One HEI involved in the Working Higher project
established links with mentors and promoted active mentoring through a residential day for mentors and employees, run by the course developer and the industry champion:

“But I think mentor training is important as well, and this is why [the academic lead] invited them [mentors] into [the HEI] for a mini workshop, as part of that training to make them feel more comfortable with what is being expected of them.”

This activity provides a number of positive outcomes for the university, the employer and the student:

1. Establishes a link between the academic lead and the mentors.
2. Provides a sounding board and initial discussion forum for all stakeholders.
3. Allows the course developer to highlight the importance of work-based learning activities.
4. Provides the opportunity to outline what is expected and when for all three stakeholders. This would allow prior planning on behalf of the student and employer in terms of designing a project and provide a timescale for the start and completion of the project.

In terms of employer engagement, the industry champions discovered that finding out exactly with whom to speak was difficult:

“But I think that is the main thing, is making sure that we speak to the right people, speaking to those at top level isn’t always the way.”

This could be a recommendation to future employer engagers; despite their pre-existing contacts, it may be worth speaking to as many different people at various levels within the company to garner as much buy-in as possible.

One industry champion believed that not having an active involvement with the university was an issue:

“I haven’t really been that actively involved with the university, it frustrates me, but at the same time, I mean, the reason it frustrates me is that I should have been more actively involved, but I think somewhere I’ve been deliberately left out because of the kind of university link.”
This is quite a serious concern; the industry champions had responsibility for employer engagement and setting up programme specifications. If they were not allowed the opportunity to be involved with the university in terms of course development it is clear that frustrations will occur and employers’ needs may not be met.

Interestingly, throughout the three interviews undertaken with industry champions there was a belief that the course developers would have fewer issues and concerns than both employers and themselves. This may show that they have more of a vested interest toward the employers and less sympathy with academia.

7.3 Course developers’ perceptions of work-based learning

Course developers initially believed that work-based learning was learning through the medium of work, learning within the workplace and work-related learning. During the project, course developers developed the belief that work-based learning is the application of knowledge in the workplace. These perceptions matched those of the industry champions in terms of on-the-job learning and the practical application of theoretical concepts. Those course developers who were involved during the whole project believed that their perception and view of work-based learning was continuously changing, incorporating into their worldview both new and different activities.

One course developer believed that a large disadvantage to the HEIs was the perception of work-based learning by those outside of higher education; in particular, the perception that work-based learning was an easier option than learning through traditional teaching methods, and qualifications which included work-based learning were perceived as poorer quality. In terms of improving the perception, the developers thought that a robust demonstration of the academic rigour would ensure that work-based learning is more highly valued in the future. Additionally, academics may be able to provide examples of case studies of good-practice, projects that were both beneficial to the student in terms of their learning and that show employers that such projects can have a strong business case and result in business improvement. This perceived negative perception highlighted by one academic did not arise throughout any further interviews with course developers or industrial champions, nor was this perceived negative stated by any of the industrial supervisors interviewed.

Towards the end of the project there was a recurrent theme emerging from the interviews. This theme was coded as “impossible to appease all employers’ needs”: 

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“... it is impossible to pick up everybody’s [employers’] needs and we just need to be honest up front.”

Course developers believed that it was difficult for the industry champions to convey to the developers the number of different approaches desired by different employers. This was a significant theme which arose throughout the discussions held with industry champions, course developers and students. One recommendation that could arise is to ensure that the industry champions, or future employer engagers, focus on the broader picture for the sector as a whole and not try to be persuaded into making the course too bespoke for individual employers. When developing a bespoke course, it may be possible to create a course for the industry with general subject knowledge but within the industry there are a number of specialised roles, and individualising the course to specific roles, specific employers, or specific niche sub-sectors was and is not viable. Although the courses should provide an adequate amount of transferable subject knowledge, the collaboration with industry should allow for a much higher percentage of industry-relevant content for each bespoke course, but it is not possible to fulfil every niche requirement desired by employers. Course developers did believe that they had fulfilled the general requirements and provided the necessary level of subject-specific knowledge, believing that they had met the needs of industry.

One course developer believed that there may be an issue around how effective their model of work-based learning is:

“I think the one for ourselves there is this question of how effective it is in the companies involved, I mean we can do our best in terms of assignments and in terms of assessing the work that’s been done, but there’s still a big gray area because at one extreme you don’t know if student has done work themselves and the other extreme is you don’t know how deep, you can’t fully know how deep the level of understanding is from the work that has been submitted.”

This may be an issue in terms of the assessment of the work-based learning activities; it may prove difficult to determine the overall level of understanding or level of competency with the techniques learned. Having effective work-based learning activities is vital for the learner, the employer and the HEI for a variety of different reasons: to promote greater understanding and the application of knowledge for the
student; to benefit the employer in terms of greater productivity, greater confidence, a
greater understanding of work processes and a reduction in process variation; and to
provide a real-work example for the work-based learning used at the HEI.

Following graduation, the employee would prove to be more highly skilled and
indeed more marketable to other employers, or equally may seek to progress from their
current role. For the employer this may prove to be an unavoidable consequence of the
student going through the foundation degree, but from an academic perspective this is
an important and positive outcome.

7.3.1 Questions raised from course developers and industry champions results
The discussion around the results obtained from the course developers and industry
champions raised a number of questions which could potentially be used to inform
future work:

- If the employer engager was unaware of whether or not the needs of employers
  would be met, how can they effectively market the programme to employers?
- If the employers’ needs are not met, how can the HEI expect to have yearly
  enrolment onto the foundation degree?
- If the course developers ignored any industrial input, what differentiates the
  newly developed foundation degree from any other foundation degree or course
  marketed toward the same sector?

7.4 Which models of work-based learning are effective?
This section expands on Section 5.11, and focuses on the work-based learning
undertaken by students who had participated in the interviews and completed
questionnaires. The modules described below were at different qualification and skill
levels. Model one discusses the Business Improvement Techniques and Health and
Safety modules which were both at level 4, model two describes the Work-Based
Project module, which was level 5, model three is the Work-Based Learning Module,
which was also at level 4. The modules provided three distinct models of work-based
learning. All three models were encountered by the students who had been interviewed.

The first model of work-based learning aimed to provide a foundation of
industry-specialist, but not subject, knowledge, with a degree of relevance to the STEM
industries as a whole. The first model describes both the learning and assessment
activities for the Business Improvement Technique developed by the University of Hull,
and the Health and Safety module developed by Manchester Metropolitan University.
The knowledge in these modules is industry-specialist, for example, in terms of being taught a number of general business improvement techniques used throughout a variety of industries, or more general health and safety legislation and law. It is possible to provide examples and case studies of business improvement and health and safety in practice in a STEM environment, and in the cases of the modules undertaken by students interviewed, case studies were included in both modules. In this model the students are taught the specialist knowledge relating to the industry, but not STEM-subject knowledge, through either distance learning or traditional learning methods, and the module included a project which involved the application of the specialist knowledge through a live project, with the assessment carried out through a skills-based and work-based portfolio of evidence, or more formal report.

The second model of work-based learning is based on a Work-Based Project module, developed and delivered by the University of Hull, which has an emphasis on the learning taking place within the workplace, developing the students’ practical and transferrable skills as well as their subject knowledge. The project and the learning activities are related to the skills-based learning outcomes of the module, rather than a subject-specific knowledge-based outcome. This model actively involves the student in a practical project that was related to their job role, putting any theory learned into practice. The scope of the work-based project was reached through negotiations held between the tutor, the student and their employer, allowing for the project to be relevant to the student’s job role and the employer’s business requirements. In the case of this module, the focus of the assessment was through the project plan, literature review, and project report with analysis of results, and oral presentation, with the majority of assessment weighting on the final report. The project and report were both STEM-related, work-related and work-based.

Model three was a module in which the students completed a work-related literature-based project. As for model two, the focus of the literature-project was reached through active negotiation between the tutor, the student and their employer, with the project having particular relevance to the students’ workplace and employer’s business requirements. Assessment was through the submission of a literature-based report. This model provided an example of a module through which the curriculum and learning outcomes are customisable to the student and employer.

It is possible to assign the three models above to the definitions provided by Gray\textsuperscript{17} and Seagraves \textit{et al.}\textsuperscript{18}, and the modules can be further broken down to specify
where the learning and where the projects fit, in terms of the definition. Looking at the Business Improvement Technique and Health and Safety modules, the specialist learning can be described as learning for work, whereas the projects from both modules can be considered to be learning at work and learning through work. The Work-Based Project module does not involve a taught element but does include specialist STEM-related skills, and thus the module can be learning at, for and through work. The literature review based module is both learning at and for work.

7.4.1 Implementation and impact

Model one actively guided the students to either implement a business improvement technique, or in the case of one cohort from one university, conduct a Health and Safety project or review. In the business improvement case the student aimed to improve the site-entry processes, which was completed successfully to the satisfaction of the student, supervisor and management and received positive feedback from visitors to the student’s work site. The Health and Safety projects were more varied, for example, one student looked at the company’s waste management processes, whereas another conducted a survey of high-rise working processes at their site. Both business improvement and the health and safety projects were highly regarded by the students and there was a positive outcome in that several students reported that their recommendations were implemented by the Health and Safety Manager, with one student now referred to as “the other health and safety guy”.

Students were positive about the work-based learning involved in model one. They were asked whether they had used any of their learning in their work environment, whether they had implemented their work-based learning into the job. A small majority stated that they had not, although a number of students and supervisors had noted that their theoretical knowledge had increased and that they were noting work improvements through an increased understanding of their subject knowledge. The students observed that the major impact had been on their learning, their understanding of the subject had improved and thus they better understood their work processes and associated equipment. This was very positive, showing that the students were actively learning new knowledge and gaining improved competencies as part of their work-based learning.

For model two, all of the students who had carried out the Work-Based Project described above were quite passive about their project; the majority believed that there had been no impact as a result of their project. However, this was not necessarily a
negative perception as, as for model one, the majority of students stated that there had been an impact on their learning, even if the work-based project had not produced any specific business or process improvements within their company.

For both the work-based projects described in models one and two, a small number of students felt that their time was being stretched and that they did not have enough time for their job responsibilities in combination with their learning activities. One student highlighted how a lack of support combined with a lack of time resulted in their perception of a negative impact.

There was no specific discussion around model three noted throughout the interviews; several of the students interviewed would have completed the literature review, but when asked about work-based learning they had carried out, they discussed the more physical work-based activities.

In terms of the effects of the work-based learning undertaken, all supervisors were positive that there had been, or will be a positive change on their work processes. Three supervisors noted that there was an improvement through the students’ personal development, increased confidence and abilities, allowing the student to take on more responsibility. Equally, in terms of long-term impact for the business, three supervisors believed that there would be an impact due to the students’ personal development, with two highlighting an active change in work processes. Supervisors were more positive than students about work-based learning, and were also much clearer about the benefits that can arise from such learning and activities.

7.4.2 Summary

On the whole, the supervisors and students were pleased with the work-based learning provision provided by the university. The majority of students and supervisors believed that the outcomes of their work-based learning had been beneficial for their business. It can be argued that all three models described above were successful in two ways.

1. The students believed that they had an improved and increased understanding and knowledge of the theory behind their work processes.
2. There were quantifiable benefits for the employer in terms of new, or altered, workplace processes which are directly attributable to the students’ work-based projects.
7.5 What are the barriers to facilitating effective work-based learning?

This section will look at the barriers in determining whether the work-based learning models described above were effective. Effective was defined as the student having successfully achieved the intended learning outcomes, with evidence gathered through the interviews and more quantitatively through the grades achieved. However, due to the learning being work-based, a second aspect was to determine whether the work-based activities had had an impact in the workplace.

Through the interviews, it was determined that both students and their supervisors stated how work-based learning had had a positive effect on both the students’ confidence and knowledge, as well as improving processes. However, what were the barriers to the student learning?

7.5.1 Support for students

Time for study was the most common type of desired support mentioned by students closely followed by help with course related issues. Interesting results were obtained in terms of the perception of whether the stakeholders had provided the necessary support. When asked whether their employer, university, or university tutors had provided sufficient support for work-based learning it was notable that 62% (n=21) of students believed that the employer had, compared with 85% (n=29) for the university and 88% (n=30) for the university tutors. This seems to indicate that employers are the least likely to provide the support expected.

In terms of support from their employer, one student believed that encouraging colleagues to help proved an issue, with colleagues not being as helpful as the student had hoped for. There was one student in particular who was critical about the support from their employer. The student had not had any help from their employer, and even mentioned how they were not allowed to carry out any university work within their work environment. As noted earlier, this student had a number of colleagues based at the same employer who were also enrolled on the course, so there may be more than this one student who received very little or no support.

7.5.2 Perceived challenges of work-based learning

Developing work-based learning for incorporation into an academic qualification will not be without issues. Below is a selection of potential issues that were identified as part of the literature research and were affirmed due to their prominence during the interviews.
Issues for the HEI and course developer:

- Due to the work-based aspects, the quality of student experience differed between workplace establishments. This was due to variables and inputs that were not within the control of the HEI, for example mentoring, students’ colleague participation.
- In some instances, workplace supervisors did not provide the necessary support that the learner required. At this stage it is unknown whether this had impact on course completion and attainment.

Issues for the employer:

- The development of the course to provide both job-specific learning and obtaining a broader science education equips students for employment in another sector or a competitor company.

Issues for the student:

- Work-based learning activities and projects can increase the learner’s workload inside the workplace.
- Not obtaining the desired levels of support from both higher education and employers can pose a problem.

It should be noted that despite the issues above, there was an overall positive attitude towards work-based learning and associated activities.

7.6 Towards a new model for work-based learning

The review of the literature brought together a number of different definitions and perceptions of work-based learning; the results and discussion expanded on these and provided an insight into the perceptions of those front-line users, both students and their supervisors, of work-based learning and associated activities. Additionally, the research provided an insight into course development and proactive employer engagement. Combined, the literature and results informed the development of a novel matrix approach to mapping work-based learning activities. The developed matrix provides a potential method through which mapping of traditional learning activities across to their work-based learning and associated work-based or work-related equivalents can be conducted. The development itself expanded upon the continuum constructed by Williams and Thurairajah, shown in Figure 3 in Section 3.4, to form a matrix with an
additional vertical axis to encompass whether the work-based learning is work-based or university-based, as shown in Figure 55.

This expansion includes:

- A spectrum of student-centred learning, which ranges from transferrable skills to subject-specialist knowledge.
- Employer-centred learning; despite the prefix “employer”, the term is used to imply learning within the learner’s work-environment.
- Teacher-centred learning; this learning is specifically university-based and would, by its nature, be work-related rather than traditional non-work related learning.

In addition, using the learning at, for and through work categories defined in Section 3.0 it is possible to include a spectrum on the matrix to show where each activity resides. Any activity which is teacher-centred, university-based and work-related is arguably learning for work, whereas any employer-centred, work-based activities could be classified as learning at and through work. One facet of the matrix is that it allows for activities to be placed within the matrix to determine the outputs of the specified work-based learning.

The top right hand sector is the most important when considering the development of bespoke work-based learning. This section allows for work-based
projects that are centred on the students’ job role that will provide an understanding or contextualisation of the specialist or scientific knowledge, potentially with a business case. Utilising such a matrix at the beginning allows the course developer to visualise how their work-based learning activities will benefit the student. Examples of pedagogic activities involved at the higher education level include:

1. Lectures.
2. Teaching laboratory sessions.
3. University-centred work-related project.
4. Employer-centred work-based project.
5. Employer-centred work-based project management.
6. Personal Development Planning.

An example of a completed matrix, using the activities above, can be found in Figure 56:

![Work-based learning matrix including activities](image-url)

Figure 56: Work-based learning matrix including activities

This form of mapping exercise may prove useful for course developers, and can be carried out on a more in-depth way. For example, two modules designed under the Working Higher remit include the Health and Safety Executive Module and the Business Improvement Technique modules. Neither of these are specialist science
knowledge and when looked at in terms of the matrix, the work-based elements can be added to the following sections, as depicted in Figure 57:

![Figure 57: Work-based learning matrix with projects and learning types]

This division shows that the learning activities are understandably teacher-centred, taking place either physically at the university or in a virtual learning environment, with a sufficient quantity of work-related learning included. The work-based projects are located within the top two sections of the matrix and can be considered learning at and through work. For a project to be work-based, it has to fall within either of the top two sections and be carried out physically within the student’s workplace. One activity that could be classified as work-based learning is the work-related literature review. Model three included a work-related literature review which was not a work-based project or activity nor was there a taught element; this activity would fall within the bottom right sector. Supervisors believed that they themselves and their employee should identify the work-based activities. Additionally, the majority of assessment related to work-based projects takes place in the top two sectors; this leads to a concept known as authenetic assessment. Authentic assessment involves assessing the students’ performance and understanding of their learning through “worthy intellectual tasks”; this approach emphasises the students being “effective performers with acquired knowledge”. This application of theory into practice in a real-world environment means that work-based learning projects can readily fall under
the remit of authentic assessment. Another variation on the term authentic assessment is sustainable assessment which is discussed by Boud; the concept of sustainable assessment was thought to be the assessment of a learner’s ability to conduct activities associated with the learning that they encounter throughout their lives. A final iteration of the matrix shown in Figure 58 identifies that the top two sectors are where the opportunity to undertake authentic assessment reside, allowing stakeholders the prospect of identifying which activities and projects can be assessed as per their institution’s authentic assessment guidelines. Additionally, Boud’s definition of authentic assessment, described above, may prove useful in terms of helping students’ to identify learning which is informing their personal development and may be incorporated into their personal development planning or lifelong learning activities.

![Work-based learning matrix with identification of authentic assessment](image)

Figure 58: Work-based learning matrix with identification of authentic assessment

In an attempt to simplify the matrix, the student-centred spectrum was removed. This allowed the matrix to be constructed in a secondary format, as shown in Figure 59:
The main alteration to the matrix is the removal of the student-centred spectrum. The transferrable skills and specialist knowledge spectrum remain, but the classifications have been transferred to the employer and teacher-centred spectrum respectively. Teacher-centred activities would constitute the majority, or potentially the entirety, of the specialist knowledge learning activities. However, the transferrable skills are not exclusively learned or honed through the employer-centred activities and thus these activities can be included in the teacher-centred sections.

Both of the matrices may prove a useful tool for course developers in their development of work-based learning. It may provide the following benefits to course developers:

- Provide an opportunity to map the learning activities involved in a pre-existing course with an aim to increasing the amount of work-based learning activities.
- Provide an understanding of where activities and projects will fall with respect to stakeholder roles.
- Help employers and HEI understand in which modules any work-based projects need to be negotiated.
- Identify where it might be beneficial to seek employer input or opportunities for authentic assessment.
In terms of the benefits to students and their workplace mentors, it is believed a completed, mapped matrix may provide the following benefits:

- Help mentors identify whether their project needs relevant specialist knowledge or whether it is transferrable skills based.
- Provide the mentor with a visual representation of which aspects and activities they will need to assist the student with, and which modules and specialist knowledge they should relate to.

**7.7 Summary**

This chapter has brought together the key findings from the research and postulated a novel matrix which may prove useful in mapping activities and learning. In the following chapters the key recommendations that have arisen from this project will be distilled and potential future work that could be carried out will be discussed.
8.0 Conclusions

Although there are many ways to describe and define work-based learning, the definition provided by Seagraves provides three key categories which describe the many models of work-based learning:

“A definition for the higher education level could involve any of the following work-based learning types; learning through work, learning for work and learning at work.”

There appears to be no rigid formula for designing work-based modules or resources, although Merril’s First Principles of Instruction provide a set of guidelines which lay the foundations for successful module development.

1. Learners are engaged in real-work problems.
2. Existing knowledge is activated as a foundation for new knowledge.
3. New knowledge is demonstrated to the learner.
4. New knowledge is applied by the learner.
5. New knowledge is integrated into the learner’s world.

These guidelines should be included within a university’s guidelines for the development of work-based learning courses.

As noted throughout the discussion, the perception of work-based learning obtained from the end users, students and their supervisors, was positive. They believed that work-based learning actively encouraged and aided the students’ learning, in particular the ability to adopt STEM subject theory into the work environment, putting theory into practice, with stakeholders stating that work-based learning provided a positive effect in terms of work-processes and learner confidence in the workplace.

From the outcomes of the research several recommendations for developing effective work-based learning can be put forward. The recommendations provide considerations and potential action points that should be considered when developing a bespoke course which involves work-based learning.

Employer engagement:

- Employer engagers should not focus on the directors and managers only. To assure buy-in, they must speak to many different levels within the company. Commitment can then be won from the senior management, promoted by the
middle, and pushed for by the potential learners. The industrial supervisors interviewed were highly positive about work-based learning and the effect it can have on the business, related processes and students’ knowledge and confidence. This level of staff could be preferentially targeted with case studies of successful projects with strong business cases.

Recommendations for the HEI in the development of employer-facing provision:

- The HEI needs to listen to, and be seen to be listening to employers, and be flexible with employers’ requests; this could mean actively showing employers where their input has had an effect on teaching content and potential work-based learning and associated activities, where their changes have been implemented or considered.

- The HEI should not appear to be risk-averse to employers in terms of implementing e-learning, work-based learning and other non-traditional learning methods.

- HEIs should ensure that employers are able and willing to provide the necessary support for their student or students enrolled on the course.

- Course developers should utilise the newly developed matrix to map across learning activities to develop work-based learning opportunities. The matrix provides an opportunity to develop work-related learning and projects that fall within each sector of the matrix, in particular in the top two sectors where developed projects lead to a negotiated and bespoke student and employer-lead experience. The matrix may allow the easy visualisation of where learning takes place and where work-based projects and work-related tasks fall within the work-based learning spectrum.

- Academics should ensure that work-based projects are aligned to the students’ learning, as well as their job role; they should work alongside the employer and employee to identify work-based projects that align with the learning outcomes of the module. If necessary, employers should be informed at the beginning of the course of the potential areas where projects need to be discussed, so they can construct a business case if required. This could take the form of presenting employers with the completed work-based learning matrix, alongside supporting material related to the module and projects.
• The HEI should develop work-based learning modules with the ability for employers and students to negotiate the learning outcomes and the scope for the project, linking these to a business case if necessary. This may assist in identifying potential authentic assessment opportunities.

Work-based learning:
• Work-based activities must be linked to learning; it must be possible to apply the taught theory to the workplace environment. Work-based activities must provide an opportunity for the student to put the theory into practice with an opportunity to have a real and quantifiable impact on the business.
• The HEI should recognise and identify where opportunities for authentic assessment may arise.
• Case studies are valuable learning tools and should be used whenever possible. They are useful within individual modules and topic areas to bolster work-related content. They can be used to highlight both positive and negative aspects of practice within industries, allowing students to contextualise case studies to their individual industries.
• The student and employers should be allowed and encouraged to negotiate the scope and outcomes for the work-based or work-related project, this provides the opportunity for work-based projects to be linked to the students’ learning as well as a business case for the employer

Supporting work-based learning:
• Work-based learning may be a novel learning vehicle for the student and their employer and thus they both may require a moderate to high level of support from the HEI.
• Employers must recognise the types of support desired by the student, and recognise the demand that this may put on them; they must take an active role in supporting the student and the HEI.
• A “one size fits all” policy for student support should be not adopted, recognising that students are individuals with diverse needs.
• Tripartite agreements should be reached (either formally or informally) between the student, employer and university. This agreement may ensure that the employers provide adequate time for their students, while providing opportunity
to deal with contingencies for themselves to ensure their processes continue without hindrance.

- Regular reviews should be undertaken to ensure that the agreement is being met by all parties.

Assessment of work-based learning:

- Academic rigour should be maintained by the HEI. However, mentors and assessors in industry may play an active role in the assessment of their employee’s work after appropriate training.
- Work-based projects may prove to be worthwhile authentic assessment opportunities.

8.1 Summary

This research showed that work-based learning activities are perceived to be a positive force in providing learning and upskilling to employees, and that the methodology behind designing work-based learning does not point to a “one size fits all” approach. The three work-based models described in Section 7.4 were all successfully implemented and received positively by students and employers. One key feature which links the three modules was the ability for the student and employer to negotiate the scope and outcomes for the work-based or work-related project, which allowed for the project to be linked to the students’ learning as well as a business case for the employer. Overall, work-based learning was perceived as positive in terms of student learning as well as providing benefits to the employer.

How does this answer the question, which models of work-based learning are effective for STEM students? Firstly, when designing work-based activities, the academic must have experience of course development and an interest in pedagogy and the STEM-specialist subject knowledge. The developer must be willing to be flexible, and be both proactive and reactive when designing modules and putting forward ideas for projects. One effective vehicle is shown in models one, two and three; these models were linked through their inclusion of the opportunity for discussions and negotiations between the student and their industrial supervisor. Activities should be planned and disseminated to the student and employer beforehand and supervisors should have the time to plan a business case for the project for their student.

Secondly, models one to three provided another key factor in designing effective work-based learning. Each model allowed the opportunity for the student to implement
their learning to a workplace environment. This fulfilled the understanding held by stakeholders throughout the research process, that work-based learning involves putting theory into practice.

Finally, the employer has a large role to play in the success of the work-based learning activities: providing a mentor; allocating sufficient time and resource for the student to complete the project; making aware colleagues and staff of the student’s project and intention to seek help. Students who had received less support perceived the activities to be more difficult, and struggled more with the workload.

It is the author’s belief that the novel matrix approach could prove instrumental in ensuring the development of effective work-based learning for new employer-facing courses or existing courses within higher education. For those who are involved with course and module development as well as for the students and their employers, the matrix may:

- Provide an opportunity to map the learning activities involved in a pre-existing course with an aim to increasing the amount of work-based learning activities.
- Provide an understanding of where activities and projects will fall with respect to stakeholder roles.
- Help employers and universities understand in which modules any work-based projects need to be negotiated.
- Identify where it might be beneficial to seek employer input or opportunities for authentic assessment.
- Help mentors identify whether their project needs relevant specialist knowledge or whether it is transferrable skills based.
- Provide the mentor with a visual representation of which aspects and activities they will need to assist the student with, and which modules and specialist knowledge they should relate to.

Overall, work-based learning can be considered to be an important addition to any course at any level; school, further education or higher education and there is great potential in devising work-based learning and authentic assessment opportunities for both the existing workforce and for full-time students. The learning and associated activities provide a vehicle through which learning and theory can be translated into a working environment, reinforcing their learning, providing transferable skills and
providing a positive future for employers and employees through their study and as part of their lifelong learning.
9.0 Future work

There is great potential to develop bespoke employer-facing provision which includes high quality work-based learning and authentic assessment. The following section indicates future research which could be carried out to build upon the results from the research discussed in this thesis.

The main focal point for the future work could involve the determination of the effectiveness and true worth of the work-based learning matrix model proposed in the discussion and this should be further investigated. This could be carried out by asking course developers to populate the matrix with activities; mapping across any activities which may prove to be strong examples of work-based learning or identification of authentic assessment opportunities. This could aid in the determination of the proportion of the learning or activities on traditionally taught higher education courses that can be mapped across to the work-based learning portion of the matrix, particularly to the student-centred learning and work-based learning section. This may determine how useful the matrix could be in translating traditional courses to more employer-facing, work-based courses. The matrix may also be advantageous in the mapping and the development of work-based learning during new and bespoke course development. This could be achieved by providing course developers with a set of instructions on how to use the matrix, primarily focusing on using it as an active or live document, with alterations and additions of activities, learning and authentic assessment opportunities included on a new version of the document. This would thus provide a history of matrix documents for analysis, showing the course development process. This would show how often the matrix is used and how it informs course development.

One question arose from the results which could inform the identification of accreditation of prior learning or accreditation of prior experiential learning opportunities and authentic assessment opportunities:

- A number of students believed that they would be spending between 20 and 39 hours per week on distance learning, does this show that students believed that most, or all, of their work activities fall under the remit of work-based learning?

It is possible that this could be determined by asking students the single question posed above. If students do believe that the majority or all of their work can be classified as work-based learning, this would assign a level of responsibility to employers in identifying and negotiating work-based learning and authentic assessment
opportunities, which could then be agreed by the HEI. This could also identify whether opportunities for accreditation of prior experiential learning should be sought. Additionally, a method could be developed to determine how effective authentic assessment may prove for work-based learning.

In terms of impact for the employer, a cost-benefit quantitative study could be developed which utilises tangible ratio, interval data or nominal data, allowing for the determination of:

- What is the true cost of supporting a student through the course?
- How much money did the successful work-based project save the company?
- Has the project resulted in an improvement in value-added time from original process?
- What tangible benefits were noted from this project?

These additional items of research would enable academia to add further value to work-based learning for the benefit of students and their employers.
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Appendix A: Pilot 1: questionnaire

Section 1: Preliminary

1. Department of Study
2. Name of Degree Scheme (e.g. Chemical Sciences, Mechanical Engineering, Plant Engineering etc)
3. What year of the course are you in?
   1 2 3
4. How are you released for your course:
   Day release  Block release  Distance learning  Mixed  Other (please specify)
5. Name of employer’s industry (e.g. Petrochemical, Pharmaceutical, Chemical/Aerospace/Civil Engineering etc)
6. Current job title and role
7. Sex
   Male  Female
8. Age
   18-24  25-29  30-34  35-39  40-44  45-49  50-54  55-59  60-64  65-70  70+

Section 2: Expectations

9. In terms of skills, please list any that you would expect to develop through this course, which would benefit your role within the workplace?

Please answer the following questions depending on your year of study:

Year 1 only:
10. To what extent do you think that the content of taught modules is going to reflect the everyday problems and projects that you face at work?
   Very much  To some extent  Not very much  Not at all  Not applicable
11. To what extent do you expect the laboratory skills developed to reflect those which are required in the workplace?
   Very much  To some extent  Not very much  Not at all  Not applicable
12. To what extent do you expect to be learning through work itself (work-based learning type modules)?
   Very much  To some extent  Not very much  Not at all  Not applicable
13. To what extent do you expect the modules taught to be delivered by “distance learning” methods, or e-learning?
   Very much  To some extent  Not very much  Not at all  Not applicable
Years 2 and 3 only:

14. To what extent do you think that the content of taught modules reflects the everyday problems and projects that you face at work?

- Very much
- To some extent
- Not very much
- Not at all
- Not applicable

15. To what extent do you expect the laboratory skills you’ve gained reflect those required in the workplace?

- Very much
- To some extent
- Not very much
- Not at all
- Not applicable

16. To what extent have you been taught through work itself (work-based learning type modules)?

- Very much
- To some extent
- Not very much
- Not at all
- Not applicable

17. To what extent have modules taught been delivered by distance learning methods, or e-learning?

- Very much
- To some extent
- Not very much
- Not at all
- Not applicable

Section 3: Workload

18. How many hours per week do you spend on:

- Lectures
- Tutorials
- Laboratory classes
- Workshops
- Work-based learning

19. How many hours per week do you spend on non-timetabled, independent study?

20. Do you find the overall workload:

- Too little
- About right
- Too much

21. Would it be more attractive to you if the course was delivered by a distance-learning approach (e.g. e-learning, virtual learning environments, asynchronous/synchronous discussions?) with more independent study?

- Yes
- No
- Don’t know

22. Would you prefer more or less of the following delivery methods:

- Lectures
  - More
  - Same
  - Less
  - Not applicable

- Tutorials
  - More
  - Same
  - Less
  - Not applicable

- Lab classes
  - More
  - Same
  - Less
  - Not applicable

- Workshops
  - More
  - Same
  - Less
  - Not applicable

- Work-based learning
  - More
  - Same
  - Less
  - Not applicable

ccxiv
23. Would you like to add any comments regarding the workload or any of the teaching methods mentioned above?

**Section 4: Types of teaching**

24. In general, how effective at helping you learn do you find the following teaching methods?

<table>
<thead>
<tr>
<th>Method</th>
<th>Very effective</th>
<th>Fairly effective</th>
<th>Not very effective</th>
<th>Ineffective</th>
<th>Not applicable</th>
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</thead>
<tbody>
<tr>
<td>Lectures</td>
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<td>Workshops</td>
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<td>Problem classes</td>
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<td>Lab work</td>
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<td>Independent study</td>
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<tr>
<td>Tutorials</td>
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<td>Work-based learning</td>
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<tr>
<td>e-learning</td>
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<tr>
<td>Group projects</td>
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</table>

25. In general, how enjoyable do you find the following delivery methods?

<table>
<thead>
<tr>
<th>Method</th>
<th>Very enjoyable</th>
<th>Fairly enjoyable</th>
<th>Not very enjoyable</th>
<th>Not enjoyable at all</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work-based learning</td>
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<tr>
<td>Problem classes</td>
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<tr>
<td>e-learning</td>
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</tbody>
</table>
26. Focusing on e-learning, would you prefer more or fewer modules/topics delivered in this way?

More             Same             Less             Not applicable

27. Focusing on work-based learning, would you prefer more or fewer modules delivered in this way?

More             Same             Less             Not applicable

28. Would you like to add any comments regarding the types of teaching mentioned above?

Section 5: Relation of course to current employment

29. Has your employer discussed with you their expectations and expected outcomes from the course?

Yes             No             Don’t know             Not applicable

30. Has your employer discussed with the university their expectations and expected outcomes from the course?

Yes             No             Don’t know             Not applicable

31. How well are the needs of your employer met for the overall objectives for this course?

Very well        Fairly well        Adequately        Poorly        Don’t know        Not applicable

32. How well do you feel that these needs are being met during the course?

Very well        Fairly well        Adequately        Poorly        Don’t know        Not applicable

33. How would you rate the relevance of the course to your current role within your industry?

Very relevant    Fairly relevant    Not very relevant    Irrelevant    Don’t know        Not applicable

ccxvi
34. How would you rate the relevance of the activities in the course to problems that you would encounter in your workplace?

Very relevant  Fairly relevant  Not very relevant  Irrelevant  Don’t know  Not applicable

35. To what extent does the course content help you address problems that are encountered in your workplace?

Very much  To some extent  Not very much  Not at all  Not applicable

36. To what extent do the skills and techniques taught in laboratory classes match the skills required in your workplace?

Very much  To some extent  Not very much  Not at all  Not applicable

37. How often do you find course activities utilise your prior knowledge or experience?

Very much  Much  Some  Not very much  Not applicable

38. In terms of skills (as identified by you in section 2) taught on the course, how often do you have the opportunity to practice any skills in the workplace that have been newly acquired?

a. At university?

Very often  Often  Sometimes  Not very often  Never

b. At work?

Very often  Often  Sometimes  Not very often  Never

39. Are you given credit on your course for prior learning and experience?

NB: Accreditation of Prior Learning (APL) and Accreditation of Prior Experiential Learning (APEL) are means by which previous experience and knowledge acquired by the student is given formal accreditation or academic/university credits toward a recognised qualification.

Yes  No  Don’t know

40. Are you engaged in any personal development planning?

NB: personal development plans (PDP) are processes in which you reflect on your progress and plan for future development.

a. At work?

Yes  No  Not applicable

b. At university?

Yes  No  Not applicable

41. If you answered yes to the above, please specify the means by which the process is being captured: (e.g. e-portfolio)

42. Do you have any additional comments regarding the relationship between your employer/industry and the university/course itself?

43. Please write any further comments you may have below.

Thank you for taking the time to complete the survey.
Appendix B: Pilot 2: questionnaire for first year students

First year questionnaire

1. Department of Study
2. Name of Degree Scheme
3. Name of employer’s industry (e.g. Petrochemical, Pharmaceutical, Chemical/Aerospace/Civil Engineering etc)
4. Current job title and role
5. What is your highest academic qualification?
6. What are your motivations for undertaking this course?
7. What do you expect to get from this course?

Distance learning:

8. Do you have any experience of distance learning?
   o If yes, please specify the subject and level of qualification.
9. Has the distance learning delivery mode influenced your decision to enrol?
   o If so, please explain.
10. How many hours a week do you expect to be spending on your distance learning course?
    o Do you anticipate being able to engage with your fellow students and if so, how?
11. What kind of support do you believe would be helpful from your employer?
12. What kind of support do you believe would be helpful from the university?
13. What kind of support do you believe would be helpful from your university tutors?

Work-based learning:

14. Is this your first experience of work-based learning as part of a formal academic qualification?
15. How many hours a week do you expect to be spending on work-based learning that is applicable to your qualification?
16. What kind of support do you believe would be helpful from your employer?
17. What kind of support do you believe would be helpful from the university?
18. What kind of support do you believe would be helpful from your university tutors?
How much do you agree with the following statements (please place an X in your chosen box):

SA = strongly agree, A = agree, N = neutral.

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<th></th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Not having regular interaction with other students and staff does not worry me.</td>
<td>Not having regular interaction with other students and staff worries me.</td>
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<tr>
<td>2. I am not worried about how I can obtain help during your course.</td>
<td>I am worried about how I can obtain help during your course.</td>
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<td></td>
<td></td>
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<tr>
<td>3. I am confident that I will get sufficient help from my employer.</td>
<td>I do not believe that I will get sufficient help from my employer.</td>
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</tr>
<tr>
<td>4. I am confident that I will get sufficient help from my university tutors.</td>
<td>I do not believe that I will get sufficient help from my university tutors.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5. I believe that I can learn the same amount in a distance learning module as in an on-campus module.</td>
<td>I believe that I cannot learn the same amount in a distance learning module as in an on-campus module.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6. I believe that I can make the same grade in a distance learning module as in an on-campus module.</td>
<td>I do not believe that I can make the same grade in a distance learning module as in an on-campus module.</td>
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</tbody>
</table>

**Advantages of distance learning and work-based learning**

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<th>SA</th>
<th>A</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Distance learning requires significant changes in learning styles by a student.</td>
<td>Distance learning does not require significant changes in learning styles by a student.</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>7. Distance learning saves me time compared to on-campus methods of study.</td>
<td>Distance learning will take me more time than on-campus methods of study.</td>
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<tr>
<td>8. Distance learning works well with my schedule.</td>
<td>Distance learning does not work well with my schedule.</td>
<td></td>
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<tr>
<td>9. Distance learning enables me to study more frequently than</td>
<td>Distance learning does not enable me to study more</td>
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<td></td>
<td>on-campus methods.</td>
<td>frequently than on-campus methods.</td>
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<td>10.</td>
<td>It is easy to contribute to class discussions in a distance learning module.</td>
<td>It is difficult to contribute to class discussions in a distance learning module.</td>
<td></td>
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<th></th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Work-based learning requires significant changes in learning styles by a student.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Work-based learning does not require significant changes in learning styles by a student.</td>
</tr>
<tr>
<td>12. Work-based learning saves me time compared to on-campus methods of study.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Work-based learning will take me more time than on-campus methods of study.</td>
</tr>
<tr>
<td>13. Work-based learning works well with my schedule.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Work-based learning does not work well with my schedule.</td>
</tr>
</tbody>
</table>
Appendix C: Pilot 2: questionnaire for second/third year students

Second and third year questionnaire

1. Department of Study
2. Name of Degree Scheme, what year of the course are you in?
3. Name of employer’s industry (e.g. Petrochemical, Pharmaceutical, Chemical/Aerospace/Civil Engineering etc)
4. Current job title and role
5. What is your highest academic qualification?
6. What are your motivations for undertaking this course?
7. What do you expect to get from this course?

Support

8. What types of learning have you encountered on your course?
9. What types of support have you encountered for your course from your employer?
10. What types of support have you encountered on your course from the university?
11. What types of support have you encountered on your course from your university tutors?
12. How do you engage with your fellow students?

Focusing on the distance learning modules, “Applied Chemistry 1” and “Applied Chemistry 2”:

13. Did you feel as though these modules suited your learning style?
14. Would you prefer paper based or online learning and assessment?
15. What types of support did you encounter for distance learning?
16. What type of support do you believe would improve your experience of distance learning?
17. Would an increase in the amount of distance learning be beneficial for you?

Effectiveness of distance learning:

How much do you agree with the following statements (please place an X in your chosen box):

SA = strongly agree, A = agree, N = neutral.

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<thead>
<tr>
<th></th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>A</th>
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</table>

ccxxi
<table>
<thead>
<tr>
<th></th>
<th>In a course with both on-campus and distance learning methodologies, I learn better through the distance learning portion.</th>
<th>In a course with both on-campus and distance learning methodologies, I do not learn better through the distance learning portion.</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>I prefer distance learning modules to on-campus modules.</td>
<td>I do not prefer distance learning modules to on-campus modules.</td>
</tr>
<tr>
<td>19</td>
<td>I believe that I can learn the same amount in a distance learning module as in an on-campus module.</td>
<td>I believe that I cannot learn the same amount in a distance learning module as in an on-campus module.</td>
</tr>
<tr>
<td>20</td>
<td>I do not believe that I can make the same grade in a distance learning module as in an on-campus module.</td>
<td>I do not believe that I can make the same grade in a distance learning module as in an on-campus module.</td>
</tr>
<tr>
<td>21</td>
<td>I would benefit if there were more distance learning modules.</td>
<td>I would not benefit if there were more distance learning modules.</td>
</tr>
<tr>
<td>22</td>
<td>Distance learning requires significant changes in learning styles by a student.</td>
<td>Distance learning does not require significant changes in learning styles by a student.</td>
</tr>
<tr>
<td>23</td>
<td>Distance learning saves me time compared to on-campus methods of study.</td>
<td>Distance learning does not save me time compared with on-campus methods of study.</td>
</tr>
<tr>
<td>24</td>
<td>Distance learning works well with my schedule.</td>
<td>Distance learning does not work well with my schedule.</td>
</tr>
<tr>
<td>25</td>
<td>Distance learning enables me to study more frequently than on-campus methods.</td>
<td>Distance learning does not enable me to study more frequently than on-campus methods.</td>
</tr>
<tr>
<td>26</td>
<td>It is easy to contribute to class.</td>
<td>It is difficult to contribute to...</td>
</tr>
</tbody>
</table>
discussions in a distance learning module.
class discussions in a distance learning module.

28. I would like to have more modules taught using the distance learning methodology.
I would not like to have more modules taught using the distance learning methodology.

(Third year students only) Focusing on the module “Work-Based Learning”; consider the process of identifying topics for the assignment and the assignment itself:

29. Would you prefer more or less modules delivered via the work-based learning methods that you’ve encountered?
30. How well thought out and planned do you believe work-based learning module to be?
31. How has the university supported you in your work-based learning?
32. How has your employer supported you in your work-based learning?
33. Do you believe that your employer and the university identified all possible work-based learning opportunities?
34. How do you believe work-based learning provision could be improved in your course?

Effectiveness of work-based learning:

SA = strongly agree, A = agree, N = neutral.

<table>
<thead>
<tr>
<th></th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.</td>
<td>I would benefit if there were more work-based learning modules.</td>
<td>I would not benefit if there were more work-based learning modules.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>Work-based learning is advantageous to me.</td>
<td>Work-based learning does not offer any advantages to me.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>Work-based learning requires significant changes in learning styles by a student.</td>
<td>Work-based learning does not require significant changes in learning styles by a student.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>Work-based learning saves me time compared to on-campus methods of study.</td>
<td>Work-based learning does not save me time compared with on-campus methods of study.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>I find work-based learning projects integrate well into my curriculum.</td>
<td>I find the work-based learning projects too dissimilar from my learning style.</td>
<td></td>
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<td></td>
<td>every day work.</td>
<td></td>
<td>every day work.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>40.</td>
<td>I believe that my work-based learning is well supported by my employer.</td>
<td></td>
<td>My work-based learning isn't sufficiently supported by my employer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41.</td>
<td>I believe that my work-based learning is well supported by the university.</td>
<td></td>
<td>My work-based learning isn't sufficiently supported by the university.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>I would like to have more courses taught using the work-based learning methodology.</td>
<td></td>
<td>I would not like to have more courses taught using the work-based learning methodology.</td>
<td></td>
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Appendix D: Final questionnaire: time point 1

**First year questionnaire**

1. Name of university

2. Name of degree scheme

3. Type of employer’s industry (e.g. Petrochemical, Pharmaceutical, Chemical/Aerospace/Civil Engineering etc)

4. Current job title and role

5. What is your highest academic qualification to date? (Please tick only one, your highest)

   - GCSE
   - A-level
   - Scottish Highers
   - BTEC
   - NVQ level 1
   - NVQ level 2
   - NVQ level 3
   - NVQ level 4
   - NVQ level 5
   - ONC
   - HNC
   - HND
   - Bachelors level degree (BSc, BA, BEng etc)
   - Masters level degree (MChem, MPhys, MEng, MSc etc)
   - PhD
   - Other (please specify)

6. What are your motivations for undertaking this course? (Please tick all that apply)

   - Improve theoretical understanding of subject
   - Improve career prospects/employability
   - Access to Higher Education/Continuing education (entry to BSc)
   - Work requirement
   - Other (please specify)

7. What do you expect to get from this course? (Please tick all that apply)

   - Improve theoretical understanding of subject
   - Improve career prospects/employability/career progression
   - Foundation Degree qualification
   - Access to Higher Education/Continuing education (entry to BSc)
   - No expectation
   - Other (please specify)

**Distance learning:**

8. Do you have any experience of distance learning?

   - Yes
   - No
   - Don’t know

   - If yes, please specify the subject and level of qualification.
9. Has the distance learning delivery mode influenced your decision to enrol?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>Don’t know</td>
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</table>

- **If yes**, please explain.

10. How many hours a week do you expect to be spending on your distance learning course?

| 0-9 hours | 10-19 hours | 20-29 hours | 30-39 hours | 40+ hours |

11. Do you anticipate being able to engage with your fellow students and if so, how?

| Yes | No | Don’t know |

- **If yes**, please explain. (Please tick all that apply)

12. What kind of support do you believe would be helpful from your employer relating to distance learning? (Please tick all that apply)

| Time (from work to study, at work to study, for block/day release) | Help with course related problems | Financial (purchasing of books, equipment, course costs) | Mentoring | Regular progress meetings | No expectation | Other (please specify) |

13. What kind of support do you believe would be helpful from the university relating to distance learning? (Please tick all that apply)

| Administration | Face-to-face meetings when facing difficulties | Help with course related problems | Time (Please tick all that apply) | No expectation | Other (please specify) |

14. What kind of support do you believe would be helpful from your university tutors relating to distance learning? (Please tick all that apply)
Face-to-face meetings when facing difficulties
- Help with course related problems
  - Time management
  - No expectation
  - Other (please specify)

Work-based learning:

Work-based learning is widely acknowledged as a vital learning strategy in ongoing and future development of the workforce. The term itself can mean a variety of strategies and approaches to different stakeholders. One definition is: “... [work-based learning is] where students are full time employees whose programme of study is embedded in the workplace and is designed to meet the learning needs of the employers and the aims of the organisation.” (Sobiechowska and Maisch, 2006)

This means, that on top of the underpinning knowledge of the chosen subject, study can be embedded around the workplace activities, providing learning opportunity and projects in the workplace itself; “putting knowledge into practice”.

15. Will this be your first experience of work-based learning as part of a formal academic qualification?

- Yes
- No
- Don’t know
  - If no, please specify the subject and level of qualification.

For question 16 and 17, consider the advantages and disadvantages of work-based learning. Please list and discuss all those that come to mind. Please do not leave these questions blank.

16. What do you believe the advantages of work-based learning will be?

17. What do you believe the disadvantages of work-based learning will be?

18. Please state how many hours per week you expect to be spending on work-based learning that is applicable to your qualification?

- 0-9 hours
- 10-19 hours
- 20-29 hours
- 30-39 hours
- 40+ hours

19. What types of support do you believe would be helpful from your employer relating to work-based learning? (Please tick all that apply)

- Time (from work to study, at work to study, for block/day release)
- Help with course related problems
  - Financial (purchasing of books, equipment, course costs)
- Mentoring
- Regular progress meetings
- No expectation
- Other (please specify)

20. What types of support do you believe would be helpful from the university relating to work-based learning? (Please tick all that apply)
21. What types of support do you believe would be helpful from your university tutors relating to work-based learning?

- Face-to-face meetings when facing difficulties
- Help with course related problems
- Time management
- Financial (purchasing of books, equipment, course costs)
- Mentoring
- No expectation
- Other (please specify)

Distance learning:

How much do you agree with the following statements (please place an X in your chosen box):

SA = strongly agree, A = agree, N = neutral.

<table>
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<tr>
<th></th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>A</th>
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<tbody>
<tr>
<td>22. Not having regular interaction with other students and staff does not worry me.</td>
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<td>23. I am not worried about how I can obtain help during my course.</td>
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<td>24. I am confident that I will get sufficient help from my employer.</td>
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<tr>
<td>25. I am confident that I will get sufficient help from my university tutors.</td>
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<tr>
<td>26. I believe that I can learn the same amount in a distance learning module as in a university-based module.</td>
<td></td>
<td></td>
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<tr>
<td>27. I believe that I can make the same grade in a distance learning module as in a university-based module.</td>
<td></td>
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<tr>
<td>28. Distance learning requires significant changes in learning styles by a student.</td>
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<tr>
<td>29. Distance learning saves me time compared to university-based methods of study.</td>
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<tr>
<td>30. Distance learning works well with my schedule.</td>
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</table>
31. Distance learning enables me to study more frequently than university-based methods.  
   Distance learning does not enable me to study more frequently than university-based methods.

32. It is easy to contribute to class discussions in a distance learning module.  
   It is difficult to contribute to class discussions in a distance learning module.

33. (If you agreed that you can NOT learn the same amount in question 26) Why don’t you believe that you learn the same amount in a distance learning module?

34. (If you agreed that you can NOT make the same grade in question 27) Why don’t you believe that you will achieve the same grade in a distance learning module?

Work-based learning

How much do you agree with the following statements (please place an X in your chosen box):

SA = strongly agree, A = agree, N = neutral.

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<th>A</th>
<th>S</th>
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<tr>
<td>3</td>
<td>Work-based learning requires significant changes in learning styles by a student.</td>
<td>Work-based learning does not require significant changes in learning styles by a student.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Work-based learning saves me time compared to university-based methods of study.</td>
<td>Work-based learning will take me more time than university-based methods of study.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>6</td>
<td>Work-based learning works well with my schedule.</td>
<td>Work-based learning does not work well with my schedule.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>I believe that I can learn the same amount in a work-based learning module as in a university-based module.</td>
<td>I don’t believe I can learn the same amount in a work-based learning module as in a university-based module.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>I believe that I can make the same grade in a work-based learning module as in a university-based module.</td>
<td>I don’t believe that I can make the same grade in a work-based learning module as in a university-based module.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

40. (If you agreed that you can NOT learn the same amount in question 38) Why don’t you believe that you learn the same amount in a work-based learning module?

41. (If you agreed that you can NOT make the same grade in question 39) Why don’t you believe that you will achieve the same grade in a work-based learning module?
Appendix E: Final questionnaire: time point 2

<table>
<thead>
<tr>
<th>Second time point questionnaire</th>
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</thead>
<tbody>
<tr>
<td>1. Name of university</td>
</tr>
<tr>
<td>2. Name of degree scheme</td>
</tr>
<tr>
<td>3. Type of employer’s industry (e.g. Petrochemical, Pharmaceutical, Chemical/Aerospace/Civil Engineering etc)</td>
</tr>
<tr>
<td>4. Current job title and role</td>
</tr>
</tbody>
</table>

### Distance learning:

5. Please state how many hours per week do you spend on distance learning that is applicable to your qualification?

- [ ] 0-9 hours
- [ ] 10-19 hours
- [ ] 20-29 hours
- [ ] 30-39 hours
- [ ] 40+ hours

6. What types of support have you received from your employer relating to distance learning? *(Please tick all that apply)*

- [ ] Time (from work to study, at work to study, for block/day release)
- [ ] Help with course related problems
- [ ] Financial (purchasing of books, equipment, course costs)
- [ ] Mentoring
  - Regular progress meetings
- [ ] No expectation
- [ ] Other (please specify)

7. Has your employer provided the support you expected of them?

- [ ] Yes
- [ ] No
- [ ] Don’t know

8. What types of support have you received from the university relating to distance learning? *(Please tick all that apply)*

- [ ] Administration
- [ ] Face-to-face meetings when facing difficulties
- [ ] Help with course related problems
- [ ] Time
  - Management
- [ ] No expectation
- [ ] Other (please specify)

9. Has your university provided the support expected of them?

- [ ] Yes
- [ ] No
- [ ] Don’t know

10. What types of support have you received from your university tutors relating to distance learning? *(Please tick all that apply)*

- [ ] Face-to-face meetings when facing difficulties
- [ ] Help with course related problems
### Time management

<table>
<thead>
<tr>
<th>No expectation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other (please specify)</td>
</tr>
</tbody>
</table>

**11. Have your university tutors provided the support expected of them?**

- [ ] Yes
- [ ] No
- [ ] Don't know
Please complete the following section only if you’ve carried out any work-based learning.

Work-based learning:

Work-based learning is widely acknowledged as a vital learning strategy in ongoing and future development of the workforce. The term itself can mean a variety of strategies and approaches to different stakeholders. One definition is: “... [work-based learning is] where students are full time employees whose programme of study is embedded in the workplace and is designed to meet the learning needs of the employers and the aims of the organisation.” (Sobiechowska and Maisch, 2006)

This means, that on top of the underpinning knowledge of the chosen subject, study can be embedded around the workplace activities, providing learning opportunity and projects in the workplace itself; “putting knowledge into practice”.

12. Please state how many hours per week you spend on work-based learning that is applicable to your qualification?

- 0-9 hours
- 10-19 hours
- 20-29 hours
- 30-39 hours
- 40+ hours

13. What types of support have you received from your employer relating to work-based learning? (Please tick all that apply)

- Time (from work to study, at work to study, for block/day release)
- Help with course related problems
- Financial (purchasing of books, equipment, course costs)
- Mentoring
- Regular progress meetings
- No expectation
- Other (please specify)

14. Has your employer provided the support you expected of them?

- Yes
- No
- Don’t know

15. What types of support have you received from the university relating to work-based learning? (Please tick all that apply)

- Time (from work to study, at work to study, for block/day release)
- Face-to-face meetings when facing difficulties
- Help with course related problems
- Financial (purchasing of books, equipment, course costs)
- Mentoring
16. Has your university provided the support expected of them?

- Yes
- No
- Don’t know

17. What types of support have you received from your university tutors relating to work-based learning? (Please tick all that apply)

- Face-to-face meetings when facing difficulties
- Help with course related problems
- Time management
- No expectation
- Other (please specify)

18. Have your university tutors provided the support expected of them?

- Yes
- No
- Don’t know
Appendix F: Industry champion script for interview 1

Work-based learning

Industry Champion understanding of work-based learning

1. What do you understand by the term work-based learning?
2. What experience have you had with respect to work-based learning?
3. From your perspective, what benefits are there are for sending a student on a course containing work-based learning?
4. What are the advantages to the employer of work-based learning?
5. What are the disadvantages to the employer of work-based learning?
6. Why do you think work-based learning can be relevant to students based in the STEM industries?
7. How could work-based learning provision be improved through higher education for STEM subjects?
8. Do you believe that crediting students for previous attainment and work should provide some weighting toward the final qualification?

Concerns/issues

9. What issues do you believe may arise during course development?
   For employers? For course developers in the HEI? For you as an Industry Champion? For employees/prospective students?
10. What issues do you believe may arise during the implementation of the foundation degree?
    For employers? For HEIs? For students/employees?
11. What issues do you believe may arise following graduation from the foundation degree?
    For employers? For HEIs? For students/employees?
12. Who might be best to arbitrate in remedying any problems that may occur between the HEI and employer?

Benefits

13. What benefits do you believe will arise from qualifying employees through the foundation degree?
    For their employer? For the industry as a whole?
14. What benefits do you believe will arise for the employee upon completion of this course?
In terms of subject knowledge of relevance to the employment? In terms of transferable skills?

**Attitudes/motivation**

15. What do you believe the current attitude toward the foundation degree is within industry?

16. How do you think that the Working Higher project will further enhance industries attitudes toward foundation degrees?

**Assessment and feedback**

17. Who do you believe should take responsibility for assessment of student’s work completed at the University?

18. Who do you believe should take responsibility for assessment of student’s work completed within the workplace?

19. How much interaction should there be between HEI and employer to ensure student is progressing well?

**Personal development planning**

20. How do you believe students should be encouraged to monitor their personal development throughout the course, both in terms of their academic and work related course material?

21. What forms of personal development planning are currently used in industry?

22. Do you think these could be used to monitor student progress?
Appendix G: Industry champion script for interview 2

Work-based learning

1. This time last year you said: “Quote industry champion”

How has your opinion changed, if at all?

2. Are you happy with the way work-based learning is being implemented within your sector foundation degree? (If not, why not? If so, why so?)

Concerns/issues

3. What issues have arisen during course development?
   For employers? For course developers in the HEI? For you as an Industry Champion?

4. What issues do you believe may arise with your remaining time as an industry champion?

5. What, if anything, has hindered your ability to raise demand among employers?

6. What, if anything, has hindered your ability to ensure your sector foundation degree meets industry demand? And do you believe that the needs of industry will be met by your sector FD?

7. In what ways have industry champions acted as mediators between academic and industry?

Attitudes/motivation

8. Do you believe that your employer engagement work has helped improve industry’s understanding of foundation degrees and if so, how?

Case studies/employer contribution

9. How easy has it been to obtain case studies from employers?

10. How do you envisage this material being used in the program and do you believe this will be carried out effectively?

Assessment and feedback

11. After learning about academic protocol, who do you believe should assess students’ work completed at the university?

12. After learning about academic protocol, who do you believe should assess students’ work completed in the workplace?

PDP

13. After working with academic leads, who do you believe is best placed to deliver PDP to the students?
Management

14. How has the management of the project facilitated the development of the foundation degree?

15. Is there anything management team could do to further enhance the outcomes of the project?
Appendix H: Industry champion script for interview 3

Work-based learning

1. For your sector FD, has the work-based learning been designed around sector-specific learning (e.g. case studies or projects)? Have employers been listened to?

2. What are employers’ attitudes to the work-based approach of the foundation degree?

3. From your discussions with employers in your sector, what support do you believe employers are likely to give to their employees with work-based learning? (For example, are employers willing to mentor their students, are they willing to get involved with assessment?)

4. What are the barriers to employers providing support to work-based learners?

5. Do you believe there will be a legacy of work-based learning development in your subject area within the university hosting your sector FD? If not, why not?

6. Anything you’d like to add or share on the subject of work-based learning?

Employer Engagement

7. Were “work-based learning” and the “bespoke, industry-led development” the focal point of your employer engagement?

8. Did your sector have, and utilize, an employer reference or employer steering group? If so, were these useful, and did they commit any students?

9. Do you believe there will be a legacy of utilizing employer reference groups at the host institutions?

10. In terms of recruiting students for the first academic year of the foundation degree, do you believe the employer engagement was unsuccessful? If not, why? If so, why?

11. What would you suggest could be done differently to recruit learners to the first year of a new, bespoke course?

12. Do you believe that the developed foundation degrees having a lasting legacy within your industry sector? If not, why not?

13. Is there anything you’d like to add about employer-facing Higher Education?
Appendix I: Course developer script for interview 1

Work-based learning

Course developer understanding of work-based learning

1. What do you understand by the term work-based learning?
2. Why do you think work-based learning can be relevant to students based in the STEM industries?
3. How could work-based learning provision be improved through higher education for STEM subjects?
4. Do you believe that crediting students for previous attainment and work should provide some weighting toward the final qualification?

Benefits

5. What are the advantages and disadvantages to the HEI of work-based learning?
6. What are the advantages and disadvantages to the student of work-based learning?
7. What benefits do you believe will arise for the employee upon completion of this course?
   a. In terms of subject knowledge of relevance to the employment?
   b. In terms of transferable skills?

Concerns/issues

8. What issues do you believe may arise during course development?
   For employers? For course developers in the HEI? For employees/prospective students?
9. What issues do you believe may arise during the implementation of the foundation degree?
   For employers? For HEIs? For students/employees?
10. Who might be best to arbitrate (/mediate?) in remedying any problems that may occur between the HEI and employer?

Attitudes/motivation

11. What do you believe the current attitude toward the foundation degree is within industry?
12. What are the current attitudes towards foundation degrees within higher education?
13. How do you think that the Working Higher project will further enhance both industry’s and higher education’s attitudes toward foundation degrees?

**Assessment and feedback**

14. Who do you believe should take responsibility for assessment of student’s work completed at the University?

15. Who do you believe should take responsibility for assessment of student’s work completed within the workplace?

16. How much interaction should there be between HEI and employer to ensure student is progressing well?

**Personal development planning**

17. How do you believe students should be encouraged to monitor their personal development throughout the course, both in terms of their academic and work related course material?
Appendix J: Course developer script for interview 2

Work-based learning
1. This time last year you said: “… course developer work-based learning quote”. How has your opinion changed, if at all?
2. How are you going to implement the work-based learning, and how are you going to ensure that it works?

Concerns/issues
3. What issues have arisen during course development? For employers? For yourself as a course developers? For industry champions?
4. What issues do you believe may arise with your remaining time as a course developer?
5. What, if anything, has hindered your ability to ensure your sector foundation degree meets industry demand? And do you believe that the needs of industry will be met by your sector foundation degree?
6. What issues relating to work-based learning, do you believe can arise for: yourselves? Employers? Students?

Attitudes/motivation
7. Do you believe that your employer engagement work has helped improve industry’s understanding of work-based learning and foundation degrees, and if so, how?

Case studies/employer contribution
8. How do you envisage case studies being used in the program?

Assessment and feedback
9. Do you believe employers should be involved in the assessing the students and if so, how?

PDP
10. Who do you believe is best placed to deliver PDP to the students?

Management
11. How has the management of the project facilitated the development of the foundation degree?
12. Is there anything management team could do to further enhance the outcomes of the project?
Appendix K: Work-based learning interview script for students

Preliminary questions (non-interview)

1. Which industry do you work for?
2. What is your current job title?
3. Are you studying through distance learning or day-release?
4. What were your motivations for enrolling on this course?

Work-based learning

5. Please describe any work-based learning that you’ve done during your course.
6. Have you used anything you’ve learned on your course in your work environment?
7. How has the work-based learning that you’ve done impacted positively or negatively on your work?
8. Have you used anything you’ve done at work to fulfil any of your course requirements?
9. How has your supervisor or employer supported your work-based learning?
10. Was this support adequate? Would you have preferred more or less?
11. Are you and your supervisor pleased with the work-based learning provision provided by your university?
12. Did the work-based learning help to make the course more relevant to what you do at work; did it help you better understand what you were doing at work?
13. Were the outcomes of your work-based learning beneficial to your employer?
14. Do you believe there will be any long-term impact for yourself and your employer from this work-based learning?
15. Did you encounter any problems with the work-based learning that you’ve done so far?
16. What is your opinion of the work-based learning and work-based activities compared to more traditional taught modules and activities?
17. How would you judge that you’ve succeeded in your work-based learning activities?
Appendix L: Pilot work-based learning interview script for supervisors

1. Type of industry?
2. Current job title?
3. What were your motivations for enrolling the student on this course?
4. Which modes of delivery would you prefer for students on foundation degrees and why?

Distance learning:

5. Do you feel as though your employee is coping with distance learning?
6. What types of support are you currently giving your employee for their distance learning?
7. Are there any advantages and disadvantages for your company from distance learning?
8. Are there any advantages and disadvantages for your student or your employee from distance learning?

Work-based learning:

9. Do you feel as though your employee is coping with work-based learning?
10. Who do you believe should identify work-based learning opportunities within the workplace?
11. What types of support do you expect to be giving your employee for their work-based learning?
12. Are there any advantages and disadvantages for your company from work-based learning?
13. Are there any advantages and disadvantages for your student from work-based learning?
14. Can you think of anything else you’d like to mention about distance learning or work-based learning?
Appendix M: Work-based learning interview script for supervisors

Preliminary questions

15. Type of industry
16. Current job title/ role of student
17. What’s your working relationship with the student? (e.g. direct supervisor, manager, mentor)
18. What were your motivations for enrolling your employees on this course?
19. Does your company have a preference for distance learning or day release, and why?
20. Do you feel as though your employee is coping with distance learning?

Work-based learning:

21. What do you understand by the term work-based learning?
22. Do you feel as though your employee had coped with their work-based learning?
23. Who do you believe should identify work-based learning opportunities? (You, your employee, the university?)
24. What types of support have you given your employee for their work-based learning?
25. Has the work-based learning affected your work processes? (Negatively, positively?)
26. Do you believe there will be any long-term impact for the business from the work-based learning undertaken?
27. Would you like more or less work-based learning in the course?
28. Are you satisfied with how work-based learning has been organised?
29. What is your opinion of the work-based activities (compared to regular taught modules?)
30. How would you judge that your student has succeeded in their work-based learning activities?