

Collaborative Initiatives and Work-based Learning Opportunities: A Case Study

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Abstract

Employability is a prominent concern as higher education considers its relationship with employers in equipping graduates to operate successfully in their chosen careers. This paper discusses key issues surrounding work-based learning provision and focuses on recent experience in utilising university resources to provide placements.

Collaboration between the Centre for Public Health Research and the Informatics Centre at the University of Chester has led to the implementation of software solutions to support data monitoring and analysis projects. Plans to expand this development provided an opportunity to utilise the University's Work-based Learning programme to provide stimulating student placements.

This paper evaluates the placements in the light of recent findings in the literature and reflects on the successes and limitations of the initiative. The paper also assesses the scope to consolidate and develop the process in view of the likely need for an expansion of employment-focused learning opportunities. Participant feedback demonstrates very positive outcomes from the initiative but a wider investigation would be more representative and might usefully seek to compare these placements with students' experience in external organisations.

Key words

Work-based Learning, Employability, Work-based Assessment, Software Development

1 Introduction

This paper presents a case study illustrating how development work arising from interdisciplinary collaboration has been exploited to support valuable undergraduate Work-Based Learning placements. The paper discusses how this can complement the undergraduate curriculum and enrich the work-based learning opportunities provided through the University's Centre for Work-Related Studies.

The ideas that underpin this case study concern the integration of resources across disciplines to establish and maintain an environment within which applied research projects can offer services to external agencies, and support rewarding student work placements.

The specialist role of the university's Centre for Work-Related Studies in providing a framework to support work placements is critical to the success of the current initiative, which has established a base of project knowledge and expertise that can sustain future placements. The paper highlights concerns expressed in the literature that the provision of good quality placements may come under threat. From this perspective, it is beneficial to have some control over the experience available to students.

The aspiration to expand the provision reported in this case study and to broaden the range of applied research projects has a number of benefits. The evidence from the initial placements suggests that students can experience a stimulating practical placement, which should boost their confidence and motivation, and their initial employment prospects, as reported in Section 2.1. Work undertaken by the students is likely to make a positive contribution to the projects concerned. The effects of this are to enhance services to external agencies and to reinforce partnerships with them. As the project base grows, so does the scope for additional case study material to inform the curriculum.

The paper assesses the achievements and limitations of this enterprise and evaluates the scope to expand the role of practical software development tasks through such joint

initiatives. Feedback from the participants is very positive and serves to justify the placements and supports the continuation of the enterprise. Although the participants proved to be well motivated and resourceful, such a small case study is not representative of the likely experience of all students: as projects evolve, it is likely that there will be scope to develop structured specifications to accommodate a wider range of placements.

2 Work-Based Learning

Significant literature exists on the increasingly prominent role of Work-Based Learning within Higher Education (HE). (Gray 2001) defines work-based learning as learning at higher education level derived from undertaking paid or unpaid work. He distinguishes between “learning for work (e.g. work placements), learning at work (e.g. company in-house training programmes) and learning through work, linked to formally-accredited further or higher education programmes.” It represents the means through which a discipline is delivered, not the discipline to be studied.

He identifies the importance of problem-solving as an integral part of the process and by including practical project briefs and self and peer-assessment, he acknowledges the primacy of a “learner-centred and problem-centred approach”. The issue of employability is prominent as higher education institutions (HEI) evaluate the relationship between academia and employer. This paper highlights the documented advantages of work-based learning and acknowledges that questions remain about its role and its scope for development.

2.1 Challenges in Integrating Work-based Learning Into the Curriculum

According to (Nixon, Smith et al. 2006), three principal factors are influencing the collaboration between HE and employers: “increasing the number of employees attaining higher level skills; encouraging higher value-added activity in business; and enabling innovation, enterprise and creativity.” Potential financial input from employers can reduce the reliance on public funding of higher education. However, they also point up the tensions between learning-providers, the HEIs, which often see their activities from a national or international perspective, and the needs of regional employers and individual employees who need to be motivated to appreciate the benefits of higher level skills development. These tensions are exacerbated by questions about the nature of HE: “from an academic perspective, work-based learning remains a contested area, not least because it challenges the very essence of universities as the primary source of knowledge.” Nevertheless, they report examples of integration between academic and occupational domains where developments at the Open University have informed “plans to incorporate practice-based learning into mainstream curriculum development and delivery.”

The case studies featured in their report offer instructive insights into the future of Work-based Learning. The observations include a recommendation to tailor solutions for employers rather than offering ‘off the shelf’ programmes. There is also a request for clearer definitions to support progression routes within HE and between HE and Further Education. An additional challenge is to exploit partnerships with Small and Medium Enterprises (SME) that meet their business requirements as well as academic standards.

Pedagogical and financial issues must also be addressed. (Nixon, Smith et al. 2006) acknowledge that a better understanding of the pedagogy is required and they caution that the costs of work-based learning can be greater than for other modes of learning. Notwithstanding potential costs, (Little and Harvey 2006) suggest that difficulties in securing student placements in an expanded HE environment, and a tendency for some students to opt out of taking up a placement, may lead to restrictions on the number of students benefiting from this valuable resource.

Although substantial resources are being invested in efforts to improve HE students’ employability skills while at university, the study by (Mason, Williams et al. 2003) challenges assumptions underpinning current strategy. The research suggests that assumptions that there is a consensus about which employability skills should be developed, the fact that they can be developed effectively in HE, and that they can readily be transferred into employment, are contentious.

The authors point to differences in the relative importance of employability skills and subject knowledge and theoretical understanding in different subject areas. Of the range of subjects

in the study, History assigned least importance to employability while Business Studies showed the least distinction between subject specialisation and generic employability skills. Interestingly, specialist Computer Studies skills are sought after by employers and more generic employability skills tend to be neglected. These differences are symptomatic of contrasting experiences and attitudes towards employability across different subjects and different types of institution.

The research attempts to measure the impact of employability-skills development on initial graduate employment. The results suggest that “the probability of graduates being employed six months after graduation ... was found to be positively and significantly associated with them having participated in a sandwich placement during their studies.” Moreover, a positive association was found between completing sandwich degrees and securing graduate level occupations. Equally, they report that employer involvement in course design and delivery was positively associated with the occupation-based measure of the quality of initial employment. Despite these indicators of employment soon after graduation, no statistically significant effect on performance was found between sandwich placements and other work experience two or three years into their careers.

The authors report that almost two-thirds of graduates in occupations below associate professional level were expected to work without detailed supervision within three months of appointment. This is acknowledged to be considerably less time than that allowed to graduates in professional, associate professional and managerial occupations, and reflects the need to offer clear guidance during placements.

What emerges from this report is the fact that there is considerable variation in approaches to employability skills training arising from differences between institutions, individuals’ background knowledge, subject areas and the range of occupations taken up by graduates. Different levels of provision and varying institutional motivations are also recognised by (Nixon, Smith et al. 2006).

2.2 The Work-based Learning Experience

Recent research by (Little and Harvey 2006) questions students from different institutions and from different subjects who were placed with employers for varying periods, ranging from six weeks to a full academic year. They are concerned with how students perceive the effects of work experience placements on learning as well as employability and they address the question of how far students seek to transfer and develop their work-based learning in subsequent stages of the taught curriculum.

Their evidence suggests that students choose placements to enhance their employability but that they also value the opportunity to gain insights into specific areas of work to assess their own compatibility with particular occupations.

It is evident from Little and Harvey’s report that work-based learning experiences are varied and that each placement confers its own benefits and constraints. They address issues such as assuming responsibility, dealing with inexperience and uncertainty, and avoiding boredom and lack of development. Inherent in this discussion is the role of training. Their research reveals that:

Students had also been able to go on a range of (primarily in-house) courses relating to the development of personal skills, for example, assertiveness; negotiating; organisation skills; time-management; effective writing; team-working.

They also report that such opportunities are complemented by the availability of companies’ on-the-job training programmes and on-line materials. Clearly, there are particular benefits for students placed in a large organisation that can provide corporate training resources. Similar advantages surround the provision and use of commercial software, as well as opportunities to gain valuable experience working in different environments with different types of people. Their report indicates that students recognise the importance of engaging in teamwork when tasks need to be completed to enable an organisation to conduct its business successfully:

They are more self-aware and perhaps self-critical, in the sense of having discovered how to take criticism, and more aware of others and how to work effectively in teams made up of diverse members with different strengths.

In reflecting on their experience, it seems that students are better able to formulate views on how they perceive working practices in a particular field and this is likely to shape how they view their own careers. In some cases, they identify changes in direction or focus on people-focused rather than technical aspects of their field, for example.

The evidence suggests that returning for final year studies often brings a more focused, questioning and confident approach. These benefits are likely to be more apparent in students undertaking longer placements. A key expectation in many institutions is that the experience will inform final year academic work and the authors acknowledge students' demonstration of an enhanced understanding of their subject.

Despite some negative observations, the authors conclude that the overall perspective on work placements of the students interviewed in their study is a positive one, although they acknowledge that the respondents are not representative of the whole student body. However, they caution that the availability of suitable opportunities in an expanding higher education sector may prove to be a factor in the potential decline of placements.

3 Pedagogical Issues in Work-based Learning

There is much current interest in the development of pedagogical methods that effectively combine the academic and occupational facets of work-based learning. (Nixon, Smith et al. 2006) maintain that good pedagogic practice will emerge from recognition that industry and academia must acknowledge the interdependence between their roles in competence development. However, they assert that the assumption that the skills and knowledge required by employers are most effectively delivered through HE and that skills developed in academia can be transferred into employment remains to be substantiated by further pedagogical research.

The authors draw upon (Penn, Nixon et al. 2005) in identifying the influences of an individual students' life plan, a learning provider's corporate plan and an employer's business plan in determining a learning contract between each party, which sets out the agreed learning outcomes. Within this context the academic serves as a facilitator supporting the student in learning how to learn and putting into effect a more self-directed approach to learning.

This is consistent with the learner-centred approach of (Gray 2001) who asserts the importance of reflection on work practices in work-based learning: this dimension extends the acquisition of knowledge and skills. Learning arises from engagement within an active environment in which people share ideas, knowledge and solutions. A key component is the acquisition of meta-competence, which is learning to learn.

Gray acknowledges the increasing importance of work-based learning for organisations requiring members of a dynamic, flexible workforce and for HE institutions that recognise the workplace as a legitimate site of learning. The issue of learning within organisations is seen as increasingly significant from the perspective of knowledge workers and their contribution to an organisation's competitive advantage (Hislop 2005). Gray regards assessment processes as central to this relationship and maintains that assessment methods should be negotiated collectively to meet the interests of all partners in the learning process.

3.1 Assessment

While the principles of assessment such as validity, reliability and authenticity apply to work-based learning as they do to more traditional forms of study, the nature of work-based learning has determined that non-traditional means have been adopted to assess it, according to (Gray 2001). These methods are tailored to a student-centred, problem-based approach including examples such as self and peer assessment, projects, portfolio-building, presentations and the practical assessment of professional competence within the workplace.

This approach is consistent with the views of (Brodie and Irving 2006) who present a holistic approach to placements including an induction incorporating a review of learning theories and an appraisal of personal and work-related skills. The adopted assessment model includes critical reflection, which enables learners to "justify and validate their claims for learning, by using a variety of evidence sources. It also enables them to recognise future learning needs: essential for a capacity for lifelong learning."

Assessment within the programme entails the use of a learning journal, which helps learners focus on self-assessment of their learning goals. The authors acknowledge that assessment requires students to “have some awareness and skills in reflective writing” and that these skills may be unfamiliar learning strategies. In this respect, assessment is based on the ability to evaluate the tasks undertaken. Assessing the quality of these processes, or measuring capability, is problematic (Poikela 2004). In the authors’ experience it is represented by a 10% contribution to assessment from employers, which many students consider too little. They see the effective assessment of capability as an important area for further investigation.

4 Work-based Learning within University of Chester Programmes

Undergraduate academic programmes at the University of Chester are designed to integrate a double module, Work-based Learning for Academic Credit, at the end of Level 5. The programme seeks to develop personal and employability skills that are an integral part of ‘graduateness’ (Mason, Williams et al. 2003). The module aims to extend students’ “ability to relate theory and practice and translate the knowledge and skills they have gained into terms intelligible to an organisation,” (WBL 2002). In addition, students are to negotiate learning outcomes with the placement provider and the work-based learning tutor and to monitor and assess their achievements and articulate what they have learned from the experience. Module assessment comprises a presentation (30%), a reflective report/essay (60%) and a placement provider evaluation (10%). The module provides comprehensive support, which includes an induction programme presenting the aims and assessment requirements of the module. The presentation is given at the end of this period.

Staff within the Work-based Learning unit have established valuable contacts with employers in the Region to provide placements for students across the University’s portfolio of programmes. However, the Work-based Learning module enables students to identify suitable placements of their own provided they meet key criteria. These include requirements to offer opportunities to enhance knowledge, personal and professional development, and to meet the Learning Outcomes of the Work-based Learning module; to provide challenging learning opportunities commensurate with Level 5 undergraduates; to provide adequate supervision, mentoring and organisation; to provide a safe environment meeting health and safety requirements. The students are also obliged to fulfil their responsibilities to the University in terms of agreeing to a suitable placement and to the Placement Provider in terms of working consistently and conscientiously and observing regulations regarding absence, illness and special requirements, for example.

The framework provided by the Work-based Learning module offers student guidance and assessment procedures that deal with the occupational/academic interface that remains the source of active research, as the earlier discussion illustrates. The remainder of this paper addresses the ways in which work arising from interdisciplinary activities within the University has been integrated with this facility to provide valuable student placements.

5 Opportunities Through Interdisciplinary Collaboration

The innovative approach to providing work-based learning experience as part of the undergraduate programme presented in this paper has emerged from collaborative initiatives between staff in the Centre for Public Health Research (CPHR) and the Informatics Centre at the University of Chester. The following section briefly summarises this work, which provides a context for the work-based learning opportunities.

5.1 Project Monitoring in CPHR

CPHR is engaged in a number of projects addressing issues in Public Health. Over recent years the Centre has been responsible for monitoring activity in the Cheshire Children’s Fund. (CCF). The Children’s Fund was introduced in 2001 in response to government policy, which highlighted the need for improved services to prevent the negative effects of child poverty and reduce the risk of social exclusion. Its key characteristics are presented in the HMI Report (HMI 2004) whose recommendation is that partnerships should implement rigorous monitoring and evaluation procedures to determine the success, or otherwise, of projects planned for children. CPHR’s role has been to help ensure effective monitoring and evaluation.

CCF's aims to target areas of disadvantage are outlined in the Operational and Strategic Plan (CCF 2005). They are aimed at improving the life chances of vulnerable individuals outlined in the "Every Child Matters" Green Paper (HMG 2003). The importance of information sharing in implementing the aims of the Green Paper is addressed in the government paper "Change for Children" (DfES 2005) which maintains that "Good information sharing is the key to successful collaborative working and early intervention to help children and young people at risk of poor outcomes."

Collaborative work between CPHR and the Informatics Centre has led to the development of an electronic database storing details of CCF contacts. This information is potentially available for integration with other agencies' databases and so has the capacity to enrich the information on vulnerable children in accordance with the aims of the Green Paper.

5.2 CCF Data Processing

The Cheshire Children's Fund involves a number of service providers based throughout the County who provide resources for children who are identified as likely to benefit from the project. They enter key information into a spreadsheet and submit quarterly returns to CPHR. A web-based environment facilitating access to a server, and the secure upload of project data, was constructed using Microsoft SharePoint Services (Microsoft 2006).

Given the commitment to using spreadsheets to capture data, routines were required to extract data from the service providers' spreadsheets and incorporate them into a Microsoft Access relational database.

The procedures established to gather data on project activity involve a significant amount of clerical control by CPHR staff. Extracting data from spreadsheets and importing them into a composite database needs to be done carefully. Checks must be carried out to ensure that the data in the spreadsheets are in the right format.

5.3 Proposed Developments

Although the volume of monitoring data is manageable using a series of update and append queries to import data into an Access database, the team wished to migrate to a more powerful platform supporting greater automation. Potentially, this relieves monitoring staff of carrying out manual procedures and enables them to concentrate on analysing the data.

Microsoft's SQL Server 2005 offers a new software environment that provides a new facility, SQL Server Integration Services, which supports the integration and analysis of data from multiple heterogeneous information sources (Microsoft 2006). The development team plan to remodel the current system using more powerful tools in the new environment. In addition to data transformation facilities, the new product includes Business Intelligence resources such as data mining tools (Payne 2006).

These developments are also likely to entail the adoption of a formal information systems architecture such as the Zachman Framework for Enterprise Architecture, which establishes a common vocabulary and set of perspectives for defining and describing complex enterprise systems (Zachman 2006).

6 Work-based Learning Opportunities

This work provided an opportunity for students to make a contribution to the development and to undertake a stimulating placement by taking advantage of the work-based learning programme.

6.1 Job Specifications

Initially, two job specifications were prepared to match two key roles that the development team considered important. It was envisaged that one student would carry out a systems analysis task to model data flows within the research centre. The second role was to investigate the capabilities of SQL Server Integration Services and to utilise the environment to reconfigure the CCF database. The roles were complementary, as they were designed to develop the database with a view to building and integrating additional databases along conforming dimensions. The longer-term aim is to construct data marts that will form a repository of research data within the Centre. This resource will support more detailed and efficient data analysis.

6.2 Activities

The aims were ambitious and challenging, as the participants reported in their feedback (see Section 8). The students faced a number of technical difficulties with data communications and software compatibility. They were severely constrained by the comparatively short timescale available for the work. They lacked the experience in data modelling required to redesign the system and implement it in a new and unfamiliar software environment. However, they were highly motivated to explore solutions using technology that they were more familiar with. There was a tension between the aspirations of the project team, whose aim was to build a generic solution capable of being extended to other projects, and the students' desire to deliver a useful solution despite limited time and little experience with the new software.

In the early stages of the placement, the students worked closely with CPHR staff to understand the system and to think about enhancements. They recognised that they could make improvements by customising the data capture processes and introducing greater automation. It was acknowledged that this would be a useful intermediate step; although a tailored solution lacked the generic appeal of the initial proposal and failed to address potential integration across projects, it offered significant benefits by reducing the clerical procedures required to transfer data from multiple spreadsheets into the database.

A number of people were involved in the activities. Researchers within CPHR were providing monitoring and analysis services on behalf of CCF. Academic staff within the Informatics Centre were providing support to CPHR in data processing and information management. The work-based learning students were placed within CPHR under day to day supervision of the principal researcher on the CCF project, who was able to appraise generic capabilities such as time management, initiative, and communication skills for example. The role of Informatics Centre staff was to provide technical direction in the development process. From this scenario, it emerged that the students were not confident that they could acquire sufficient expertise in SQL Server Integration Services to implement a solution in the time available to them. Significantly, they began working together to get an understanding of the existing system and contextual requirements of the CCF project. They sought solutions that were compatible with the skills that they already possessed and that were more closely allied with their own software development interests.

It soon became apparent that the students, in helping each other to understand the system and its environment, were not conforming to the two job specifications that had been prepared for them. In view of this, their roles were altered. It was recognised that there was scope to develop useful routines to automate the extraction of data from spreadsheets into the database. The students turned their attention to the development of code to build an interface enabling the user to select spreadsheet data without creating queries in Microsoft Access. Furthermore, they included routines to highlight missing data and provide the user the option of abandoning the update process. They added routines to flag any data sets that had already been added to the database. They worked closely with the project researcher to identify features that would best improve the system from his perspective. The students worked together on designing, implementing, testing and documenting the software that they developed.

6.3 Achievements

Although the initial job specifications were altered, the students negotiated modified tasks that led to the development of useful routines that brought significant benefits for users of the system. These modified tasks were challenging and the students worked extremely hard to accomplish valuable solutions within a tight timescale. Inherent in this achievement was the demonstration of a range of technical and generic skills. This experience is representative of the kinds of challenge that small teams often face when constructing software solutions under time and resource constraints. In this respect the placements provided insight into whether this is the kind of environment in which they would like to work.

6.4 Limitations

Questions might be raised about the extent to which the placements offered a realistic experience of work within an organisation. This paper has discussed the advantages of gaining insights into the 'real world', and the benefits that working for a large organisation can

bring (see Section 2.2). The fact that the placements were within a research centre, where the students worked as members of a small professional team on a project for external clients, certainly conveyed a sense of the skills, routines and levels of co-operation and communication that are required to operate successfully; and they certainly played their part fully in this enterprise. They were also given significant responsibility in developing the new software. While this was not critical to the success of the project, as the existing system remained adequate for the job, they were motivated individually and collectively to make a contribution to the project.

It became apparent that there were discrepancies between the development planned by the Informatics Centre and the skills and experience of the students who took up the placements. However, this is unsurprising in view of the innovative developments that led in a relatively short time from interdisciplinary collaboration to exploring the opportunity to integrate work-based learning placements into the project. In the event, these discrepancies did not detract unduly from the benefits that the students derived from being confronted with challenging technical tasks that were focused on real-world issues requiring valid software solutions. They made a contribution, which represented a valuable intermediate stage in the development of the software. The aspiration to introduce Microsoft SQL Server 2005 and to utilise the product's Data Warehouse and Business Intelligence capabilities (Mundy and Thornthwaite 2006) within the project remains. Opportunities might emerge for aspects of this development to be undertaken by future work-based learning placements and the team will address how these developments might be achieved by rethinking job specifications in the light of these initial experiences.

7 Staff Roles

This paper is presented from the perspective of computer staff whose principal concern has been to facilitate Work-based Learning placements in a stimulating software development environment. The focus is on how the environment has been fostered and managed, while assessment has been handled by Work-based Learning staff. Nevertheless, there are interesting issues surrounding the interface between computer staff, the nature of the work undertaken and the students' critical reflection on the experience, which is to be assessed by Work-based Learning tutors. Essentially, the role of computer staff has been to project-manage software engineering tasks. This has involved the provision of technical direction while day to day supervision has been undertaken by colleagues within the research unit where the work has been applied. Arguably, there is a tension here between the relationship that the students normally have with computer staff as academic tutors, who assess their work, and the particular Work-based Learning circumstances in which their support is being enlisted in tackling a real-world problem that affects external clients. The relationship is qualitatively different to that which would obtain if the students were working in a commercial environment removed from the university in which familiar staff would play no part. It seems there is a trade-off here between the advantages of working in an environment that is entirely independent of the university, and engaging in a project that poses challenges that complement the students' field of study yet remain associated with the institution and the perspectives of its staff. From this point of view, it is beneficial that the Work-based Learning assessment should be handled independently: the work undertaken has been influenced by project management decisions, yet this can be reflected upon independently and the students are free to evaluate these constraints critically along with a critical appraisal of their own contribution.

This is a major strength of the resources that have been established within the University of Chester. Staff within the Informatics Centre have been free to concentrate on specific project demands while relying on the induction and assessment framework provided by specialist staff within the Centre for Work-Related Studies.

8 Participant Feedback

The students were asked to reflect on their experiences some weeks later when they were already well into the final year of their degree programme. Their response was very positive. The value of the placement lay not only in the technical challenges but also in the "rewarding" experience of solving problems in order to help people in their work. They recognised the flexibility and responsibility that the work entailed and they welcomed the sense of autonomy: "the structure of the work performed was dictated more by the students."

The main frustrations were caused by some of the initial technical limitations of the environment in which they found themselves working. Resourcefully, they provided additional IT support to members of the CPHR team when they were temporarily held up by a failed server.

A clear link was identified between the software development undertaken during the placement and subsequent academic progress, which is consistent with views expressed elsewhere (see Section 2.2). In one case, the placement prompted further independent work on web development, which “provided me with advantages for my Advanced Programming module this year.” The ability to tackle new problems and to produce valuable software solutions was seen as a tangible benefit of being involved in the project.

It is also evident that the structure of the placement was valued; target deliverables were agreed with Informatics Centre staff and monitored at weekly meetings. They also acknowledged the support of staff from Work-Related Studies in handling their appraisals of the placements.

The students assumed significant responsibility for working closely with CPHR staff to progress the work. Feedback indicated that this collaboration, as well as seeking specialist help from other staff within the Computer Science and Information Systems department, was seen as a valuable part of the process, which had led to ongoing co-operation and support. They also commented on the challenge of having to produce effective work in an initially unfamiliar environment, adding that there was considerable pressure to generate solutions within tight deadlines.

9 Evaluation

This case study reflects the experiences of a relatively small department in seeking to exploit a number of resources to support interdisciplinary initiatives to provide services for external agencies and in doing so to provide worthwhile work-based learning placements for its students.

This is a very small-scale study and the experiences of the participants cannot be taken as representative of the likely results if more students of varying ability and motivation were involved. This section looks at lessons learned and at the experience and outcomes of the initiative.

9.1 Lessons Learned

Feedback from the participants indicates that they valued the opportunity to explore programming solutions and that they enjoyed working successfully in a small team. This positive view is tempered by their frustration in dealing with a complex networking environment. In fact, they had to be resourceful to operate the network successfully. Had they been less skilled and determined, it is possible that they might have achieved comparatively little during the placement. Such an outcome would have been likely to impact badly on their motivation and confidence. Similarly, the discrepancy between the development team’s initial aims and the intermediate solution that was agreed upon could have led to a frustrating outcome in which neither party’s aspirations would have been fulfilled.

These issues were not anticipated. While they did not prevent the overall success of the placements, it is instructive to be aware that placements must be carefully planned and that additional management and negotiation may be required to ensure that the tasks set can lead to meaningful deliverables for the students concerned. The feedback also acknowledges some of the inherent difficulties in the overall task. It is important to strike a balance between a stimulating and an overwhelming environment. Perhaps this can best be achieved by giving careful thought to the job specification but it is also important to provide direction to guide students towards achievable goals.

A further consideration is the extent to which the environment truly reflects the workplace. On reflection, the research centre proved to be a thriving and stimulating environment with a significant amount of IT-based activity supporting a variety of research projects. The work was also focused on the requirements of external clients, which provided an outward-looking dimension to the project.

An important factor in seeking to offer placements to support the collaborative work between CPHR and the Informatics Centre was the central role played by the Centre for Work-Related Studies in providing a programme to facilitate administration and assessment. This freed staff to concentrate on directing the work itself.

9.2 Experience and Outcomes

This paper has presented details of an initiative to utilise resources and activities across three centres to enable students to contribute to an ongoing software development project while completing valuable work-based learning placements. This case study has been presented within the wider context of the role and perceived benefits of work-place learning within the curriculum.

Research suggests that there are positive effects on confidence, motivation and initial job opportunities for students who engage with employers during their programme of study. Feedback from the participants in this study is very positive and indicates that the experience has conferred a number of benefits, as the discussion in Section 8 shows.

From an employer's perspective, the practical achievements of the students made a significant contribution to continuing interdisciplinary development between CPHR and the Informatics Centre. The placements were linked to an integral work-based learning component of their undergraduate programme and so fulfilled the requirements of this particular module.

The initial outcomes reported here are very positive. This suggests that if the scheme could be expanded, which would entail broadening the base of externally-focused practical projects, such as the data management project jointly undertaken by CPHR and the Informatics Centre, then additional places could be supported. In these circumstances, the question of whether the students' experiences are as worthwhile as they might be had they been placed with external organisations might usefully be posed as an area for further research.

The experience certainly indicates that there are many positive benefits from linking the curriculum to real-world activities in this way. In addition to the individual demands of specific projects, it is feasible to attempt to harness project knowledge so that students can learn from their collective experience, and from the inherent difficulties in doing this (Newell, Bresnen et al. 2006).

A further potential benefit of this kind of collaboration between centres of knowledge and expertise within the institution is its potential impact in providing services and knowledge transfer to the wider community, which is key role in many modern institutes of higher education.

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