

Promoting Innovation by Work Based Learning

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Promoting Innovation by Work Based Learning

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1. Introduction.....	2
2. What is work based learning?.....	2
3. Key issues in work based learning.....	3
4. Work Based Learning in relation to other learning environments.....	4
5. Creation of knowledge in Work Based Learning settings	8
6. WBL and innovation: Combining university-industry co-operations in R&D and lifelong learning (LLL).....	10
7. WBL and accreditation of prior learning (APL).....	16
8. The WBL landscape in the UK	20
9. In-depth case study of a new WBL programme at Middlesex University, London	21
9.1 Background to WBL at Middlesex University	21
9.2 The project-driven approach concept	22
9.3 How this works in practice:.....	22
9.4 Guidelines and support for completing the project	24
9.5 The project-driven approach pilot	25
9.6 Conclusion to the case study	34
10. The WBL landscape in Germany	34
11. Cases: Generating innovation in WBL and related settings	38
12. Measuring the effects of PBL/WBL programmes on organisational knowledge and competence.....	42
13. Emerging trends in WBL	48
14. Future R&D issues.....	50
15. What needs to be done?	50
16. Summary.....	51
17. References.....	51
18. Appendices.....	56

1. Introduction

This study is about bringing learning, research and development, work, and innovation together, proposing Work Based Learning (WBL) as the core concept for this integration.

In the two following chapters, the concept of WBL will be introduced, and, in the fourth chapter, WBL will be contextualised in relation to other learning environments.

Chapters 5 and 6 will expand the scope of WBL within knowledge generation and the relations between WBL – or similar learning environments – and innovation within university-industry cooperation networks.

Chapter 7 will put forward the Accreditation of Prior Learning (APL) as a complementary concept to WBL, and will explain how both elements together contribute to efficiency and permeability in educational systems and learning processes.

The WBL landscapes in the United Kingdom and Germany are laid out in Chapters 8 to 10, with extra emphasis, including a detailed case study, on the comparatively more developed WBL landscape in the UK.

Chapter 11 proposes further cases, specifically selected to illustrate the effects of WBL and related learning environments on innovation.

In chapter 12, some first experiences with measuring the effects of WBL and WBL-like programmes on organisational knowledge, competence, and innovation will be discussed.

Chapters 13 to 15 will look into the future, presenting emerging trends in WBL, identifying open R&D issues, and proposing actions to be undertaken in order to further promote WBL in practice.

2. What is work based learning?

There is no single or simple definition of work based learning (WBL) other than that it is about learning – and not teaching – and arises not on campus but through activity in the work place (Brennan, 2005) or, more widely, from purposeful and useful activity that occurs in a multiplicity of sites (Butler, 1993).

Further definitions depend upon the focus of WBL: vocational perspectives emphasise the gaining of knowledge and competences in the work place including workforce development (Connor, 2005), whilst higher education (HE) aims to facilitate the recognition and acquisition of high-level knowledge, skills and abilities (Garnett et al, 2004).

Work based learning frameworks in higher education offer innovative programmes that focus high-level critical thinking on work in order to facilitate specific outcomes of significance to the learner, their work and to the university (Garnett, 2005). The use of reflective and critical analysis of tasks and learning enables the learner to understand the knowledge inherent in personal actions,

organisational processes, and procedures, with the general aim of effecting change.

Boud and Garrick (1999) summarise the purposes of learning based at work as being of contributive benefit to the organisation for personal development and for social investment, whilst King (2007:28) posits in a UK report into employer engagement with higher education that WBL programmes offered by universities should be of organisational benefit and “be demand-led, delivered at a time and quantity that employers want (i.e. small chunks, not courses) with learning outcomes linked to business performance outcomes”. King also contends that higher educated managers are more likely to embrace change and that high-level skills are a “vital component to maintain a global trading position” (ibid:13).

This focus on skills and outcomes/performance fore-grounds competence as the principle means of measuring not only business success and competitiveness, but also of personal/professional development (ie: learning as utility), and is being implemented across Europe through the ‘lifelong learning’ paradigm. In the UK it is exemplified by the significant shift towards employment-based and industry-specific learning through the previous Government’s skills agenda which promoted and funded schemes that ‘encouraged’ universities to develop programmes in conjunction with employers such as the ‘Employer Engagement’ scheme.

3. Key issues in work based learning

Work based learning is positioned within work contexts – individual or organisational – and not within more traditionally conceived codified and discrete university disciplines. Thus, WBL presents a direct challenge to universities from the perspectives of knowledge legitimacy, of potential quality assurance issues, and of the management of WBL programmes within existing internal systems (Costley et al, 2010). However, the last few years have seen growing interest across Europe in the innovative learning opportunities that WBL presents with its unbounded transdisciplinarity, and its potential transformative impact on people and organisations.

One of the key, but often unacknowledged, problems with work based programmes is that they are predicated on systems that validate or accredit learning emanating from the work place, but simultaneously require learners to demonstrate to the university that they have attained high-level learning comparable to university-defined knowledge and/or competences through academic language, criteria and systems. Even the French VAE system which fully acknowledges the work place as a site of learning and uses a dual tutor approach¹ still demands that the university not only provides courses to fill any learning gaps, but also that the student must physically attend these. This mismatch of knowledge and learning emanating from the work place and its required ‘containment’ within academic parameters will be considered in more detail in the case study below that forms part of this paper (see chapter 9).

¹ From university and industry

4. Work Based Learning in relation to other learning environments

In this study, Work Based Learning (WBL) is discussed as a specific learning environment, combining real-world problem solving, professional practices or organisational development with learning in a higher education context.

This concept is related to other types of settings, also designed to bridge the gap between learning and real-world problem solving.

Figure 1 below shows a typology of learning environments, located in a two-dimensional space. One of these dimensions is the learning - problem solving continuum, the other refers to three institutional/functional contexts of learning. The first of these contexts is an educational institution; the third is a domain of practice in industry or other areas of practical activity. The second context is research and development (R&D) which takes place in public or private research centres as well as in higher education institutions and industrial corporations where it is usually functionally (and often also organisationally) divided from, on the one hand, learning, and, on the other hand, 'ordinary' productive or administrative work. This is why the three contexts are called 'institutional/functional'.

In the lower part of Figure 1, two learning environments are depicted which are not designed to integrate learning and practical problem solving. One of these is course-based or school-based programmes in higher or vocational education. The other is on-site, but off-job educational and training formats in domains of practice.

More relevant for the topic of this paper are the other learning environments. A characteristic element for the German vocational education and training (VET) system is the 'Dual System'. In initial VET – usually for young people after leaving school – the Dual System offers a combination of school-based education and practice-based apprenticeship. There might be a short-cycled change between the two environments, e.g. three or four days in the company and one or two days in school every week, or longer periods of practical apprenticeship integrated with longer blocks of school courses.

Comparable VET systems are now being introduced, or have already been in operation, in other European contexts – including the UK where the relatively new Modern Apprenticeship scheme for the post-16 sector and the Graduate Apprenticeship scheme enable young people to study/work and gain National Vocational Qualifications (NVQs) or the new Diplomas which will gradually supersede NVQs. In order to incentivise 16-18 year-olds to study, the previous Labour Government offered students a weekly financial payment based on means-testing of parental income, although this allowance has now been cut by the new Conservative/Liberal Democrat Coalition.

The notion of work based or work place learning is intrinsic to VET systems, but the learning derived from these experiences is not always acknowledged and validated through the award of credits thereby tending to isolate and potentially devalue learning mediated through the work place. The example of WBL in higher education (as practised by Middlesex University, London and detailed later

in this paper, see chapter 9) where the work domain is fully *recognised* as a generator of valid knowledge and learning, marks a significant shift in the discourse of learning environments away from functional/institutional divisions to a more equitable and innovative integration of work and learning.

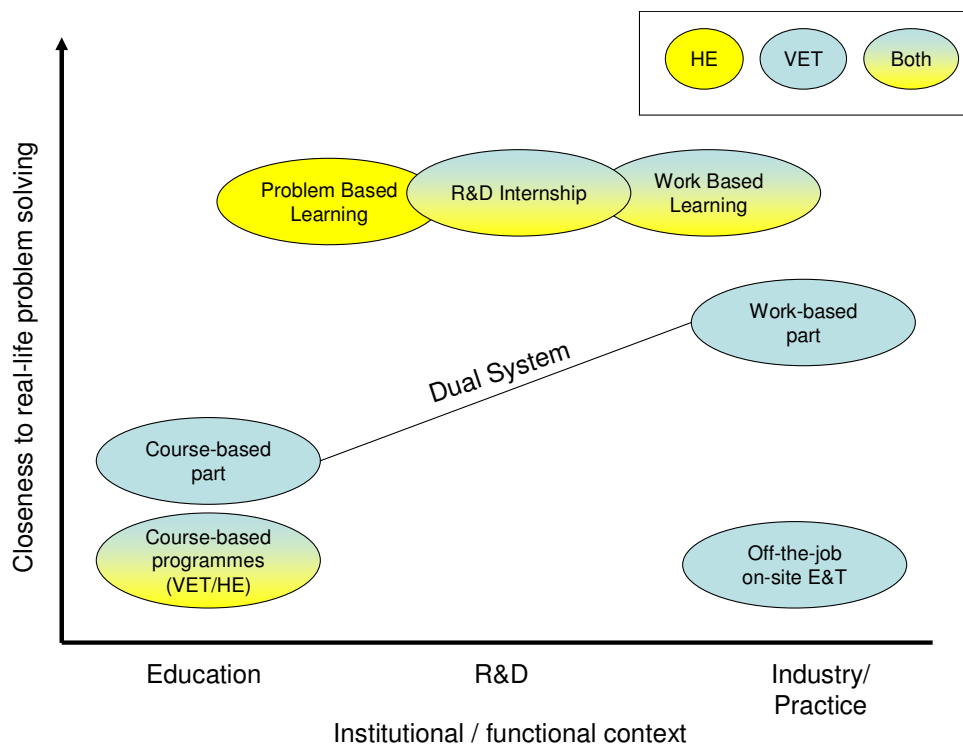


Figure 1: Typology of learning environments (HE: Higher Education; VET: Vocational Education and Training; R&D: Research and Development)

The concept of Problem Based Learning (PBL) refers to the integration of real-world projects in higher education programmes. An international hot-spot of PBL is Aalborg University (AAU) in Denmark, founded in 1974 as an institution dedicated to educational reform, using PBL from the start. In 2007, the UNESCO Chair for Problem-Based Learning (UCPBL) was established at AAU to create a global society for researchers and academic staff working with PBL (Kolmos et al., 2004).

In PBL, real-world problems, often identified by cooperating industrial companies, are the core elements of learning. Within the academic programmes, half of the credit points are gained by PBL. Barge (2009: 2) defines core concepts of PBL within the Aalborg model as follows:

- “(..) A problem can be theoretical, practical, social, technical, symbolic-cultural and/or scientific and grows out of students’ wondering within different disciplines and professional environments. The problem is the starting point directing the students’ learning process and situates the learning in a context. A chosen problem has to be exemplary. (..)
- (..) A project is a complex effort that necessitates an analysis of the target (problem analysis) and that must be planned and managed, because of desired changes that are to be carried out in people’s surroundings, organization, knowledge, and attitude to life; it involves a new, not previously solved task or problem; it requires resources across traditional organizations and knowledge; it must be completed at a point in time determined in advance. (..)
- Exemplarity is a principle of selecting relevant specific learning outcomes and content / scientific knowledge that is exemplary to overall learning outcomes. That is, a problem needs to refer back to a particular practical, scientific and/or technical domain. The problem should stand as one specific example or manifestation of more general learning outcomes related to knowledge and/or modes of inquiry.
- (..) A team is a group, sharing and working closely together on the same goal in solving the problems. The binding cooperation of members on successful completion of the project is an essential component of the overall approach to learning.

Although, in this definition, the concept of a ‘problem’ is rather widely defined to include PBL applications in a broad range of scientific and practical domains, the engineering programmes at AAU are usually based on real-world engineering problems (Kjærdsdam & Enemark, 1994).

The core feature of PBL is its foundation in R&D. It transcends the institutional and functional barriers between learning, research, and practice. This very nature of PBL puts it also in a key position for fostering innovation within university-industry partnerships.

PBL or PBL-oriented programmes have, besides Denmark, been implemented in, for example, universities in Canada (McMaster University), the Netherlands (Maastricht University), Malaysia (Universiti Tun Hussein Onn Malaysia), and the United States (University of Delaware).

A PBL-related example also comes from Germany in the specialisation track ‘Integrated Product Engineering’ (IPE²) within the mechanical engineering study programme at Otto-von-Guericke-University, Magdeburg. Also here, practical problems from industrial companies, non-profit organisations or public

² In German: Integrierte Produktentwicklung.

http://lmi.uni-magdeburg.de:8080/cms/index.php?article_id=164&clang=0

administrations are at the core of projects performed by interdisciplinary teams³ of students. Within one semester, these teams develop practically applicable products responding to the problems defined by the external partner organisations (Bernard et al., 2007; Vajna & Burchardt, 1998).

Another also very R&D-centred learning environment could be called ‘R&D internships’. In this setting, recently graduated alumni of higher education institutions are playing a key role within an R&D relationship between their (former) university and a company, often a small or medium sized company (SME). During this project, the alumni may be employed by the company or the higher education institution.

In the United Kingdom, the Knowledge Transfer Partnerships programme is a good example of this approach. Knowledge Transfer Partnerships, and its predecessor, the Teaching Company Scheme, have been in operation for the past thirty-five years, since the Teaching Company Scheme (TCS) was established in 1975 by the Science and Engineering Research Council. There are more than one thousand partnerships supported every year. Today, the KTP programme is managed by the Technology Strategy Board, an executive non-departmental public body (NDPB), established by the British Government in 2007 and sponsored by the Department for Business, Innovation and Skills (BIS). More than 350 case studies from KTP projects are available online⁴.

An example from Germany is the programme ‘Forschungsassistenz (Research Assistance)’ at Beuth Hochschule für Technik – University of Applied Sciences in Berlin⁵. This programme is funded by the Berlin Senate Department for Economics, Technology, and Women’s Issues. In contrast to KTP, which is a nation-wide programme, Forschungsassistenz is geared towards companies, especially SMEs, in Berlin.

Finally, Work Based Learning (WBL) – the focus of this paper – is distinguished from all concepts discussed so far by being much more profoundly situated in working life. Whilst all concepts discussed so far originated in educational programmes, or in the context of knowledge transfer from higher education institutions to domains of practice, the origin of Work Based Learning is in the workplace itself; as Brennan and Little (1996: 5) put it: “(..) the learning derived from the workplace is at the heart of the individual's overall programme of study and thus provides the starting point for its design, planning and implementation.”

Another crucial aspect is the interplay between learner, employer, and higher education institution in defining the learning process:

“(..) the aspect that distinguishes work based learning from other processes of learning is the part that negotiation between individual, employer and higher education institution plays. Negotiation between these three stakeholders in identifying achievable learning outcomes

³ Involved disciplines include e.g. mechanical engineering, economics, industrial design, computer science, psychology.

⁴ <http://casestudies.ktponline.org.uk/casestudies>

⁵ <http://www.beuth-hochschule.de/forschungsassistenz/>

which are meaningful and challenging to the individual, are relevant to the employer and have academic credibility; establishing, through negotiation, appropriate methods of and criteria for assessment acceptable to all parties; establishing and maintaining, through negotiation, a supportive learning environment (based primarily in the workplace).” (ibid: 5)

Regarding this core nature of WBL, it also becomes evident that WBL is mainly designed for mature learners with significant work experience. In contrast, the other learning environments discussed above are often used for ‘traditional’ students, or young people recently graduated from (higher) education.

WBL has a long history in the UK. Brennan and Little, in their above mentioned study funded by the UK Department for Education and Employment in 1996, could already draw on a substantial basis of experience regarding WBL arrangements in higher education (HE).

In Germany, WBL is more closely related to vocational education and training (VET). Also, there is no such central role of negotiation between individual learner, employer, and educational institution as in the higher education WBL programmes in the UK. Rather, the learning arrangement is set in a co-determination process involving employers’ and labour representatives, moderated by the German Federal Institute for Vocational Education and Training (BIBB).

An example of WBL-related VET programmes in Germany is the IT Further Education System (Loroff & Stamm-Riemer, 2006). A core element of this system is the methodology for work-flow-embedded qualification (in German “Arbeitsprozessorientierte Weiterbildung – APO”). Learning is guided by Work-Process-Oriented Curricula – these are generalised reference processes serving as a template to be filled with company specific content and procedures (Rogalla & Prehn, 2004). The learner is accompanied by a coach in reflecting learning processes. The coach also gives support for personal development. In addition, the learner is accompanied by technical experts to support technical problem solving processes (Loroff & Mattauch, 2005).

5. Creation of knowledge in Work Based Learning settings

Work based learning epitomises knowledge creation that is rooted in “the world of action, practice, and work” (Barnett, 2000:27). In its widest sense, WBL is both project-based and problem-based (and can include R&D in this interpretation) and it is always wholly connected to knowledge produced within a work context generally with the aim of implementing some kind of organisational change. This type of demand and market-led knowledge has been categorised as mode 2 (Gibbons et al, 1994), marking the apparent paradigm shift of knowledge epistemology from Enlightenment mode 1 science that valued knowledge and intellectual rigour to knowledge production - personally expressed through competence, skills and abilities and systemically and formally bounded, managed,

and exploited as organisational procedural or propositional knowledge and as knowledge capital (Tsoukas, 2005).

The recent and significant shift in the UK towards employment-based and industry-specific learning corroborates the mode 2 emphasis on utility, borne out by the previous Government's skills agenda focused on promoting and funding schemes that 'encouraged' universities to develop programmes in conjunction with employers such as the 'Employer Engagement' scheme. In this, the UK is not alone - across Europe this approach is being implemented through the "lifelong learning" paradigm, to the potential detriment of knowledge valid *per se*.

Knowledge transfer schemes and traditional higher education programmes presuppose a polarity where the university is the site of theoretical knowledge and the work place is a recipient, to which employees transfer and apply acquired knowledge using practical skills and competences to fulfil specific tasks and functions. This division negates the recognition that work is already an independent locus of existing implicit high-level learning and knowledge but organisations may lack the requisite skills and systems required to explicitly codify, validate, or build on this knowledge. There is a potential opportunity here for universities to collaborate with organisations and provide expert systems of codification that are highly relevant to the needs of both employees and organizational development. However, so long as universities persist in failing to acknowledge the work place as an independent and valid site of knowledge creation and in offering programmes that are largely unconnected to real-world demand, then the polarity between universities and organisations will continue, exacerbated by a lack of commonality in language describing needs (Connor, 2005).

Work based learning approaches can begin to bridge this divide by offering innovative programmes that focus high level critical thinking on work in order to facilitate specific outcomes of significance to the learner, their work and to the university (Garnett, 2005) - thus establishing a tri-partite partnership which in reality is usually weighted towards the university as senior knowledge partner. Notwithstanding this imbalance, one of the key benefits of reflective and critical analysis of tasks and learning enables the learner to reach beneath the surface of actions to understand and explicate the substantive knowledge and value bases that underpin the functional mechanisms of work processes from personal, professional and organisational perspectives.

Boud & Solomon (2001) have queried existing boundaries of disciplinary and work based knowledge challenging conceptions of universities' roles, and proposing the alteration of power structures and of ownership of learning and knowledge, thereby opening the way to enable universities and organisations to become collaborators in knowledge generation. Currently, the majority of work based programmes are predicated on systems that validate or accredit learning emanating from the work place, requiring learners to demonstrate on the university's terms with its fixed language, criteria and systems that they have attained high-level learning comparable to university-defined knowledge and/or competences. A fundamental question needs to be asked here: why does this

situation persist if knowledge creation increasingly occurs in work domains and could be validated there?

Knowledge needs to be viewed in a more holistic and universal way where it is shared rather than owned - although this premise immediately raises issues of commercial interests which might prefer to enclose knowledge that is relevant to their own needs. In this rather idealistic *weltanschauung*, knowledge can be created and grown in collaborative partnerships between industry and learning institutions, but this requires a paradigm shift that enables universities to engage with work and markets in new dynamic ways, acknowledging that they are not the sole arbiters or owners of knowledge.

Even where there are examples of the university engaging more equitably with social partners, these often focus more on validation of knowledge rather than on collaborative knowledge creation, thus reinforcing hegemony. Whilst the French system acknowledges the work place as a site of learning and some universities have forged close relationships with work organisations through the dual tutor system, developing joint programmes that meet the needs of those candidates who attain partial accreditation (or knowledge validation) of their experience, there is still a requirement that the university not only provides courses to fill the gaps, but also that the student must physically attend these. In the case of Middlesex University which has pioneered work based learning since the mid-90s, the programmes are highly flexible and innovative, coming much closer to a recognition of the work place as a site of independent and existing valid knowledge creation. However, the university still retains a position as judge and arbiter of learning as experienced and knowledgeable practitioners are obliged to present evidence of their knowledge in an academically acceptable format that meets an established set of level criteria.

6. WBL and innovation: Combining university-industry co-operations in R&D and lifelong learning (LLL)

Education – or more comprehensively, learning – as well as Research and Development are core prerequisites for innovation.

To become effective in practice, learning and R&D activities need to be intricately intertwined with real-life work settings, promoting and making use of innovation processes.

Work Based Learning and related learning environments are paradigmatic instruments to establish and reinforce these links between learning, R&D, and innovation, with a special emphasis on small and medium-sized enterprises (SME), because they rather focus on small-scale, pragmatic innovation projects.

In chapter 4, learning environments like Problem Based Learning (PBL), R&D internships and Work Based Learning (WBL) were introduced as complex frameworks for activities at the boundaries between education, research and development (R&D), and practice. In chapter 5, the collaborative creation of knowledge in WBL frameworks was investigated in more detail.

With regard to the overall topic of this paper – ‘Promoting Innovation by Work Based Learning’ – it may be asked which role WBL might play in supporting innovation in industry, especially in small and medium sized enterprises (SMEs).

Figure 2 shows EUROSTAT data from the 5th Community Innovation Survey in 2006⁶, referring to enterprises with innovation activities. These innovation activities may include product, process, or organisational innovations. The data show percentages of enterprises cooperating with any type of external partners in these innovation processes, and with universities in particular.

It becomes apparent that in most European countries less than half of the innovating enterprises cooperate with external partners, although some individual countries score much higher. More specifically, the cooperation rate with universities is considerably lower, below 20 percent for most, below 10 percent for some countries. Notable exceptions are Finland and Slovenia with proportions as high as more than 30 or 20 percent, respectively.

For Germany, there are no data, unfortunately, for cooperation with universities. It can, however, be observed that the total cooperation rate – regarding all types of partners – in Germany (about 17 percent) is less than half as high as the cooperation rate with universities alone in Finland (about 36 percent). Thus it seems that there is much room for improvement regarding university-industry cooperation in R&D and innovation, and the example of countries like Finland shows that a much higher level of this cooperation – as compared to most other countries – is possible. It also seems to be no coincidence that Finland repeatedly gained top scores in international comparisons of innovation systems, for example in the European Innovation Scoreboard⁷.

⁶ More recent data not available.

⁷ <http://www.proinno-europe.eu/page/european-innovation-scoreboard-2009>

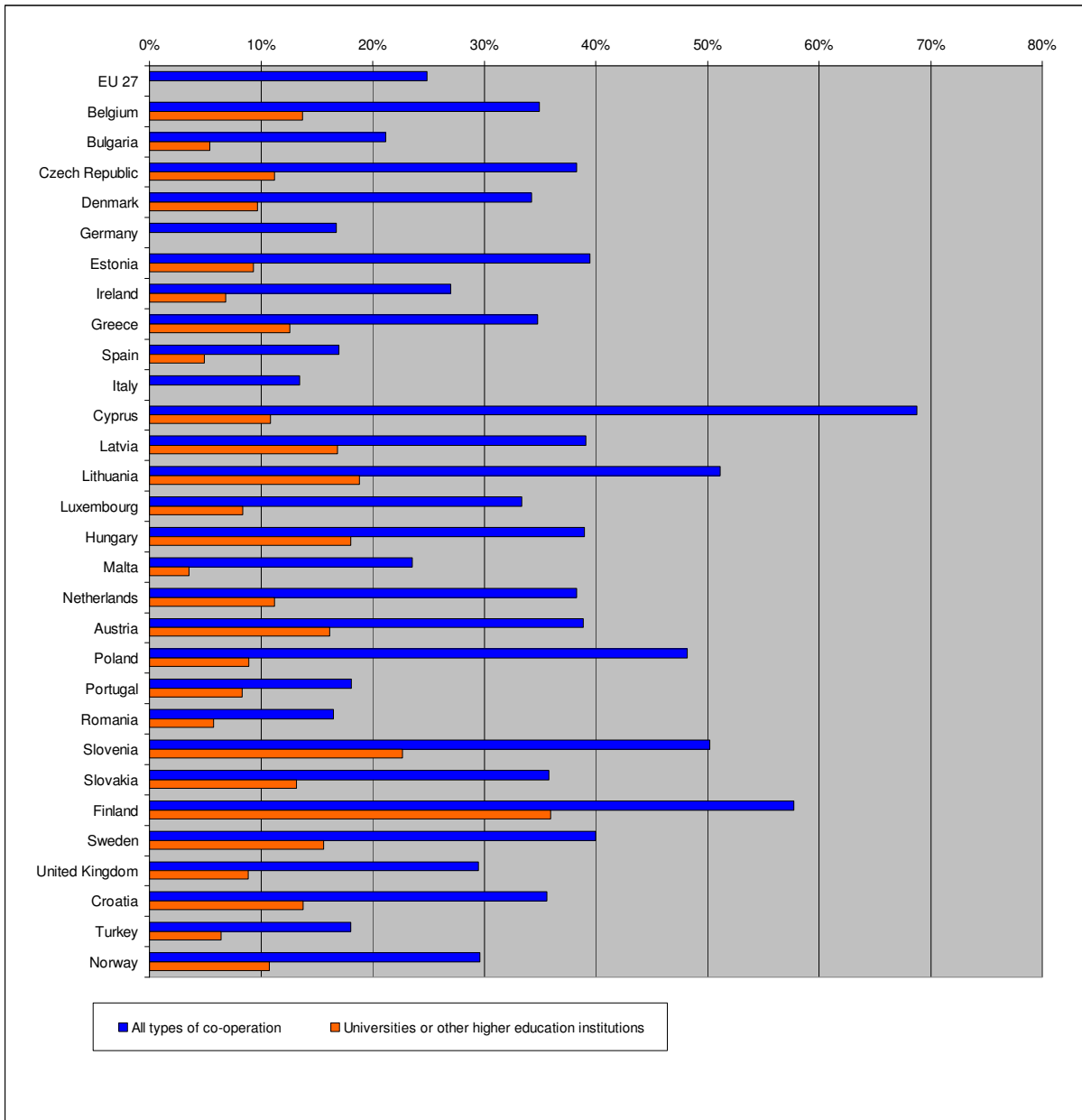


Figure 2: Cooperation of enterprises with innovation activities with external partners (all types), and with universities in particular, 2004-2006 (EUROSTAT, Community Innovation Survey 5, 2006)

Figure 3 shows data regarding the cooperation with universities and other higher education institutions, also for enterprises with innovation activities. In this figure, data are shown separately for enterprises of different sizes, as measured in numbers of employees.

As can be seen here, cooperation ratios with universities can be 50 percent and higher for large enterprises (more than 250 employees). For the two subsets of smaller enterprises (10-49 and 50-249 employees, respectively), percentages are considerably lower, below 10 percent for the smallest enterprises, and below 20

percent for the medium size in most countries. Again, Finland and Slovenia provide remarkable exceptions to this rule.

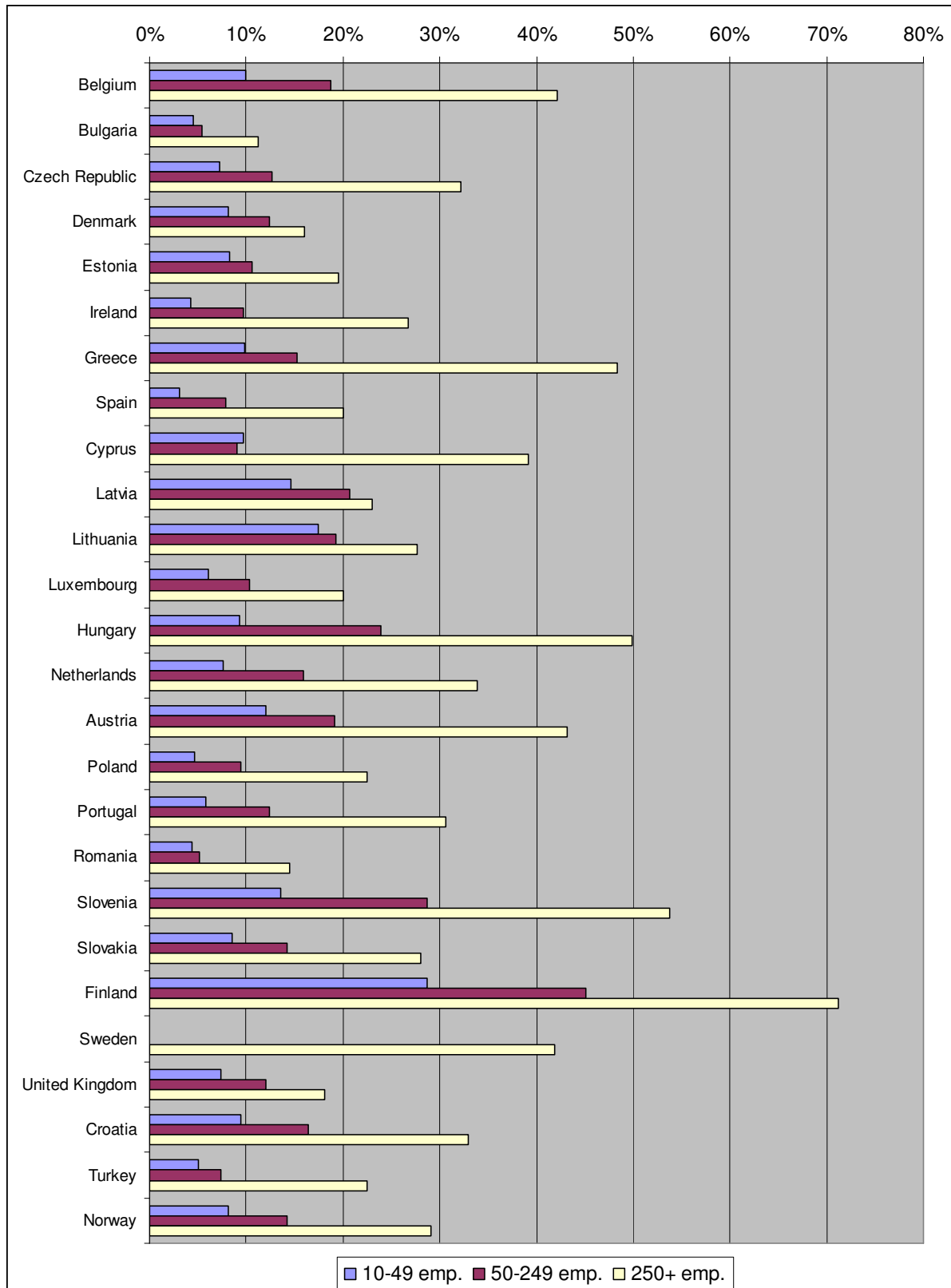


Figure 3: Cooperation with universities of enterprises with innovation activities, 2004-2006 (EUROSTAT, Community Innovation Survey 5, 2006)

Regarding all these data, it has to be kept in mind that they all refer to enterprises already involved in innovation activities. These enterprises might be able to improve those innovation processes through cooperation with universities. Besides this, there are lots of enterprises – generally speaking, more than half of all enterprises in Europe (ranging from 37 percent in Germany to 84 percent in Latvia, with more than 50 percent in most countries⁸) – not involved in innovation activities of any kind. For these companies, low-threshold opportunities to cooperate with universities could be a crucial prerequisite to become engaged in innovation.

The core argument of this paper is that WBL – and related concepts like PBL and R&D internships – have the potential to stimulate those innovation processes, for both types of enterprises, those already involved in innovation, and those which are not (yet).

In 2007, the Organisation for Economic Co-Operation and Development (OECD) published a study on higher education's role in regional development and innovation (OECD, 2007). In this study, three types of university-industry relations are distinguished:

- “Relations between multinational enterprises and world-class universities. Multinational enterprises externalise part of their research and development activities and are looking for laboratories, scientists and students.
- Relations between higher education institutions and small high technology firms (spin-offs and knowledge-intensive business services).
- Relations developing in a regional context between firms, often SMEs, and the local higher education institutions. Here firms are looking for short term, problem-solving capabilities. These services are often promoted by means of regional clusters around higher education institutions.” (OECD 2007:119).

The third type of university-industry relations is the most crucial in the context of this study. The authors argue that – despite R&D results being available on national and global levels – regional proximity still plays an important role in innovation processes based on industry-university cooperation. In recent years, the location-centred concept of clusters has developed into a core element of innovation policies in many countries. According to Michael E. Porter:

“Clusters are geographic concentrations of interconnected companies and institutions in a particular field. Clusters encompass an array of linked industries and other entities important to competition. They

⁸ Based on data of the 5th Community Innovation Survey in 2006, http://epp.eurostat.ec.europa.eu/portal/page/portal/science_technology_innovation/data/database

include, for example, suppliers of specialised inputs, such as components, machinery, and services, and providers of specialised infrastructure. Clusters also often extend downstream to channels and customers and laterally to manufacturers of complementary products and to companies in industries related by skills, technologies, or common inputs. Finally, many clusters include governmental and other institutions – such as universities, standard-setting agencies, think-tanks, vocational training providers, and trade associations – that provide specialized training, education, information, research, and technical support.” (Porter, 1998:78)

In the OECD study, regional development policies based on this cluster approach, including close industry-university cooperation, are described for fourteen countries in Europe, America, Asia, and Australia. All these policies aim at establishing universities as key players in Regional Innovation Systems.

The New University for Regional Innovation (NURI) programme in Korea is an example of one of these policies. It was funded by the Korean Ministry of Education and Human Resource Development from 2004 to 2008 to enhance regional innovation and to ensure development outside the Seoul metropolitan area. 109 participating higher education institutions implemented more than 130 programmes aligned to the characteristics of the regional economy.

Another cluster-based approach is The Finnish Centre of Expertise Programme sponsored by the Ministry of Interior. These centres are focussed on key industries in different sectors including culture, media and digital content where there is a degree of regional specialisation in the private sector and research competence in universities and polytechnics. In 2003-2006, 18 different regional centres were set up across Finland. After a re-organisation in early 2007, there are now 13 nationally co-ordinated clusters that comprise four to seven regional centres of expertise.

The French Poles of Competitiveness Programme (Pôles de Compétitivité) is an industry-led initiative. Within the poles businesses, research and testing centres, basic and further training organisations combine their efforts to achieve a critical economic, scientific and technological mass in regions. In 2005, 67 poles were designated on the basis of national competition, 6 of which were worldwide poles, 9 with high international visibility and 52 regional or national poles.

In Japan, the METI Industrial Cluster Programme (2001-2005) was launched by the Ministry of Technology and Industry (METI) to foster the existing indigenous capabilities of 19 major regions. The programme aimed to support exchanges and cooperation between higher education institutions, industry, and the government with the key elements of development of technologies for local application and training for entrepreneurs. The 500 civil servants of the regional METI offices cooperated with 5800 SMEs and researchers from more than 220 universities. The programme entered its second phase in 2006-2010.

The “Kompetenznetze Deutschland”⁹ (Competence Networks Germany) initiative of the Federal Ministry of Economics and Technology brings together about one hundred leading innovation clusters in Germany, organised in nine topical domains and spread across nine regions in Germany. The nine topics are biotechnology, health and medical science, transportation and mobility, new materials and chemistry, production and engineering, aviation and space, energy and environment, information and communication technologies, and micro, nano, and optical technologies.

In cluster environments like these, work based learning and R&D frameworks serve as channels of cooperation, especially, but not exclusively suited for SMEs. In the OECD study, many specific examples of those frameworks are discussed, including the PBL, WBL and R&D internship concepts presented above.

7. WBL and accreditation of prior learning (APL)

As discussed in the previous section, WBL can play a key role in Regional Innovation Systems. To be a suitable instrument for industry, and especially SMEs, WBL needs to cope with a core dilemma relevant for all learning environments designed for gainfully occupied learners: the time needed for learning versus the time pressure in work processes due to high workload¹⁰. In other words, any learning environment suitable for industrial contexts must be highly time efficient.

WBL serves this purpose in an obvious way: the core idea of WBL is to use work-based problem solving, project implementation or organisational/professional development for learning thus, making double use of time spent as shown in Figure 4.

⁹ <http://www.kompetenznetze.de>

¹⁰ Cf. the core dilemmas identified for the International Monitoring to the Program „Working – Learning – Developing Competences. Potential for Innovation in a modern Working Environment“
http://www.internationalmonitoring.com/fileadmin/Files/20080605_IMO_en_gl.pdf

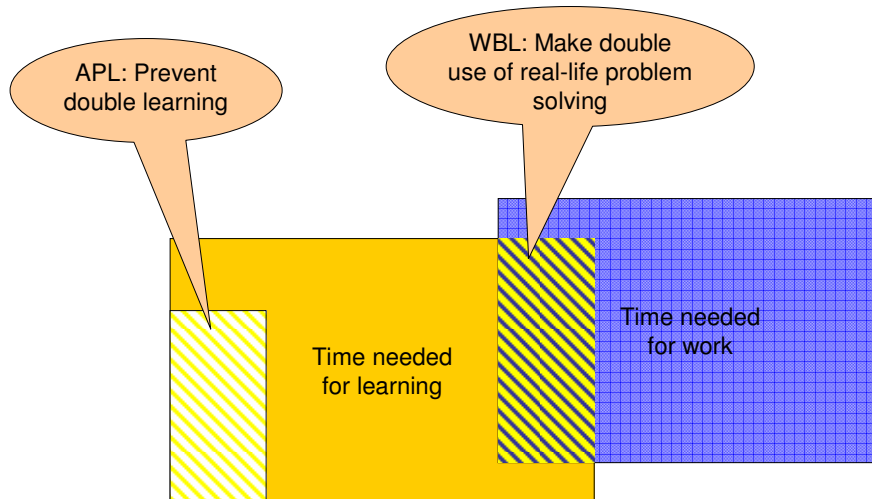


Figure 4: Time efficiency effects of Work Based Learning (WBL) and Accreditation of Prior Learning (APL)

The reasoning so far relates to future learning, learning that takes place after the learner has entered the WBL programme. But, as WBL learners usually have substantial work experience already, the scope of WBL can easily be extended to past – or prior – learning. This is where Accreditation of Prior Learning (APL) comes into consideration. APL means to recognise and validate outcomes of prior learning – i.e. knowledge, qualifications or competences gained through prior learning and experience – and accredit these learning outcomes through assigning credit points which may provide building blocks of higher education programmes. Additionally, APL can be highly time efficient as it prevents double learning (see Figure 4).

The importance of APL processes was underlined by the European Ministers responsible for Higher Education in their 2003 and 2009 conferences in Berlin and Leuven, respectively:

“Ministers underline the important contribution of higher education in making lifelong learning a reality. They are taking steps to align their national policies to realise this goal and urge Higher Education Institutions and all concerned to enhance the possibilities for lifelong learning at higher education level including the recognition of prior learning. They emphasise that such action must be an integral part of higher education activity.” (European Ministers for Higher Education, 2003:6)”

“Successful policies for lifelong learning will include basic principles and procedures for recognition of prior learning on the basis of learning

outcomes regardless of whether the knowledge, skills and competences were acquired through formal, non-formal, or informal learning paths.”
(European Ministers for Higher Education, 2009:3)

These statements have also been fully supported by the European University Association who committed themselves to Accreditation of Prior Learning in their Charter on Lifelong Learning (EUA, 2008).

In the statement of the European Ministers for Higher Education, formal, non-formal and informal learning are referred to. A well-known definition of these concepts was provided in the European Commission’s ‘Memorandum on Lifelong Learning’ in 2001¹¹:

- Formal learning takes place in education and training institutions, leading to recognised diplomas and qualifications.
- Non-formal learning takes place alongside the mainstream systems of education and training and does not typically lead to formalised certificates. Non-formal learning may be provided in the workplace and through the activities of civil society organisations and groups (such as in youth organisations, trades unions and political parties). It can also be provided through organisations or services that have been set up to complement formal systems (such as arts, music and sports classes or private tutoring to prepare for examinations).
- Informal learning is a natural accompaniment to everyday life. Unlike formal and non-formal learning, informal learning is not necessarily intentional learning, and so may well not be recognised even by individuals themselves as contributing to their knowledge and skills.

With respect to this typology of learning, APL procedures can be distinguished as approaches focussing on non-certified informal learning – Accreditation of Prior Experiential Learning (APEL) – and methods suitable for formal learning leading to certificates – Accreditation of Prior Certified Learning (APCL: Figure 5). In the case of non-formal learning, which may or may not involve certificates, either approach might apply. Usually, outcomes of non-formal learning are addressed by APEL procedures (Werquin, 2008).

Furthermore, APL methods can be divided into individualised and standardised procedures. Standardised procedures do not focus on individuals, but rather on certificates. The learning outcomes as certified by a specific certificate – e.g. a generally acknowledged VET certificate – may be given credit with respect to some other formal education programme – e.g. a Bachelor programme. Within the limits of this accreditation, each holder of this specific prior certificate will be awarded a specified amount of credit points for the future or ongoing programme, without any individual examination. Thus, the accreditation decision is made only once, and then applied to every individual holding the respective certificate. This

¹¹ <http://www.bologna-berlin2003.de/pdf/MemorandumEng.pdf>

standardised approach can also be used to accredit, for example, in-house company training.

In individual procedures, prior learning outcomes achieved by one specific individual are assessed with respect to learning outcomes required in a specific programme this individual is applying for. This approach is specifically suitable for outcomes of non-formal and informal, experiential learning (APEL). Additionally, outcomes of formal learning (certificates) may also be addressed in individual procedures, if these certificates have not (yet) been included in standardised accreditation processes.

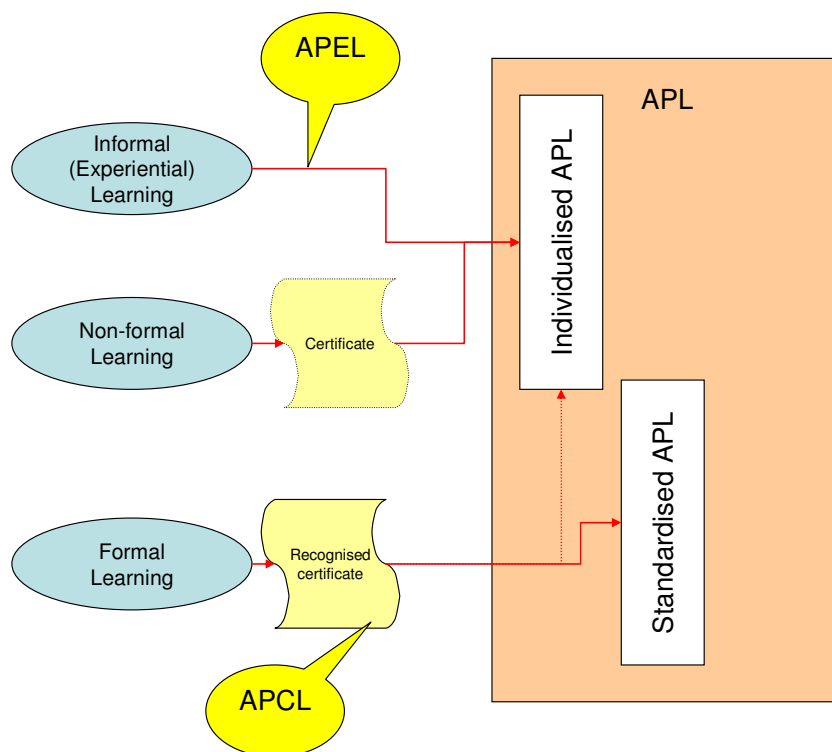


Figure 5: Pathways for the Accreditation of Prior Learning (APL)

APL procedures are often integral parts of WBL programmes. In Germany, the development and implementation of APL has been boosted since 2005 by the initiative ANKOM¹², funded by the German Federal Ministry of Education and Research (Hartmann et al., 2009).

¹² ANKOM: Anrechnung beruflich erworbener Kompetenzen auf Hochschulstudiengänge (Accreditation of Competences from Vocational Education and Training for Higher Education Programmes), <http://HIS/ANKOM:DE>

8. The WBL landscape in the UK

There is a complexity of provision under the WBL umbrella in the UK, although accurate figures for institutional participation are not available and the direct engagement of the Higher Education (HE) sector with industry is not so extensive when compared with some other European countries as corroborated in Figure 3 and 4 above. Provision can range from work experience taster or independent study modules on undergraduate programmes, the inclusion of WBL elements in graduate apprenticeships and foundation degrees to accredited in-company, Continuing Professional Development and cohort or individually negotiated programmes.

Brennan (2005) provides a useful classification of work based learning programmes in HE which include the use of key concepts of partnership, flexibility, relevance and accreditation (Reeve& Gallagher, 2002) as follows:

- *employability* focused on preparing people (usually at undergraduate level) for work within the lifelong learning agenda
- *skills development* focused on developing specific skills and competencies usually in relation to external sector standards
- *knowledge recognition, creation and development* focused on workforce or organisational development where pathways and outcomes can be negotiated

WBL is increasingly acknowledged as a legitimate higher education activity able to achieve national policy targets (Nixon et al, 2006). It is an ever-expanding field with a multiplicity of types of provision and providers and at levels ranging from the school curriculum with new Diplomas for 16-18 year-olds to professional doctorates. It is used by higher education institutions as part of blended learning programmes integrating work-related projects to ensure some relevance to industry, or as full negotiated programmes such as at Middlesex University; it is used extensively in vocational and training qualifications from school to graduate levels to learn or increase skills and competences; it is increasingly relevant in continuing professional development provided both by professional bodies and education institutions; and can legitimate learning in the work place through accredited in-company courses.

In the new, dominant lifelong or experiential learning and knowledge economy ontology, the paradigm of learning is often now understood in terms of value-based skills discourse that aims to develop employees ‘fit for purpose’. This is exemplified by the Leitch Report¹³ (2006) which was commissioned for the recent Labour Government and found that the UK ranked 12th for skills out of 18 comparative members of the Organisation for Economic Co-operation and Development (OECD). It recommended that by 2020, more than 40% of adults should be qualified to degree level, and that the provision of vocational education and training should be demand-led, adaptable and responsive with more direct

¹³ Prosperity for all in the Global Economy – World Class Skills: www.official-documents.gov.uk/document/other/.../0118404792.pdf

involvement of employers. This led to significant increased funds for up-skilling young people and adults within the vocational sector, and also in the HE sector through Strategic Development Funds (SDF) with particular focus on employer engagement. However, with the current recession and recent change in Government it is uncertain that such funding will continue. The Institute for Work Based Learning at Middlesex University, as a key and long-standing provider of innovative work based learning programmes, gained significant SDF funds operating over a 3-year period to establish a network of organisations and educational institutions that would develop learning programmes focused on meeting employer needs. As part of this, a specific pilot programme was developed that uniquely begins with a focus on projects and is the subject of the case study below.

9. In-depth case study of a new WBL programme at Middlesex University, London

9.1 Background to WBL at Middlesex University

WBL at Middlesex University originated in a research project in the early 1990s that established that learning occurred in the work place as employees had to demonstrate their knowledge gained from activities in order to work and progress (Portwood, 2000). Simultaneously, a modular credit-based academic framework was introduced and this enabled a WBL curriculum to be developed that took learners' experiences as the starting point and viewed work (paid and unpaid) as a field of study and a subject discipline unique to each individual. The Middlesex programme is distinct from many other higher education WBL programmes which focus on disciplines, professional development or vocational training, as it is usually unbounded by disciplines and focuses high-level critical thinking on work in order to achieve outcomes of significance to both the learner and the learner's place of work (Garnett et al, 2009).

The core WBL curriculum (see Figure 6 below) consists of four modular components that are individually negotiated and are generally sequential and applicable to both the undergraduate and the post graduate programmes - the Programme Plan and Research Methods modules are generally taken concurrently:

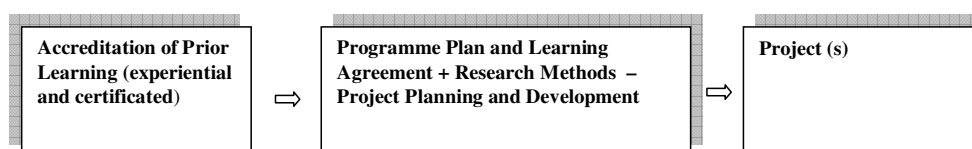


Figure 6: Basic structure of WBL at Middlesex University

A maximum of 2/3rds Accreditation of Prior Learning (APL) is allowed, and as a minimum, a degree programme will take 3 semesters in part-time distance learning mode. All learners will have an individual adviser to accompany them throughout the programme, and all work is assessed against the appropriate academic level criteria according to modules and award sought.

Many learners have little or no experience of higher education, and as no entry qualifications are required other than that of work experience as a qualifier, some experience difficulty in understanding and meeting academic requirements with concomitant sense of failure, despite being capable and knowledgeable in their own professional contexts.

This perceived knowledge gap together with the recognition that organisations already hold valuable knowledge and the need to engage more directly with employers formed the initial drivers for the conceptualisation of the project-driven approach, as a new strand of Work Based Learning at Middlesex University, complementing the well-established WBL programmes as described above.

9.2 The project-driven approach concept

The key concept lies in a unique university/organisation partnership approach that focuses high-level learning on real life work based projects that are designed to meet the business objectives of the employer, enhance the knowledge and competence base and motivate individuals by the prospect of gaining formal qualifications at higher education level. The starting point is the identification, planning and conduct of a work project - the converse of the WBL programme as described above - in conjunction with a university consultant who is instrumental in facilitating both the project development and the learning occurring as a result of this process. The key benefits to the organisation of this approach are:

- academic input and support for work objectives
- achievement of strategic workforce and organisational development aims
- clearly focused projects and project teams
- strategic use of work based projects to enhance the intellectual capital of the organisation
- development of individual and organisational professional competences and practices
- motivated staff leading to increased retention
- benchmarking, quality assurance, recognition, and potential accreditation of existing high level individual learning
- potential to draw on a pool of university research expertise

9.3 How this works in practice:

Initial informal meetings are held to identify appropriate projects, and then a formal agreement is signed with the university working closely with the organisation to achieve success, and provide quality assurance and professional development opportunities. The role of the university consultant is to help:

- identify and articulate the project knowledge, learning and competence development opportunities within the agreed projects
- link the strategic organisational objectives to learning objectives
- facilitate the learning and professional development of the whole team and of individual project team members
- accredit the learning of individual project team members
- establish a clear, informed project rationale with a substantive theoretical base using a range of methodologies and approaches
- assess and evaluate the project outcomes

The process is articulated in four stages:

1. **Initial project identification and agreement:** two initial informal meetings (free of charge) are held between the Institute for Work Based Learning (IWBL) and the organisation to agree outline Terms of Reference, to identify appropriate project(s) and project team members, and an appropriate university consultant to support the project work. This is then formalised in a written agreement. *N.B: Constituent members at most stages are senior manager(s) of the organisation, the project team, and a senior IWBL academic consultant.*
2. **Detailed project identification and project plan:** at least two meetings (daily cost incurred) are held between the organisation's project team members and the designated university consultant assigned for the project duration to:
 - identify the strategic workforce and organisational development aims
 - ensure the proposed project is focused on these aims and its wider impact is identified
 - establish a framework to identify and evaluate the potential university-level learning of individual project team members and how that learning might impact on others
 - identify any potential project knowledge gaps
 - agree a project plan and key milestones against which progression can be assessed and quality assured
3. **Interim project evaluation:** (daily cost incurred) at one (or by agreement more), project milestones, the designated university consultant works with the project team to benchmark the interim internal organisational evaluation, identifying and giving feedback on:

- interim outcomes mapped v. the project objectives and strategic aims
- individual team members' interim achievements and learning mapped v. the university's Learning Outcomes Framework and recommendations are made to supplement any perceived shortfalls
- any project shortfalls and proposed actions

4. Final project evaluation: (daily cost incurred) at project completion, the project team and the designated university consultant benchmark the final internal organisational evaluation, identifying and giving feedback on:

- final outcomes mapped v. the project objectives and strategic aims
- individual team members' final achievements and learning mapped v. the university's Learning Outcomes Framework

The completed and evidenced written project reports are assessed by two Institute academics, whilst the oral presentations are evaluated by an academic jointly with the senior manager(s) of the organisation. Participants can subsequently progress onto full Honours or Masters Degrees pathways, or can opt for one of the following qualifications dependent on their level of academic achievement:

- **University Certificate in Work Based Studies**
 - NQF¹⁴ Level 4 60 credits (30 ECTS)
- **University Diploma in Work Based Studies**
 - NQF Level 5 60 credits (30 ECTS)
- **University Advanced Diploma in Work Based Studies**
 - NQF Level 6 60 credits (30 ECTS)
- **Postgraduate Certificate in Work Based Studies**
 - NQF Level 7 60 credits (30 ECTS)

9.4 Guidelines and support for completing the project

The current support provided for learners engaged in completing a WBL undergraduate or postgraduate degree by distance learning consists of handbooks for each module, online resources, workshops, face-to-face tutorials, peer group support and regular formative feedback. The existing handbook for projects consists of 70 pages, in conjunction with a further 66 pages of more generic information on the work based programme. The project-driven approach team

¹⁴ National Qualification Framework

considered that this amount of information would be unhelpful in conducting an organisational project within a set time-span, so project guidelines¹⁵ were written that provided the elements both for the project and to identify the learning. These were produced in a series of information sheets (IS) designed to be used at the different stages outlined above, and are presented below in Appendix 1 in order to enable the reader to identify with an employee for whom academic learning may not be the norm, and who receives these sheets at intervals during the four project stages¹⁶. Support was provided by the academic consultant, members of the peer project team, and the senior managers involved in the process – in this pilot the online and university library resources were not used.

9.5 The project-driven approach pilot

The first organisation interested in piloting this approach to learning was a construction company who aimed to develop their senior managers in order to expand their business – this clearly stated ‘bottom line’ aim undoubtedly resonates with most organisations who view human resource (HR) development as critical to innovation and becoming, or maintaining a position as market leaders. During *Stage 1* the two key areas of health and safety and waste management within which the projects were to be conducted were proposed by senior directors in agreement with the managers who would conduct them. A contract was then signed between the company and IWBL clearly laying out project stages (described above), timescales, support and costs, and the university academic consultant was appointed¹⁷. Four managers from across the company signed up to undertake the projects – in this first pilot they were keen to progress to a full degree in work based learning: two on BAs and two on MAs – and only one participant already had a degree.

Stage 2 comprised the detailed outline, plan, and development of the individual projects, linked to *Information Sheets 1 & 2*. The university external consultant (EC) created a useful framework and template (in Figures 7 & 8 below) for planning and implementing the projects, which commenced the shift of the learning framework from a university-oriented narrative to an organisation relational schema which conceptualised the project as a critically important *product* that concomitantly (but secondarily) was able to identify substantive learning that could be recognised by the university. This innovative way of viewing knowledge is key to the eliding of boundaries (Scott, 1997) and the new types of relationships that can be formed between two currently very distinctive and often parallel worlds: the academy and the work place. It also foregrounds the value of ‘project-oriented, problem-centred, practical and trans-disciplinary knowledge’ (Trompenaar, 1993) that finds expression in work based or work

¹⁵ Drawing on some of the material in the IWBL Project handbook

¹⁶ These Information Sheets will be referred to by number throughout this text

¹⁷ The academic (EC) had significant experience in organisational development, but less in WBL programmes, which enabled him to facilitate a different approach to learning than one that might have been taken by a more experienced WBL academic

related learning, and signifies that academic discourses need to relate much more closely to real world domains, rather than trying to fit these into an existing academic framework.

Additionally, by working in an innovative academic/organisational partnership, the dynamics of work based learning can be seen as a wider social process that impacts not only on the individual's personal and professional development, but also directly on the work environment and on economies of time and cost. This is a crucial factor as resources were invested that were able to simultaneously produce real benefits: to the individual participant gaining knowledge, expertise and public recognition and to the company that measured and advanced its own practices both internally through the production of guidelines and procedures and verified these in the public domain through the implementation of its new approaches.

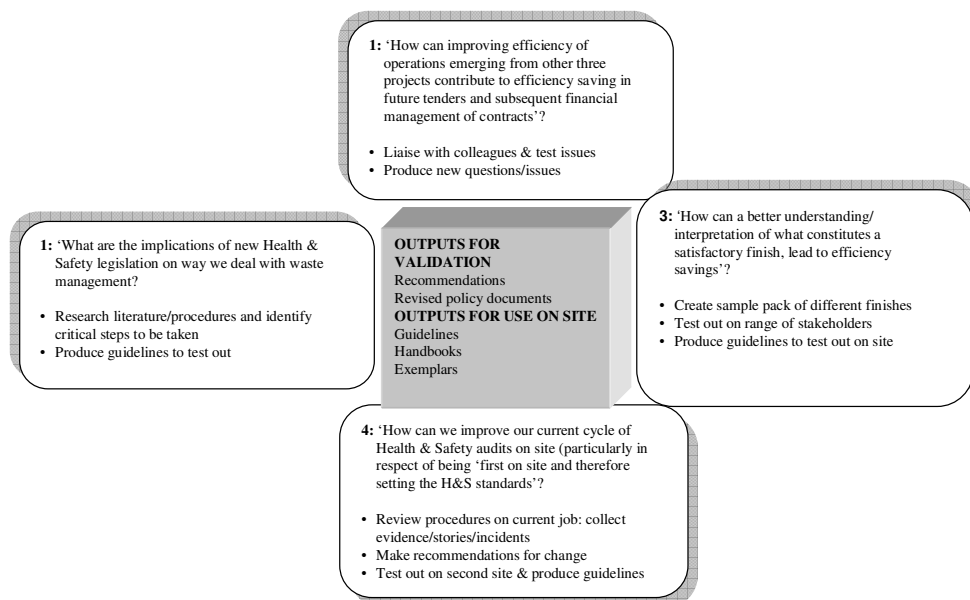


Figure 7: Framework for Integrating Learning from WBL Projects

Comparing *IS 1* to the framework in Figure 7 above, it is clear that the *IS* emanates from the university with terminology that is potentially a barrier (eg: critical awareness, methodology, inquiry), and also takes an instructional top-down approach (eg: the simplistic project cycle model). Assumptions have been made that professionals have little knowledge of conducting work projects which in many cases will be false, and the focus has been placed on *how to do the project* rather than on identifying the *substantive knowledge, learning and competences* required to do the project.

NB: Project 1 changed subsequently to 'Averting falls from heights'; project 2 to 'The implications of changes in waste management legislation'.

The support provided by the academic consultant in all stages of the pilot was crucial in jointly identifying appropriate projects and in facilitating the

understanding of what was required both by the company and by the university. However, it was highlighted in an internal university review of the pilot that a more structured approach to the initial meetings is essential in order to focus more on organisational strategic development or change and early needs analysis from which a range of projects can emerge or be identified, rather than struggling to identify projects as was the case in this pilot.

IS 2 focuses on planning the project - again in a fairly simplistic way with no guidance to explicating the substantive skills and knowledge base. The EC usefully linked this phase to Kolb's (1984) experiential learning cycle¹⁸ and to the university's assessment criteria as shown in the framework in Table 1 below drawing on project 2 as an example.

Activities on plan <i>Concrete Evidence</i>	Questions/problem s/issues emerging. Reflections. Evidence to support learning descriptors <i>Reflective Observation</i>	Other people involved <i>Active Experimentation</i>	Emerging themes <i>Abstract conceptualisation</i>
Review change in legislation re waste management & implications for the company Investigate current practice & systems for managing waste Test out level of awareness of managers and staff Create guidelines for use on site Involve H&S manager in how to introduce Introduce & evaluate	Keep note of issues & questions that arise as you put your plan into action. Note your reflections and see if you can relate to evidence you need to provide to meet learning descriptors that apply to your project (ie: level 6/7). For example: reflect on how you are becoming aware of your ability to 'critically appraise' your practice (B2 – see appendix 2 for criteria)	In becoming aware of how you can learn from a work based project, you also become aware of other people whose knowledge/help you need. You also become aware of people who will be affected/influenced/changed by the outcome of your project. As you complete each phase of your plan keep note of others who you have engaged with – later on these people can best testify to the success of your project	As you complete each stage of the plan, note what seem to be the emerging themes and patterns that help you make sense of the evidence you are collecting. Also note how what you are finding (or not) complies with/differs from what others have discovered or what has been reported in the press or in professional/Government guidelines

Table 1: Framework linking project plan activities to learning

This framework takes a more holistic output-oriented approach to the work based learning process, helping participants to produce evidence in order to meet the assessment criteria and reflect on their own practice and the likely impact of their project on others and on the organisation. The 'emerging themes' column focuses on making 'sense of evidence', however, in abstract conceptualisation it is crucial to ground practice in theory in order to fully understand and surface underpinning

¹⁸ Seminal theory underpinning WBL

theories leading to the establishment of new ‘norms’. This type of approach was tested previously with management workshops run for SMEs¹⁹ where the process of joint knowledge articulation and legitimization (see figure 8 below) through living theory based in practice (Whitehead & McNiff, 2006) was able to create collective intellectual capital. Thus, individuals, organisations and the university linked the “dispersed social systems” (Cope, 2000:155) and learning flowed back into the university domain as codified new theory, and into the work place domain as codified structural capital such as new systems or procedures (Light, 2009).

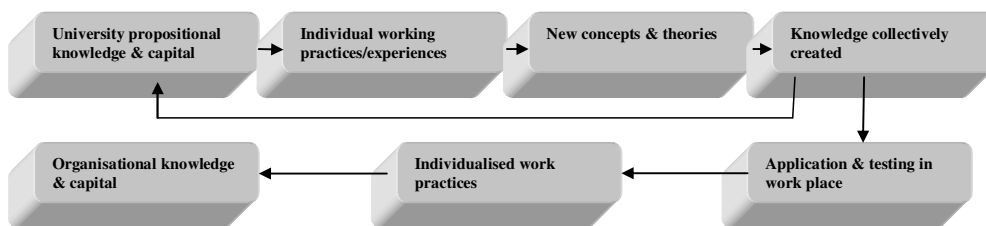


Figure 8: The process of collective knowledge creation

This model demonstrates that this could be a key and innovative way in which universities and organisations can collaborate closely in surfacing practice-based theories and in creating knowledge and capital of mutual benefit.

Stage 3 of the project-driven approach process is a formative evaluation that aims to map interim project and learning outcomes linked with *IS 3* & 5. Participants can write reports of their projects in a style of their choosing (*IS 3*), but as only two options are detailed²⁰, it is almost inevitable that one of these will be chosen. In this pilot a hybrid of these was adopted, with the inclusion of a product prototype and terminology more appropriate to the sector than in *IS 3* as compared in Table 2 below.

Chapters	IS 3 - Reporting project learning	Pilot projects
1	Introduction	Introduction
2	Terms of reference/objectives	Objectives & approach
3	Professional inquiry approach	Inquiry & investigation
4	Project activity	Findings & observations
5	Project findings	Conclusions & recommendations
6	Conclusions & recommendations (including reflection on learning)	Reflection on learning
	References & appendices	References & appendices

Table 2: Table comparing project report structures

¹⁹ Small and Medium Enterprises – (see Light, 2009)

²⁰ Option 1 allows for a critical commentary (with reduced word count requirement) on a ‘product’ which can be loosely interpreted; option 2 is based on the main style in current use at IWBL

As part of the work based learning framework *IS 3* follows a more academic methodology in its structure, particularly in the first two chapters, whilst the pilots engage more immediately with the real world projects in structure and in terminology. Part of the consultant's facilitation role seems to be that of interpreting the university framework and acting as a bridge between two very diverse domains, which indicates that barriers still need to be broken down in order to mesh academic/organisational approaches. The EC produced an interpretative visual (see Figure 9 below) to help negotiate this barrier, but it might be opportune to define project reports produced for academic recognition in terms of expected project and learning *outcomes* rather than by report *structure*.

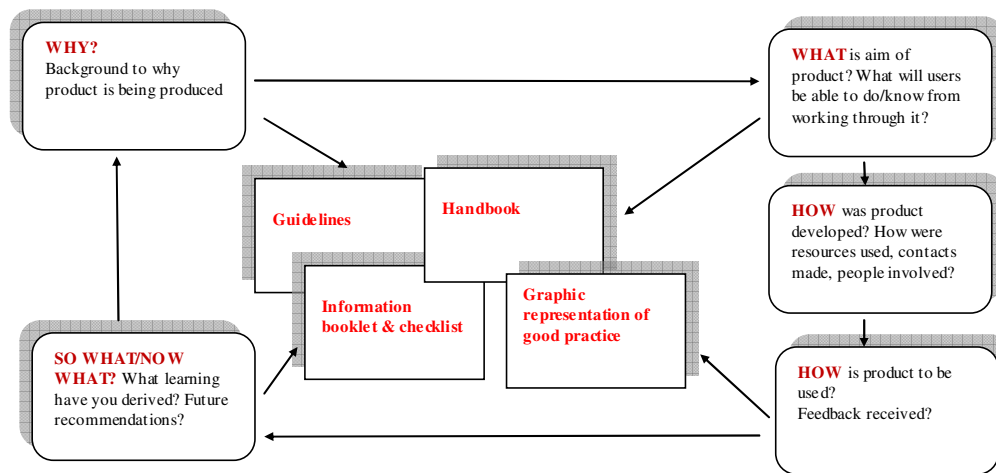


Figure 9: Framework encompassing project product and critical commentary

Using the 'question words' as analytical tools enables the project/report development and concomitantly creates a link to the assessment criteria²¹ eg: 'what learning have you derived?' (criteria B2 & C1) and 'what resources have you used?' (criterion C2), thereby ensuring that the project report is written with an additional focus on summative assessment.

A critical part of the project report is the university requirement that the ethics intrinsic in the conducting of the project is carefully considered and made explicit (it is also assessed in criterion A3). *IS 4* on ethical considerations follows University and Institute guidelines focusing on:

- current legislation such as data protection
- negotiating access and consent to participants involved in the research (ie: the potential research subjects)
- anonymity, confidentiality, and the rights of participants
- the use of inclusive language
- intellectual property rights

²¹ See appendix 2

Particular emphasis is also placed on researching with vulnerable subjects such as children or patients in the health sector and meeting specific and stringent codes of practice and legislative requirements. Learners on a full WBL programme would have justified the ethics of their projects in the Programme Plan and the Research Methods modules, but it has become increasingly apparent recently that the Institute ethical guidelines need to be much wider in order to fully represent its constituency of learners²². This has been particularly obvious in this pilot, where the participants commenced with the project that is normally the end point of a WBL degree, so were able to apply their own ethical codes with immediacy and realism. For example, safety in the construction company is a matter of prime concern as much of the work is carried out at height – one manager stated in his project that he ‘wanted his workers to arrive at work safely and return home in the same condition’. The ethical imperative for these participants was therefore not the need to ‘negotiate access and consent’ or ‘use inclusive language’ but to ensure that all health and safety measures and legislation were implemented to the highest standard as this was the ‘*moral responsibility* of the company’. Whilst it is essentially a positive aspect of the WBL programmes that there is a requirement to consider ethics, these seem to be academically focused and narrowly framed within social science research projects which are not relevant to the real world projects that are undertaken within organisations - again highlighting the impellent need for a shift towards the recognition *per se* of learning emerging from the work place. More relevant codes would be, for example, demonstration of corporate social responsibility and consideration of sustainability issues.

The final stage (4) of the project-driven approach is that of evaluation and assessment where conceptually the project should meet:

- the strategic requirements of the organisation measured by successful and utilisable outcomes
- the learning outcomes of the university project module assessed using standard level assessment criteria (see *IS Appendix 2*)

Assessment was a difficult process from the university perspective because:

- the project reports were not exclusively structured and written for an academic audience, focusing more on the project outputs thereby making it hard for the assessors to identify the learning outcomes
- the language and terminology used was more relevant to the construction industry than to the university
- grading the reports was potentially divisive as the participants were partially collaborating, and the report structures were not easily comparable within the WBL programme framework

The academic consultant tasked with advising the participants on how to frame their reports in order to meet the organisational/ academic requirements, produced two frameworks – Figure 9 above and Figure 10 below. Whilst Figure 10 presents some of the key learning outcomes used to assess WBL projects: reflection,

²² Ethical guidelines are currently being revised

communication, resourcing, team-working, Figure 10 focuses on project processes, products and outcomes and the overall impact on the organisation. From the company's perspective, the projects were demonstrably successful as they met the stated aims of developing the participants and the company and from the university's perspective the learning outcomes had been met thereby validating the projects.

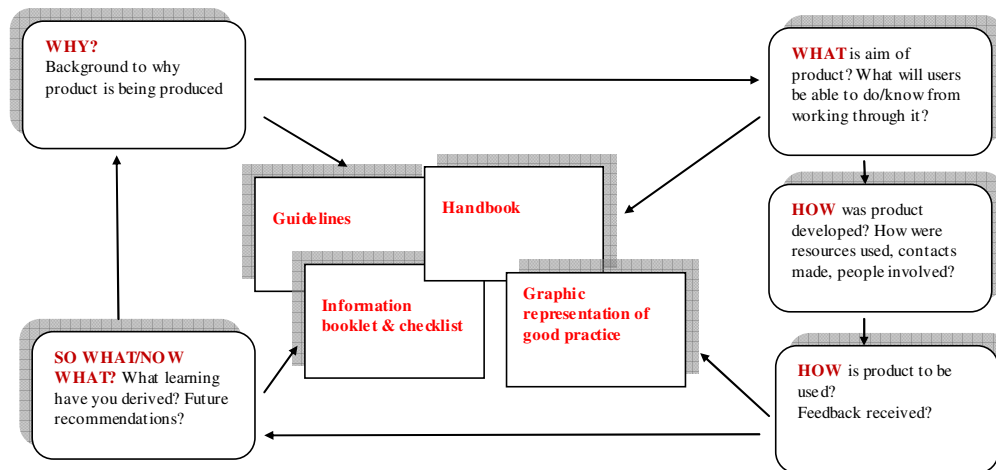


Figure 10: Framework demonstrating organisational outputs of projects

Standard university project assessment includes an oral presentation evaluated by the academic programme adviser and the second project supervisor –usually this is used formatively to enable the learner to improve certain aspects of the project through oral feedback, and the learner does not have sight of the oral assessment form. In this case, the oral assessment was summative - the company directors who had been instrumental in identifying the projects replaced the second supervisor and assessed the validity of the projects according to their value to the organisation; concurrently, the university consultant assessed the academic learning outcomes. Both assessors used different forms²³ in order to evaluate the relevant outcomes with the diverse criteria compared in Table 3 below, but again these were not given to the participant.

University criteria	Organisational criteria
Clarity and appropriate selection/ordering of materials (identifies context, central themes, approaches and rationale for the outcome/s and impact)	From what you have learned from this presentation about the project's outcomes what contribution will it/could it make to the organisation?
Ability to convey the essence of the project, enlarge and deepen assessors' understanding.	What are the project's strengths?
Ability to respond to questions (authenticity and depth of understanding)	What gaps emerged for you which need to be investigated further?

²³ See Appendix 3 for both forms – for interest a completed organisational form has been included by permission

Major strength and weakness noted	Recommendations for future action
<i>A grade is agreed</i>	Other comments

Table 3: Table comparing university and organisational oral assessment criteria

Several key observations can be made here:

- university criteria focus on assessing the project *process* and *approach* or *methodology* but the organisational criteria focus on project *outcomes*, *validity* and *utility*
- although presentation *skills* are not assessed by the university criteria, the ability to *prepare* a holistic presentation is, however the organisational criteria assess the *strengths of the project itself*
- university criteria assess the ability to respond to questions on the project (often probing on issues of methodology) and the key strength and weakness, but the organisational criteria focus on strategic needs and future actions

This comparison further highlights the divide between academic/organisational approaches to knowledge and learning - albeit it must be noted that the organisational form was drafted shortly before the presentations as the academic assessors realised the inappropriateness of the academic criteria for the company directors who were evaluating the project in the context of their strategic aims rather than as an academic exercise²⁴. For example, the company managing director clearly stated the critical and essential contribution one project made to dealing with working at heights:

“This presentation has outlined the procedures to be undertaken for a rescue from a fall from height or a rescue from a tower crane using equipment that has been assessed for its suitability of ease of use. The rescue procedure will be used by the company providing us with an excellent recovery plan in the event of a fall from height and may well lead to the saving of someone’s life”²⁵.

Compare this criticality to the academic criteria of assessing the ‘clarity and appropriate selection/ordering of materials (identifies context, central themes, approaches and rationale for the outcome/s and impact’, and it can be seen that the university needs to make a significant shift towards recognising and validating the **real** strategic personal, professional and organisational learning and impact that projects can have. If this divide has opened up between the differing oral assessment criteria and focus, then it also begs the question as to the nature of assessment of the written reports which analysed the project process, but also crucially focused on the development of prototype outcomes or products. These

²⁴ All the project-driven approach materials will be reviewed after this pilot

²⁵ See Appendix 3.3 for the full assessment

reports were assessed by academic criteria alone which focus on process ie: selection, uses and analysis of knowledge and evidence, methodology, ethics, reflection, application of learning, use of resources, team working and communication – only action planning potentially focuses on outcomes or impact.

Certainly, the mismatch of using academically-focused criteria to assess organisationally-focused projects represented the key issue in the assessment of these pilot projects posing the dilemma as to the appropriateness of these criteria in evaluating *organisational learning*. *Personal* and *professional* learning can be assessed through an academic framework adding significant value to the individual enabling them, for example, to construct meaning and new knowledge from their own practices (Moore, 2007) which will inform and enhance future practice as well as contributing to their organisation's intellectual and structural capital (Stewart, 1998). However, new tools which are 'fit for purpose' and capable of measuring both individual and organisational learning need to be developed in order to fully exploit the capability of university WBL programmes that are otherwise highly relevant to social and economic needs. These programmes can be innovative and ground-breaking focusing on facilitating the creation, recognition, socialisation, and use of knowledge (Costley et al, 2010), but concomitantly universities need to allow for enhanced connectivity and equality between the two domains and recognise that knowledge cannot be exclusively evaluated by academic criteria (Light, 2008).

Whilst the university, the company and the participants in this pilot all undoubtedly benefited from this partnership, it can be clearly seen in Table 4 below that the university faces a potential challenge to its existing approach to learning, and that the power dynamics need to change.

University	Participants	Organisation
Pilot for a new approach	A university award	Strategic development
Mirror for current approach	Analytical ability	Policies and procedures
Challenge to academic framework	Ability to reflect on practice	Handbooks and guides
New knowledge & understanding	New knowledge & understanding	New knowledge & understanding
Experience	Experience	Experience
New partnership	Project research ability	New partnership
Challenge to supporting materials	Project implementation skills	Motivated staff

Table 4: Table showing gains

One of the key points emerging here is that both the university and the organisation need to make a paradigm shift towards mutual recognition that a learning partnership is precisely that: an equal partnership comprising complex layers from which all stakeholders derive benefits using an analytical rational process to surface valuable learning. What might assist this shift is the enhanced use of reflection – this paper itself is a reflection on the project-driven approach pilot and it is exposing the relevance of the current WBL framework to strategic

organisational learning, whilst simultaneously remaining highly innovative and significant in flexible *individual* lifelong learning pathways and workforce development²⁶. The company directors reflected on the impact that the projects had on the organisation (see appendix 3.2), and the participants themselves analysed their personal learning journeys related to their styles, to Kolb's cycle and very closely to the conduct of their projects.

9.6 Conclusion to the case study

Although the work based learning programmes of the Institute for Work Based Learning are still in the forefront of integrating work and learning for individuals, and to some extent for organisations through accrediting internal learning frameworks, the project-driven approach pilot has clearly highlighted that there is still a divide between academic and organisational concepts of knowledge creation. In order to mitigate this, mutual recognition and validation between the two domains needs to mesh through a more equitable partnership, melding the organisational strategic outcomes as well as the academic learning outcomes into a single framework and using a facilitative dual 'tutor' system. In this way, the organisation and its learners will benefit from explicit, visible knowledge and valuable implementable 'products' as well as academic recognition and status, and the university will benefit through a close working partnership with the work place where real life projects generate mutually beneficial knowledge.

10. The WBL landscape in Germany

As already pointed out above in chapter 4, work as an environment of learning is a core aspect of apprenticeship programmes within the German Dual System. In Higher Education, however, WBL is extremely rare, or probably almost absent in Germany. A recent study performed by the Higher Education Information System (HIS)²⁷ provides some data about accreditation of prior learning (APL) and project based learning in German Higher Education, specifically within extra-occupational programmes (see also Völk & Hartmann, 2010).

The Bologna process (European Ministers for Higher Education, 2009) is relevant here in two aspects. Firstly, the – still ongoing – replacement of traditional one-phase Diploma programmes by the Bachelor / Master system has also spurred on efforts to set up specific programmes for gainfully employed students,

²⁶ From *A New Impetus for European Cooperation in Vocational Education and Training to Support the Europe 2020 Strategy* –

http://ec.europa.eu/education/news/news2888_en.htm

²⁷ The Higher Education Information System (HIS) supports German institutions of higher education (universities and universities of applied sciences) and their administrations as well as higher education policy-makers with services in three domains: Software for higher education administration, higher education research, and higher education development including higher education organisation, construction and building. Owners of HIS are the German Federal and states (Länder) Governments.

predominantly Master programmes for those who enter into the employment system immediately after achieving their Bachelor's degree.

Secondly, APL has always been a core issue of the Bologna process, although this is widely ignored in the public discussion. As discussed above (cf. chapter 7), and also demonstrated in detail in the Middlesex case study (cf. chapter 9), APL and WBL both crucially contribute to improving the permeability between vocational and higher education. Ideally, extra-occupational higher education programmes include APL as well as WBL elements to optimise this permeability for gainfully employed and practically experienced students.

Figure 11 shows data from the HIS study regarding extra-occupational study programmes at universities and polytechnics in Germany. These extra-occupational programmes are specifically designed for gainfully employed students, they usually rely heavily on various modes of distance learning or blended learning. Distance learning has a long tradition in Germany, including renowned institutions like the FernUniversität Hagen, founded in 1974, the only state-maintained distance teaching university in Germany, offering Bachelor, Master and Doctorate programmes on the main campus at Hagen as well as at the around 50 study centres in Germany, Austria, Switzerland and Central and Eastern Europe for over 69,000 students. In the last decades, lots of other higher education institutions focussed on distance learning have been established by private founders.

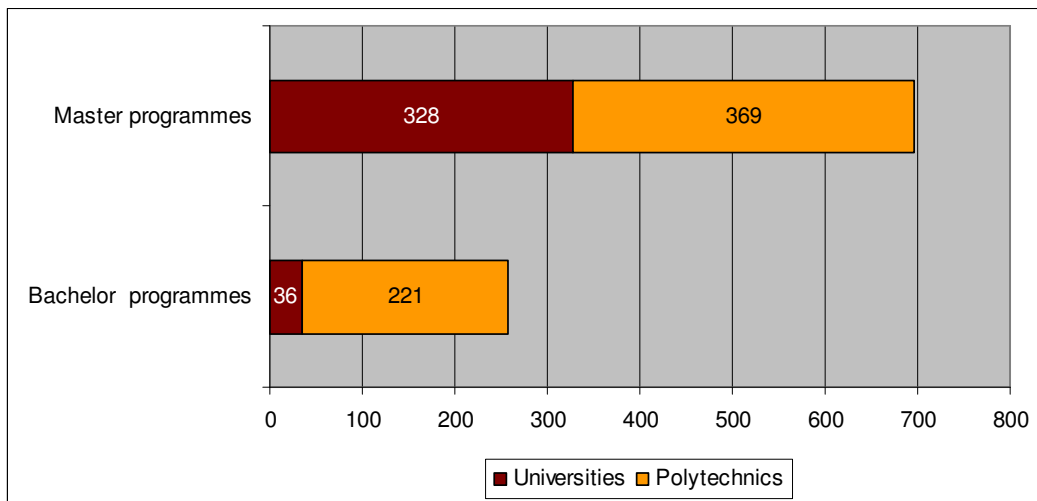
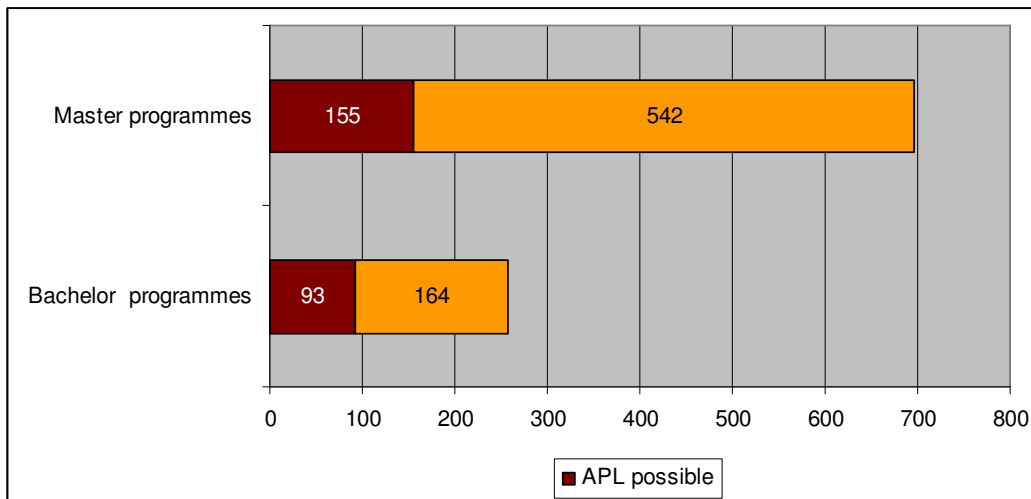


Figure 11: Extra-occupational study programmes in Germany (Source: HIS berufsbegleitende Studienangebote 2009)

Not surprisingly, polytechnics provide the majority of programmes, especially in the Bachelor domain.

The practical implementation of APL is not very widespread among German higher education institutions, although some progress has been made in recent years, as described in chapter 7.

Figure 12 shows data regarding the availability of APL procedures within the extra-occupational study programmes as shown in Figure 11. Among the Master Programmes, only about one fifth offers this opportunity, among the Bachelor programmes, it is a bit more than a third. This is what should be expected, considering that non-traditional students²⁸ – who are most likely to profit from APL – are not admitted to Masters programmes directly in Germany²⁹ and therefore need to enter Bachelor programmes.



²⁸ In a wide definition, non-traditional students are those who enter higher education on access pathways other than those traditionally designed for access to HE, the latter usually being certificates achieved at the second stage of secondary school (ISCED 3A, 'Abitur' and 'Fachabitur' in Germany). Because these traditional routes to HE and therefore – being relationally defined with respect to traditional routes – also the non-traditional pathways to HE differ between countries, this wide definition of non-traditional access routes includes substantially different types of access pathways to HE, depending on the country in question. Therefore, the authors of the recent EUROSTUDENT study (EUROSTAT, 2009) provided a narrow definition: "Non-traditional route is understood here as: Access to higher education through the validation of prior learning and work experience – with or without entrance examination." (op. cit., p. 59).

²⁹ In fact, the German situation is a bit more complicated, due to 'educational federalism', keeping most (almost all outside the areas of vocational and further education) political authority and legislation in the domain of education at the Länder level, as opposed to Federal level. In 14 of the 16 Länder, access to Master programmes strictly requires a first higher education degree (e.g. Bachelor). In Rhineland-Palatinate and Schleswig-Holstein, however, a direct access to Master programmes is possible for prospective students being vocationally qualified and/or having a defined amount of practical experience. This non-traditional access to Master programmes in these two Länder includes an entrance examination. In practice, however, these opportunities are not widely used; for some experiences from Rhineland-Palatinate, see Elenz & Oechsle (2010).

Figure 12: APL in extra-occupational study programmes in Germany (Source: HIS berufsbegleitende Studienangebote 2009)

Most interesting in the context of this paper, however, is the prevalence of project based, problem based or – ideally – work based programmes among these extra-occupational programmes. Figure 13 shows data regarding the percentage of programmes offering project based learning phases. Again, the share – more than a third – is higher among Bachelor programmes than Master programmes (between a fifth and a quarter).

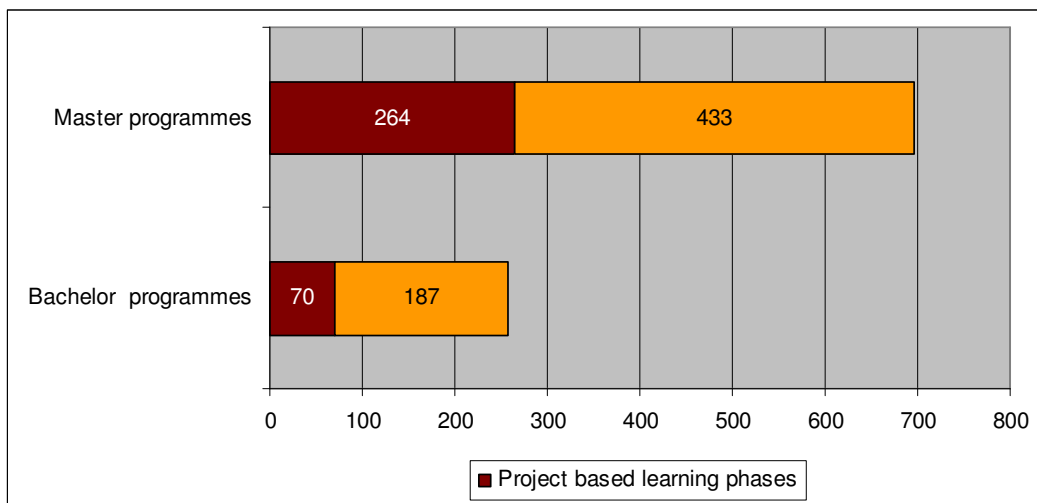


Figure 13: Project based learning in extra-occupational study programmes in Germany (Source: HIS berufsbegleitende Studienangebote 2009)

This research is based on publicly available descriptions of study programmes. These sources do not directly allow to discriminate further into the following three categories:

- Traditional project based approaches: Projects, although being related to practice, are predominantly defined in an academic context.
- Problem based approaches: Projects are focussed on real-life problems, and mostly taken from real-life contexts, but project work (predominantly) takes place at the HE institution (see chapter 4).
- Work based approaches: Real-life projects from the occupational environment of the students are (predominantly) being executed in work environments.

Further research on the basis of the databases provided by HIS will be needed to shed some light on this issue.

As the data presented above illustrate, WBL is far less developed and widespread in Germany as compared to the UK. Among the few programmes in existence, the two following examples represent advanced practice.

The Bachelor programme “Business Administration in SMEs” at Oldenburg University has learning projects related to or situated in students’ professional environments at its core. Elaborated standardised and individualised APCL/APEL procedures are also available (Hartmann et al., 2009)³⁰.

Another example is the programme “Process Technology” (Prozesstechnik) at Aachen University of Applied Sciences (FH Aachen), which is offered in close cooperation with a regional VET institution (Rhein-Erft Akademie; see also Schermutzki et al., 2010)³¹.

11. Cases: Generating innovation in WBL and related settings

The previous chapters gave an overview on WBL programmes in UK and Germany, and provided some in-depth insight in one specific programme.

As the main focus of this paper is the impact of WBL and related learning environments on innovation, this chapter will sketch some cases illustrating such innovation related effects.

The first two brief case studies refer to learners³² taking WBL programmes at Middlesex University, London, where learner-centeredness and reflective practice is key to achieving significant and innovative outcomes for all the stakeholders in the learning partnership - the learner, the organisation and the university. As has been highlighted above, the WBL project in the programme will always be about change - whether this is problematised or forward looking –and recommending solutions and actions forms a crucial part of the project. Personal and professional benefits will therefore accrue to the individual learner and the organisation (often the learning sponsor) will benefit from tangible recommendations and the implementation of required change.

Case study 1: The participant worked in graphic design and wanted to develop expertise in providing accessible information for visually or hearing impaired clients. The choice of the Middlesex programme enabled the participant to study at a distance within a tight time-frame; focus on making existing personal knowledge and experience visible and explicit; and the employer was able to work with the employee to ensure that the project was relevant to organisational needs. The participant benefited by acquiring confidence, enhanced professionalism and new skills and competences to better understand and resolve issues. The organisation benefitted from a more skilled employee able to new implement ideas and sound proposals to increase accessibility to the organisation’s services.

Case study 2: This case study refers to a postgraduate leadership and management programme for a major bank validated by Middlesex University with some organisational input into the programme design. Key advantages to the WBL programme over an MBA were the more practical focus on the work

³⁰ <http://www.bba.uni-oldenburg.de/>

³¹ <http://www.fh-aachen.de/prozesstechnik.html?&L=1%2525252Fdownload>

³² Extracts from “*Work Based Learning Impact Study*”, 2010, report prepared by Costley, C. & Abukari, A. for the Higher Education Academy: www.heacademy.ac.uk

context, compatibility with work schedules, and the specificity of directly meeting organisational development needs. The participant benefited from personal prestige and development, with the added benefit of a deeper understanding of professional work role, performance and how this impacted on others. As the employer had instigated this corporate programme in order to grow internal talent, the benefits were demonstrated through improved performance of the participant in applying enhanced cognitive skills when dealing with day to day issues.

While these two examples are more closely related to personal and organisational development, the following cases focus on technological innovation. They are collected from two German programmes mentioned before (see chapter 4).

Within the PBL-style Integrated Product Engineering programme at Otto-von-Guericke-University Magdeburg, a whole series of development projects focussed on sports and leisure equipment, like bicycles, skis, boats and other water sports equipment. These might be variants of existing products, or completely new types of devices. Other projects were more tuned towards industry or even agriculture, as e.g. an almond cracking machine to be used in developing countries.



Figure 14: Examples of IPE projects (LMI, Otto-von-Guericke-University Magdeburg)

Figure 14 shows some more examples from IPE projects, in particular (from left to right, top to bottom):

- **hausBOOT:** A modular design for floating houses.
- **rollSTUHL:** A modular design for an innovative wheelchair, geared towards enhanced activity, including a sledge module for strolls in the snow, or a trailer module to combine the wheelchair with a bicycle.

- **holzSCHLITTEN:** A foldable wooden sledge, as a high-end craftsmanship product.
- **trimaranBAUSATZ:** Further development of a do-it-yourself kit to build a paddling and sailing boat for two persons.
- **redesignWHEELMAN:** Redesign of the wheelman³³, a motor driven sports device. The feet are put inside the wheels, so that each wheel rotates around the respective foot.
- **punktFINDER:** A new GPS³⁴ based system to help surveyors find boundary stones and triangulation stations in the open country. The system consists of a hand-held device and sensor-equipped boundary stones or triangulation stations.

In the “Forschungsassistenz” programme of the R&D internship type at Beuth Hochschule Berlin, one project improved sensors and actuators for bionic hands, to be used e.g. as prostheses. In another project, a complex planning strategy for reconstructing historic buildings was developed, and applied to an old village church.



Figure 15: Example of a Forschungsassistenz project (Beuth Hochschule, Berlin)

Figure 15 shows a Forschungsassistenz project, the “Waterbike-Kit”, an inflatable and easily portable kit to temporarily convert conventional bicycles into waterborne vehicles.

All these projects were selected to be easily understandable for non-experts in the respective fields. Other projects are much more ‘technological’ or ‘scientific’ in

³³ <http://www.wheelman.de>

³⁴ Global Positioning System

nature, which implies that they cannot be explained by a picture and a few sentences.

As a final example for innovation-related effects of WBL and related learning environments, it is worth noting the well-known student satellite projects at Aalborg University (AAU) (Bhandari et al., 2006). An important year for Danish space activities was 1992, when the design phase of the first Danish satellite Ørsted began, in cooperation between AAU, the Danish Technical University (DTU), and several Danish companies. The Ørsted satellite was successfully launched in 1999. Inspired by the success of the Ørsted satellite, AAU and DTU launched initiatives to give students the opportunity to design, build, and launch small one kilogram cubesats, beginning in August 2001, when the AAU CubeSat and DTU student satellite projects were initiated.

At AAU, the AAU CubeSat satellite became the starting point for an educational program within space engineering, as a part of the Problem Based Learning (PBL) approach of AAU as a whole. The AAU CubeSat project started in September 2001. The satellite was launched on 30 June 2003 from Plesetsk Cosmodrome in Arkhangelsk Oblast, Russia, carried by a Rockot space launch vehicle. The main payload was a CMOS³⁵ imager, an active-pixel optical sensor.

Amongst many activities under the PBL space engineering program, students have participated in the pan-European student satellite SSETI-Express campaign, bringing together students from 14 different universities across Europe. The project was supervised and supported by the European Space Agency (ESA). In 2003, the SSETI³⁶ Association was created to work as an umbrella for international student space projects, and a network of students that will work together to design, build, launch and operate satellites or spacecraft.

The SSETI-Express satellite was launched on 27 October 2005 on a Russian Kosmos-3M space launch vehicle, also from Plesetsk Cosmodrome.

AAUSAT-II is another cubesat built and operated by students at AAU. It was launched on 28 April 2008 from Satish Dhawan Space Centre in India on a PSLV rocket. AAUSAT-II carries a radiation sensor and was still operational by December 2009.

The examples collected in this chapter demonstrate that various types of innovations – including personal and organisational development, re-design and new design of consumer products, and complex missions as satellite programmes – may all be included in WBL, PBL and related learning environments.

³⁵ Complementary Metal–Oxide Semiconductor

³⁶ Student Space Exploration & Technology Initiative, <http://www.sseti.net>

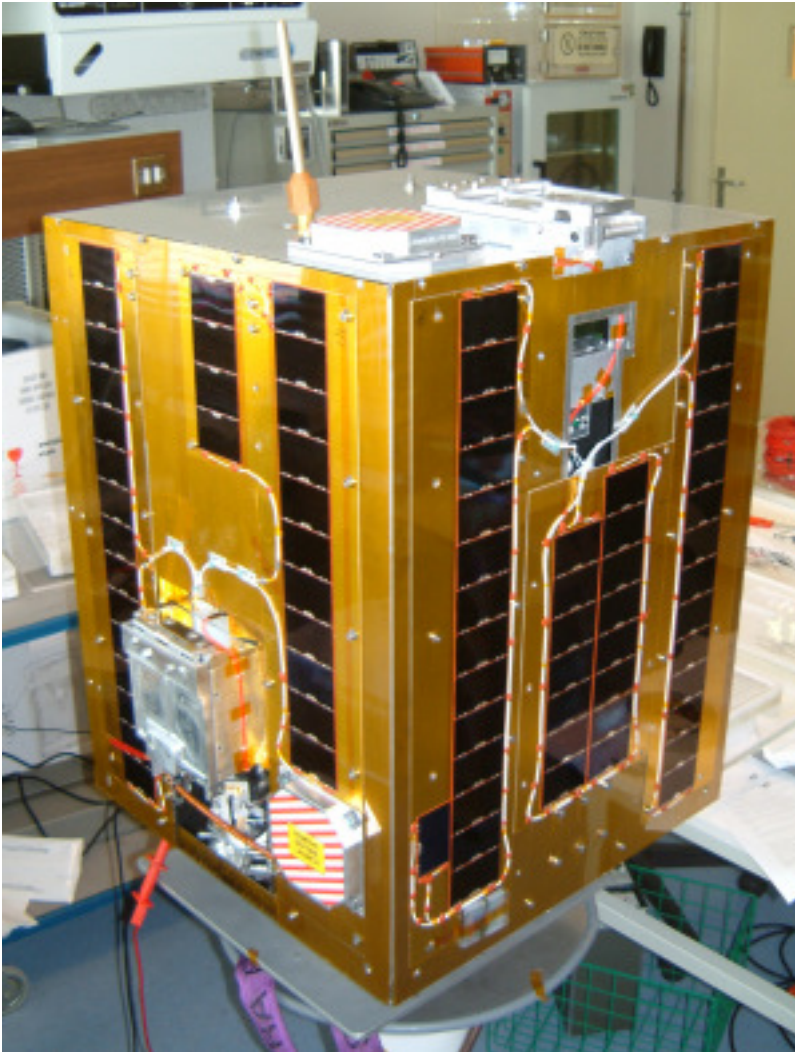


Figure 16: The SSETI Express satellite (Aalborg University, from Bhanderi et al., 2006)

12. Measuring the effects of PBL/WBL programmes on organisational knowledge and competence

In the previous chapter, impacts of WBL and related learning environments on innovation were illustrated with sample projects. In this chapter, a more comprehensive and systematic view on innovation related impacts of these learning environments will be put forward.

To assess the impact of interventions on the innovative ability of organisations, some concepts from research on intellectual capital have proven to be useful (Steward, 1998). A common distinction between concepts relating to intellectual capital refers to three classes of phenomena (Alwert, 2005):

- Human capital: The knowledge, skills, competences, motivation and other performance-related properties of the members of an organisation.

- Structural capital: The organisational structures and processes allowing the sustained operation and innovation of the organisation.
- Relational capital: Relations to all relevant groups outside of the organisation, like stakeholders, customers, suppliers, associations etc.

Human capital	Structural capital	Relational capital
Domain-related knowledge and skills	Corporate culture	Relations to customers
Practical experience	Cooperation and communication within the organisation	Relations to suppliers
Social competences	Equipment regarding information technology, software, and other technological systems	Relations to investors / shareholders
Motivation	Knowledge transfer and storage	External cooperation with educational institutions
Leadership skills	R&D for product innovation	External knowledge acquisition
Corporate education and Personnel development ³⁷	R&D for process innovation	Engagement in Associations, Engagement in Corporate Social Responsibility (CSR)
	Structural organisation	Image / Brand
	Process organisation	

Table 5: Human, structural and relational capital as determinants of innovative ability (modified from Alwert, 2005, p. 23)

These three aspects of intellectual capital may also be regarded as dimensions of organisational competence and innovative ability. The more an organisation is tuned towards maintaining, identifying, internalising and developing knowledge with respect to its employees, the organisation itself, and the networks the organisation is part of, the more it is able to use this knowledge in generating innovation (Mertins et al., 2008). Conversely, research and development for product and process innovation are important aspects of structural capital (cf. Table 5).

³⁷ Corporate education and personnel development is in itself no aspect of human capital, but rather of structural capital, as it refers to organisational structures and processes, rather than individual properties. But as these activities are geared towards maintaining and developing human capital, they are put here in the left column.

In the context of a project to evaluate innovation-related impacts of programmes to foster R&D cooperation between companies and higher education institutions on behalf of Berlin Senate Department for Economics, Technology, and Women's Issues, a tool was developed to assess effects of projects within these programmes on gains in knowledge and competence on the organisational, as opposed to individual, level.

One of these programmes is the 'Forschungsassistentz' programme, as described in chapter 4 (sample projects also in chapter 11). In Forschungsassistentz, a junior scientist cooperates in a practice-related research project with a company, usually a small or medium sized enterprise (SME). The junior scientist is jointly supervised by a professor and a practice supervisor at the company.

The other programme, 'Exzellenzandem' is similar, but in this case, it is a student performing his or her final thesis (Bachelor or Diploma thesis), rather than a junior scientist. As in 'Forschungsassistentz', however, the student is jointly supervised by a professor and a practice supervisor.

It was specifically emphasised that the tool for assessing impacts on knowledge gains on organisational level should be generally usable for programmes of this kind, or similar ones, beyond the original programme contexts (Globisch et al, 2010).

The concept of human, structural, and relational capital as components of intellectual capital – as proposed by Alwert (2005) – was used as a framework for the development of this tool. Table 5 shows the specific elements of human, structural, and relational capital. On the basis of this table of elements, items were generated for a questionnaire. For all these elements (e.g., domain-related knowledge and skills, product innovation, external knowledge acquisition), a set of questions was generated, in each case following the same structure, as detailed below:

- Before the project, was any effect expected regarding “...” (e.g. domain-related knowledge and skills, or any other element from Table 5)
- If yes, how was the expected magnitude of the effect (to be rated on a scale from 0 to 3, as indicated in Table 6).
- How was the magnitude of the effect actually observed (to be rated on a scale from -3 to +3³⁸, as indicated in Table 7).
- Please describe the actual effect (qualitative description)
- Is any effect expected for the future? If yes, which effect (qualitative description)
- Was the actual effect a single occurrence or a more sustainable impact, enduring over some time?

³⁸ The negative part of the scale was introduced to allow for the possibility of detrimental effects of the respective projects; in practice, no such negative effects were observed until the time of writing (June 2010).

- Besides the employee immediately involved in the project, were there any effects on other employees, or departments of your organisation? If yes, how was the magnitude of these effects? (to be rated separately for other employees and other departments on a scale similar to the one shown in Table 7)
- If yes, please describe this/these effect(s) on other employees / other departments (qualitative description)

No effect	Small effect	Medium effect	Big effect
0	1	2	3 ³⁹

Table 6: Scale for assessing expected effects

Negative effect				Positive effect		
big	medium	small	No effect	small	medium	big
-3	-2	-1	0	1	2	3

Table 7: Scale for assessing actual effects

In the exploration and development phase, the tool was devised as a face-to-face interview. Meanwhile, it has been transformed into a CATI⁴⁰ questionnaire. An online questionnaire was also considered as a design variant, but was discarded regarding the complexity of the questions, and the intended target group (SMEs).

The interview partner is a representative of the cooperating company, usually on some managerial or executive level. The person should be close enough to the project to be able to assess it and its effects, but should not have been directly involved; specifically, the interviewee must not be the practice supervisor of the student or junior researcher, respectively. Usually, the interviewee is the immediate superior of the practice supervisor. In SMEs, this is frequently the CEO of the company.

In the following, a preliminary analysis of interview data for ‘Forschungsassistentz’ and ‘Exzellenztandem’ projects is presented. It should be kept in mind that these data serve only illustrative purposes. The data are based on eight interviews conducted during the exploration and design phase of the tool. These results are shown here because they provide some illustration as to how future analyses of knowledge gains on organisational level brought about by

³⁹ A ‘big’ effect was defined as the maximum effect to be reasonably expected from an intervention of this kind. As examples, the effects of a one-day workshop – even if perfectly designed – should be small compared to the effects of a three-year R&D project. So, effects of one-day workshops (or three-year R&D projects) should be assessed relative to what might be reasonably expected from a ‘perfect’ one-day workshop (or three-year R&D project, respectively).

⁴⁰ Computer Assisted Telephone Interview

WBL/PBL or similar formats might look like. Thus, all following discussions of these data need to be regarded as preliminary and hypothetical, or rather hypotheses-generating.

Furthermore, it might seem peculiar that only a few of the impact dimensions (intellectual capital dimensions) tend to score high in the graphs presented in the following. Here, it has to be kept in mind that the impact assessment tool for organisational knowledge gains is designed to be applicable across a broad range of interventions and programmes. Each of these programmes will be designed for different sets of impacts. Thus, the selectivity of the impacts to be discussed below reflects the planned selectivity of the programmes under consideration.

Figure 17 shows data regarding effects of ‘Forschungsassistentenz’ and ‘Exzellenztandem’ projects on human capital. To interpret these data, two aspects should be considered. Firstly, although the organisational level is at the focus of the overall analysis, gains in knowledge and competence on the individual level are also important for the organisation. Thus, they are covered here.

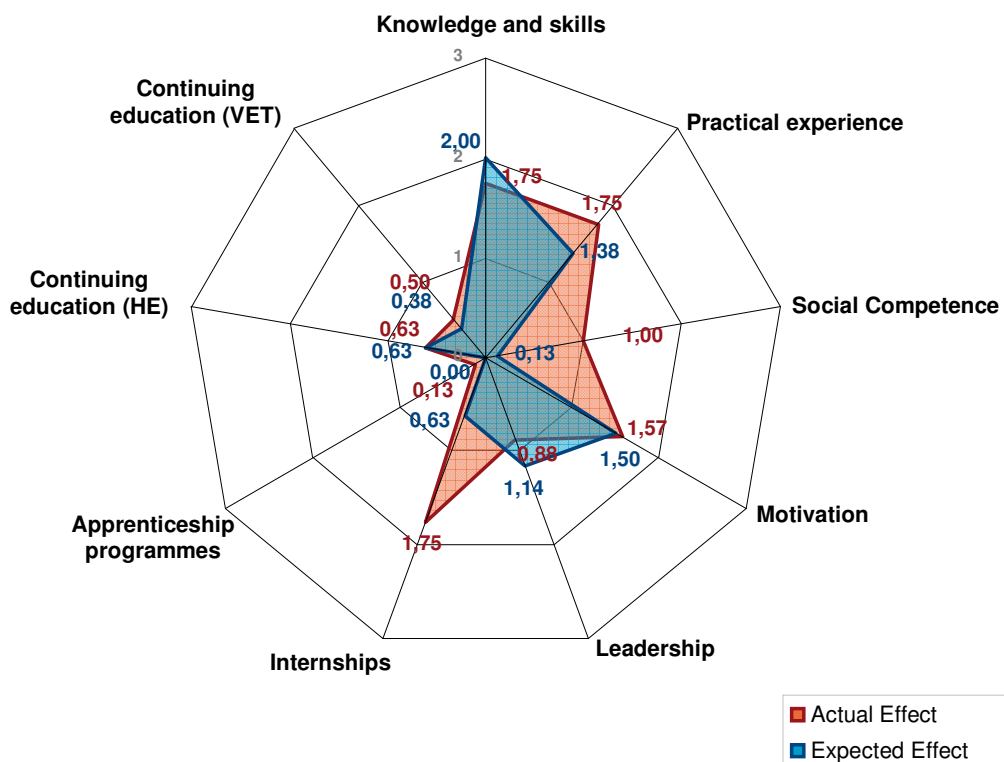


Figure 17: Effects on human capital (Preliminary data for illustration purposes only, n=8)

Secondly, all effects on individual level refer to the practice supervisor of the student or junior researcher, respectively, because it is knowledge gains on the company side that are in focus here. These effects do not refer to the students and junior researchers themselves. In most cases, the impacts – knowledge gains –

would be much higher for the students and junior scientists, as compared to their practice supervisors.

Figure 17 shows data regarding expected effects in green, and regarding actual effects in red. Generally, it is obvious from the graph that actual effects tend to be higher than expected effects. Surprisingly, the impact on knowledge and skills – of the in-company practice supervisor – are lower than expected, although still roughly of medium size. This might be – as an hypothesis – explained with a ceiling effect: The supervisors will usually have been academically educated people, often with significant R&D experience. On the other hand, it is surprising that the effects regarding practical experience tend to be higher than expected. On explanation might be that the projects were successfully geared towards the company's needs, and the relevant fields of practice. Also surprisingly high is the impact on social competence, which might be explained referring to the challenge to mediate between academic and industrial environments, including the respective habits, implicit codes of conduct, and, generally, cultures. Finally, the peak in the dimension 'internships' indicated that the companies tend to continue internship-like projects, based on good experiences from 'Forschungsassistenten' and 'Exzellenztandem'.

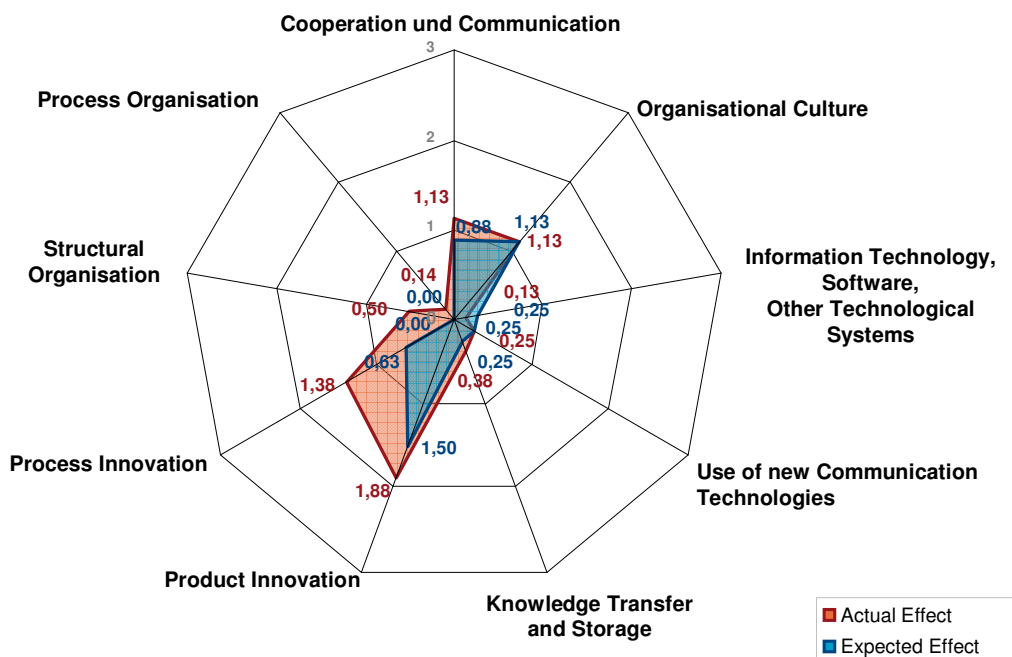


Figure 18: Effects on structural capital (Preliminary data for illustration purposes only, n=8)

The actual effects on structural capital also tend to be higher than the respective expected effects (Figure 18). Interestingly, and most important regarding the core issues of this paper, the main impacts are in the innovation domain. Whereas the score for actual product innovation is higher (predictably, because this was one of the main intentions of the 'Forschungsassistenten' and 'Exzellenztandem' programmes), the difference between expected and actual effects is much bigger for process innovation, indicating significant effects beyond expectations. It

should be noted that the interviews yield not only abstract ratings of effects, but also qualitative descriptions of the specific innovations achieved, allowing some internal validation of these impacts.

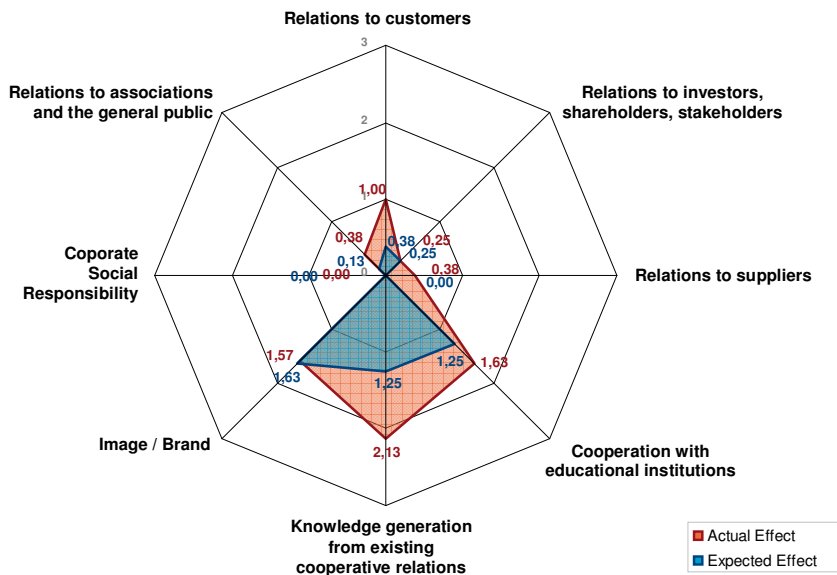


Figure 19: Effects on relational capital (Preliminary data for illustration purposes only, n=8)

Figure 19 finally shows effects on relational capital. The researchers had, before the interviews, merely expected effects on cooperation between industry and higher education, and – closely related – on external knowledge generation from the perspective of the companies. Both impacts actually emerged (although less expected by the companies), but there was also – as expected by the companies – some effect on the image of the company and the reputation of the respective brand(s). As an example, some of the companies presented results of the research projects at industry fairs, thus promoting their image as innovators.

Summing up, these preliminary data show how effects of WBL and similar learning environments on organisational knowledge, competence, and innovation may be measured and investigated in more detail.

13. Emerging trends in WBL

The plethora of work based learning initiatives signifies that it is difficult to clearly identify emerging trends, or to quantify provision within databases. Whilst WBL is increasingly acknowledged as a legitimate higher education activity able to achieve national policy targets (Nixon et al, 2006), conceptualisations and practices can vary from recognising high-level learning processes in the work place to work-related training. The paradigm of learning is often now understood in terms of value-based skills discourse that aims to develop employees ‘fit for purpose’ in the new, dominant lifelong or experiential learning and knowledge economy ontology.

In the UK, WBL is an ever-expanding field with a multiplicity of types of provision and providers and at levels ranging from the school curriculum with new Diplomas for 16-18 year-olds to professional doctorates. WBL is used by higher education institutions as part of blended learning programmes integrating work-related projects to ensure some relevance to industry, or as full programmes in the case of Middlesex University; it is used extensively in vocational and training qualifications from school to graduate levels to learn or increase skills and competences; it is increasingly relevant in continuing professional development provided both by professional bodies and education institutions; and the work place itself is beginning to be viewed as a site of legitimate and accreditable learning.

In Germany, the issue of permeability between vocational and higher education, which has been discussed for decades, is receiving increased political attention in the last years.

This attention is at the moment rather focussed on APL than WBL, as demonstrated by the Federal Initiative ANKOM mentioned before, and also some corresponding Länder programmes, e.g. in Brandenburg⁴¹.

Currently, Lower Saxony runs an “Open University” (“Offene Hochschule”⁴²) programme, which does not (yet) explicitly incorporate WBL, but might be a suitable platform for this purpose.

The Joint Science Conference (Gemeinsame Wissenschaftskonferenz von Bund und Ländern, GWK⁴³) decided on 28 May 2010 to introduce a funding scheme to support open university programmes („Wettbewerb Aufstieg durch Bildung: Offene Hochschulen“), with a budget of about 250 million Euros for the years 2010 to 2018⁴⁴. Again, this initiative is not explicitly focussed on WBL, but will eventually also cover WBL-related activities at German higher education institutions.

⁴¹ <http://www.lasa-brandenburg.de/Initiative-Durchlaessigkeit-Berufsbildung.947.0.html>

⁴² http://www.mwk.niedersachsen.de/live/live.php?navigation_id=6286&article_id=19108&psmand=19

⁴³ GWK is a common body of German Federal and Länder Governments: “Members shall be the Ministers and Senators of the Federal Government and Länder responsible for science and research as well as for finance. The Conference shall deal with all questions of research funding, science and research policy strategies and the science system which jointly affect the Federal Government and the Länder” (Notification of the Administrative Agreement between the Federal and Länder Governments on the Establishment of a Joint Science Conference (GWK Agreement) of 19 September 2007) <http://www.gwk-bonn.de/fileadmin/Papers/gwk-agreement-engl.pdf>

⁴⁴ http://www.gwk-bonn.de/fileadmin/Papers/wettbewerb-aufstieg_durch_bildung.pdf

14. Future R&D issues

Future research and development into WBL and related learning environments should address as high-priority issues:

- Methodologies to measure competence development on an organisational – rather than individual – level, as instruments to track effects of WBL on organisational competence and innovation (taking up and expanding existing work as e.g. the approach described in chapter 12).
- Research to discern the relationships between characteristics of WBL arrangements (e.g. types of partners involved, scientific / academic disciplines addressed, design of curricula, design of learning support, R&D focus of programmes) and innovation effects (e.g. product, process, social innovation effects) in different kinds of organisations (e.g. SMEs, regional clusters, supply chains).
- Investigation into favourable and inhibiting conditions for WBL arrangements, regarding on an intermediate level (regional) network relations between industry, Higher Education and R&D institutions, and innovation policies on a higher level.

15. What needs to be done?

From a UK perspective, several key issues present challenges to universities wishing to implement work based learning, highlighting the need to⁴⁵:

- Establish a shared understanding of high-level work based learning in theory and practices
- Expand provision with the strategic involvement of employees and organisations to ensure relevance, building long term and equitable relationships
- Encourage relevant pedagogic practices that meet the needs of all stakeholders
- Provide cost-effective work-based learning solutions as these can be resource intensive
- Develop strategies that cross the cultural bridge between learning and work making the case for the relevance of WBL to universities, learners and organisations
- Support WBL initiatives through national policies and funding.

Regarding the last item, this has occurred in the UK to some extent, but it remains to be seen how much support will be available with the new Government.

In Germany, project-type support by the Länder and the Federal Government has, in the past, rather addressed ‘Dual Programmes’ (Duale Studiengänge),

⁴⁵ Summarised from *WBL – Illuminating the Higher Education Landscape* Nixon et al (2006): a report for the Higher Education Academy

combining a Dual System apprenticeship with an academic Diploma or Bachelor programme. While having their own merits, Dual Programmes are not specifically suited for lifelong learning, and are not specifically tuned for the impacts on innovation as discussed here.

On the other hand, the “Open University” programme in Lower Saxony and even more so the recently announced joined programme of Länder and Federal Governments regarding open programmes in Higher Education – both already mentioned above (see chapter 13) – could provide opportunities to boost WBL approaches in German HE institutions.

Beyond these specific HE-centred funding schemes, it should be borne in mind that WBL has lots of connecting points to other strands of funding. As discussed above, WBL nicely fits into cluster policy approaches, and should be more explicitly and extensively used as an element of cluster policies. Furthermore, WBL programmes might very well accompany technologically oriented public R&D funding programmes, as an instrument especially suited for SMEs, and as an efficient way of funding R&D and educational innovation in combination.

16. Summary

Work Based Learning (WBL) and related paradigms of learning environments – like Problem Based Learning (PBL) or R&D Internships – tuned towards real-life problem solving were discussed as instruments to foster innovation, especially, but not exclusively, in small and medium sized enterprises (SME).

Practices and experiences from a broad range of European and non-European countries were presented, including some in-depth cases of WBL programmes and selected projects.

A Methodology was proposed to measure effects of WBL, PBL and similar paradigms on organisational knowledge gains, competence, and innovation.

Combined with APL (Accreditation of Prior Learning) methodologies, WBL was shown to have a genuine potential to increase time efficiency, thus mitigating the dilemma between time needed for learning and increasing time pressure in work processes.

For the future, WBL should be a core issue at the intersection of educational and innovation policies, specifically in cluster policies fostering regional innovation in cooperation network integrating industry and HE / research institutions.

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18. Appendices

Appendix 1 - Project Information Sheets

Information sheet 1 - Introduction to Project Learning

Project learning is a Middlesex University initiative to enhance and formally recognise the learning of individuals and organisations through real-life work projects. Working with the Institute for Work Based Learning you will be supported by a University consultant to develop your knowledge and skills at work, maximise the impact of your project in your organisation and gain a university qualification.

During the meetings with your project team members and the university consultant, you will:

- identify the project aims
- agree a plan and key milestones against which progression can be assessed
- agree and assign tasks
- identify any knowledge gaps and how to fill them.

Working with your learning consultant you will agree what evidence of learning achievement you will put forward to the University for formal recognition. This learning process will support your project and enable you to capitalise upon the individual and organisational learning opportunities in a way that can also be evaluated by the University for the award of credit, part or the whole of a qualification.

Key points in developing and providing evidence of project learning

1. The evidence demonstrating your learning should follow the real project cycle of activity: project planning and development, implementation and delivery, and monitoring and evaluation. Articulating your learning will help to develop your **critical awareness** of issues in professional inquiry and evidence-based practice and enable you to apply this in the development of your work project.

2. You may be working **collaboratively** on the work project as part of a multi-professional work team. However, when you provide evidence of your learning you will need to clearly identify your role and show how you fit within the team, as well as identifying your personal contribution to the work project and your learning.

3. Take a structured approach to collecting information that demonstrates your project learning, identifying and including core factors such as:

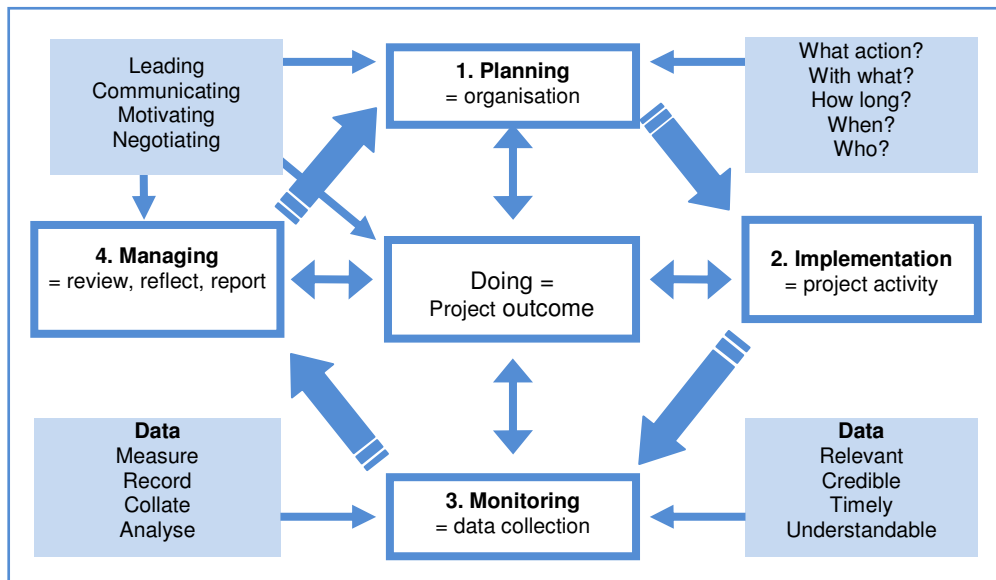
- your organisational context
- aspects of change within your practices
- the relevance to your area of work
- the specific knowledge base: for example, demonstrating professional knowledge and/or relating to a community of practice
- modes of collaboration
- ethical considerations
- methodology of systematic inquiry which informs the project
- analysis of your personal learning arising from undertaking the project and reflection upon the project process
- demonstration of academic quality and rigour, and of the achievement of level descriptors that meet University requirements.

4. The benefits from articulating your learning include a contribution to your personal career development and academic recognition for your work, as well as having practical outcomes for the organisation as work projects will often impact on, or bring about change. This enables you to develop skills as a change agent within your organisation, together with associated skills such as enhanced communication and/or dissemination strategies.

Project cycle model

Projects go through stages: beginning and end, periods of growth or stability or much or little activity, but they always require organisation and management to plan and implement. Figure 1 illustrates the cyclical nature of planning, implementing, monitoring and reviewing the project process. Each component may be dependent upon others so that one must be in place before another aspect can begin, and several will overlap each other and run concurrently.

Figure 1: Example of project cycle*



*Adapted from Baguley, P, 1999, *Teach yourself project management*, London: Hodder & Stoughton (reproduced from the IWBL project handbook)

The example above can help you to identify and reflect on the processes involved in the different stages of your project and also to articulate the learning you have gained as a result.

Information Sheet 2 - Planning the Project

Defining the boundaries

If you are collaborating in a large project you will need to identify your personal contributions and show how these link to the overall project aims, objectives and outcomes. If you are independently managing a smaller project, then there may still be linkages to other projects you wish to explore or contributions from other stakeholders that you should acknowledge.

To define the boundaries of the project you need to construct a clear plan. Ask yourself the following questions:

- What are the intended outcomes of the project?
- What are your aims and how will you achieve them? This will lead to determining your objectives and the steps required for the success of your project
- Who are the key stakeholders involved?
- What is the timescale of the project?
- Will any personal or organisational cost be involved?
- What boundaries or limitations are there? These may emerge as terms of reference which may be imposed upon you by your work situation, but there also may be constraints from other factors such as access to data, limited timeframe, and current work practices

Principal steps in project planning

When you have answered the questions above you will have a clearer picture of what you hope to achieve and will be able to start project planning. For example:

- Outline a structured breakdown of the component parts of the project, including the sequence of activities and time dependencies, that is, what steps must be completed before another starts
- Determine project specifications of the quality and quantity of outcome required for each activity, for example, the standard or amount of data to be collected
- Identify measurable objectives or milestones
- Use a project planning tool like a Gantt chart to show timing for each stage, or analytical frameworks (see examples in Figure 2 below)

- Agree budget details for resource costs for each activity with the budget holder. If you are doing this independently ensure you factor in costs such as time, any collaborators' time, expenses, and any overheads such as photocopying, postage and phone bills
- Complete a summary sheet that allows you to track progress of all project components, including responsibilities for each activity, especially if you are relying on others to contribute to your project.

Figure 2: Examples of analytical frameworks

Analysis type	Categories
SWOT	strengths, weaknesses, opportunities and threats
STEP	Social, technological, environmental and political
PEST	Political, environmental, social and technological
STEPELI	Social, technological, environmental, political, ecological, legislative and industry
PESTELI	Political, environmental, social, technological, ecological, legislative and industry

Remember: during the first two meetings between your project team, a senior manager of the organisation, and the university consultant, the following actions may already have been agreed so please make sure you incorporate them:

- identification of the strategic workforce and organisational development aims
- ensuring the proposed project is focused on these aims and its wider impact is identified
- establishment of a framework to identify and evaluate the potential university-level learning of individual project team members and how that learning might impact on others
- identification of any potential project knowledge gaps
- the project plan and key milestones against which progression can be assessed and quality assured

Note: You will also need to consider any issues of ethics.

Information Sheet 3 – Reporting Project Learning

Evidence of the wide ranging learning you have gained during your project needs to be explained to us, and you can choose how to present the most appropriate written report for your organisational project to submit to Middlesex University for assessment.

Two report types are proposed below, but you can also use your own preferred style. In all cases, however, you will need to provide evidence, or a product. You will also be asked to give an oral presentation of your project which is intended to give an overview of the main themes, approaches to professional enquiry, and outcomes.

1. Project product and Critical Commentary

You can submit a “product”, for example, procedural handbook, business plan, or artifact and a critical commentary which explains the purpose of the product, how it was developed and how it will be used. Please include a title page (see project no.2 below for details).

Introduction

Give the work context and your position. What was the background to the creation of the product, what need/opportunity was the product a response to?

Terms of reference

What was the specific aim of the product, what objectives did you have to address in order to produce the product?

Product development

How was the product developed? What research and development activity underpinned the creation of the product? What was your role, how did the product development draw upon/extend your knowledge and skills? What resources were involved?

Use of the product

If the project includes a pilot or actual use of the product, how has the use been planned, how has feedback been received and how has it been evaluated? If changes have been made, what are they and why are they required?

Conclusions and recommendations

What is the outcome of your evaluation of the product and how will it inform future use/revision of the product? Reflect upon your personal and professional learning from the development and use of the product you have created.

2. Project report with chapters

Title page

Title of project (preferably up to 20 words), your name, student number, module code, month and year of submission, and keywords.

Contents page

This is easy to add at the end, but if you are having difficulty getting started you might want to do the contents page first using the standard chapter headings and then add the page numbers later.

Summary

This should take the style of an executive briefing explaining in outline what the project was about, the main approach used and major conclusions and recommendations. There should be no new material in the summary. The summary can only be written after all the main chapters and should be about 250 words.

Chapter 1: Introduction

Put your project into a wider work context by explaining its relevance to you and the organisation, identifying the main themes or problems you are inquiring into, and remembering to identify any collaborative aspects. The introduction may be about 5 per cent of your report.

Chapter 2: Terms of reference/objectives

This sets out the specific aims and objectives of your project and the terms of reference and the boundaries you are operating within. It should include a statement of your professional inquiry approach which is different to the aim and objectives. This chapter need not be long (about 10 per cent of the report) but should be highly focused.

Chapter 3: Professional inquiry approach

This describes and critically justifies your choice of inquiry approach and any data collection techniques required to conduct your project. Remember to include a discussion here of how you deal with issues of a confidential or ethical nature. Where appropriate discuss how 'triangulation' of methods reinforces the validity of the findings, and support your reasoning with any relevant reading. This chapter should account for approximately 20 per cent of your report.

Chapter 4: Project activity

This describes and analyses what you did, and what helped or hindered the activities. It is important that you critically discuss the processes of conducting the project as well as the content. This can be written concurrently while you are conducting the project process but review it before final submission as reflection upon it will increase the learning you gained. This chapter is likely to amount to 20 per cent of your report.

Chapter 5: Project findings

Your project results should be presented with a full analysis and evaluation of the outcomes and how these impact on your organisation. If you are presenting a lot of numerical data please include a visual representation (eg graph) of major

results. Reflect on what you have learned personally and professionally as a result. This is likely to be your longest chapter, approximately 30 per cent of your report.

Chapter 6: Conclusions and recommendations

Your conclusions must be clearly drawn from your project results. Address the terms of reference/objectives you set out in chapter 2. Recommendations should arise from the project and should normally be directed to your organisation and other appropriate stakeholders. This chapter (approximately 15 per cent of your report) should be clear, succinct and encapsulate the important issues and outcomes of your project.

References and bibliography

If you need further guidance on writing your project, there are a number of project management books and websites for reference and you will also probably be able to draw on your organisation's experience and documentation.

References and bibliography must follow the Harvard system. Make sure that you reference all the sources consulted within the main text as well as in a list at the end of your report. The bibliography is a list of sources you have read but not quoted from in your text and should include any electronic sources and information retrieved from the internet.

Use numbered footnotes or endnotes to add additional relevant information if required.

Appendices can be used to support and evidence the depth, as well as the breadth of your learning and activity throughout the course of your project.

Project report presentation

The report should normally be presented in a hard binder that has a spine, for example, a ring binder. Write the title (no more than 20 words), module code, and your name on the spine. You should also provide three keywords for use on our database. The first word should indicate an occupational area where possible, such as 'construction' or 'management'; the other two words should indicate the content of the project, for example, 'information technology' or 'performance'.

The recommended word count is dependent on the type and size of project – shown in Table 2

Table 2 Recommended word count by project type and size

Words needed by project type	20 credits	30 credits	40 credits	60 credits
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Product +critical commentary	2000	3000	4000	6000
Standard project report	4000	6000	8000	12000

Information Sheet 4 - Ethical Considerations

Introduction

When writing your project report for academic assessment, you need to demonstrate how you have addressed any ethical issues that might be relevant to your project. For example, consider current legislation and how your project operates within those parameters, and evaluate the potential effect your project might have on members of staff and key stakeholders. Your organisation will probably also have a system of policies, practices and protocols including values and codes of conduct that you normally adhere to, so you will need to make these explicit in your report.

If you want to find out more about ethics, there are several recommended texts in the appendix on bibliography, and, of course, you can consult books and publications on pertinent ethical issues associated with your particular project and its unique context.

Additionally, please make sure that you adhere to any relevant national or international legislation, if your project takes place outside the United Kingdom.

Negotiating access and consent

Informed consent is required for all participants in your project and report from your own organisation as well as from other stakeholders, and it may be worth requesting this in writing. Negotiating with participants is an important part of the ethical process, so establish clear protocols about expectations, activities they might be involved in and the amount of time required, particularly if this is beyond their normal activities. Consider the power dynamics of working with clients, colleagues or subordinates, and how your collaborators will impact on your project. Establish good communication lines to keep all stakeholders informed as you need to have their good will and support.

Anonymity and confidentiality

In your project inquiry you may need to assure colleagues and other participants of confidentiality and anonymity in the conduct and write-up of your project and undertake not to reveal anything of a personal or compromising nature. If you intend to use information that is in any way sensitive, seek permission to use it from the originator and/or the organisation as appropriate. Do not reveal the real name of people or places unless you have specific permission to do so.

Your responsibilities regarding the rights of participants

- Inform all interested parties of what you are doing from the start.
- Ensure that participants are comfortable with procedures and are always in full command of their own involvement in the project.

- State that the purpose of the written part of your project is part of your degree or diploma.
- Inform participants of the objectives of the study and what is to be done with the information that they provide.
- Tell the participants whether or not they will receive a copy of the final project. Consider the cost and time implications before you promise to do any of these things.
- Produce regular progress reports for interested parties and make them easily available.
- Carefully consider each part of the research and development process and its possible impact on others.

Middlesex University is committed to using spoken, written and visual language which avoids sexism and racism or language offensive to those with a disability. As a student of the university you should follow this guide in your interactions with others and in your written material

Publication/dissemination and intellectual property rights

Projects from University degrees are kept in the library at Middlesex University and are considered to be in the public domain as are publications which may arise from the project. The copyright rests with the student and/or employer depending upon their contractual conditions of employment

(Generic university information was provided here)

Information sheet 5 – Evaluation and Assessment of your Project Report

Demonstrating capabilities

University assessors will expect you to demonstrate a range of practical, methodological, and intellectual capabilities that you have applied in your focused activities throughout the project, so make sure that you include the following core features in your report:

- demonstrate if the project was individual or collaborative in its conception and realisation, clearly identifying any consultation, teamwork and autonomy
- justify the particular approach you used for your professional inquiry
- explore what is being generated through your project using analysis, evaluation, and critical thinking
- identify and evaluate the specific features of your project
- critically evaluate the overall impact of your project and its outcomes
- identify your learning and show how it aligns with that of the organisation

Interim evaluation

The written reports are marked against the University's WBL learning outcomes and assessment criteria. Feedback on your project report will be given to you by the university consultant or academic advisor at the one-third and two-thirds completion stages. Email a copy of your work, and please allow 10 working days for feedback.

Once the agreed project milestones have been reached, the designated university consultant and/or academic assessors will work with the individual members of the project team to help identify the learning and give feedback on:

- interim outcomes mapped v. the project objectives and strategic aims
- interim achievements of individual team members and learning mapped against the university's Learning Outcomes Framework and recommendations made to supplement any perceived shortfalls

Final project evaluation

At project completion, the project team and the designated university consultant and/or academic assessors will benchmark the final internal organisational evaluation, giving feedback on:

- final outcomes mapped v. the project objectives and strategic aims
- oral presentations of individual team members' final achievements and learning mapped v. the university's Learning Outcomes Framework

Completed portfolios of learning and evidence will be assessed by the IWBL, and appropriate awards made to the team members.

NB: Appendices to the information sheets included recommended reading and the assessment criteria used to evaluate the projects.

Appendix 2 – Assessment Criteria and Suggested Evidence

A1 Identification and appropriate use of sources of knowledge and evidence			
Level 4	Level 5	Level 6	Level 7
Identification and appropriate use of sources of knowledge and evidence will be within a very familiar context	Identification and appropriate use of sources of knowledge and evidence may be within a familiar context but will be largely self directed	Identification and appropriate use of sources of knowledge and evidence will be wide ranging and critical	Identification and appropriate use of sources of knowledge and evidence will be wide ranging, critical and often innovative
Evidence of how you have used sources of knowledge you are familiar with to undertake your project	Evidence of how and why you have selected and used the specific sources of knowledge you are familiar with to undertake your project	Evidence of how and why you have selected and used sources of knowledge which you might not normally be familiar with to undertake your project	Evidence of how and why you have selected and used sources of knowledge which you might not normally be familiar with and critically evaluated their contribution to your project and why, for you, this is an innovative use of sources

A2 Selection and justification of approaches to task			
Level 4	Level 5	Level 6	Level 7
Selection and approaches to task will show some consideration of alternative approaches	Selection and justification of approaches to task/problem will often be self directed and involve recognition of a range of options from which a justified selection is made	Selection and justification of approaches to task/problem will be self-directed and involve recognition, articulation and critical evaluation of a range of options from which a justified selection is made	Selection and justification of approaches to task/problem will be self-directed and involve recognition, articulation and critical evaluation of a range of options from which a justified selection is made based upon a reasoned methodology
Evidence: Show why you have chosen the approach you have for tackling the project task and describe what other alternative approaches you might have taken	Evidence Show why you have chosen the approach you have for tackling the project task and justify why this approach was selected in preference to alternative ways of tackling the task	Evidence Show why you have chosen the approach you have for tackling the project task & critically evaluate why each of possible alternatives were not appropriate	Evidence Describe what is your underpinning research methodology for selecting the approach you have for tackling the project task and justify how this has enabled you to select approach you have while rejecting alternatives

A3 Ethical understanding			
Level 4	Level 5	Level 6	Level 7
Ethical understanding is likely to be context specific and may be confined to application of a prescribed code	Ethical understanding is likely to be context specific, where appropriate prescribed codes will be understood and applied	Ethical understanding will span a range of contexts, where appropriate prescribed codes and their rationale will be fully understood and routinely applied	Ethical understanding will span a range of contexts, where appropriate prescribed codes and their rationale will be critically understood and sensitively applied
Evidence of how you have adhered to a prescribed code of ethics undertaking your project	Evidence of how you have adhered to appropriate codes of ethics in undertaking your project	Evidence of how you have adhered to codes of ethics that span a range of contexts	Evidence of how you have adhered to and critically evaluated codes of ethics that span a range of contexts

B1 Analysis and synthesis of information and ideas			
Level 4	Level 5	Level 6	Level 7
Analysis and synthesis of information and ideas will be sufficient to present an argument	Analysis and synthesis of information and ideas will be sufficient to indicate further areas for development	Analysis and synthesis of information and ideas will be sufficient to make judgments and derive principles to guide further action	Analysis and synthesis of information and ideas will result in the creation of knowledge of significance to others
Evidence of how you have analysed data you have collected and put it together in such a way as to support your conclusions	Evidence of how you have analysed data collected and put it together in such a way as to identify areas for further explanation/development	Evidence of how you have analysed data collected, put it together and come to conclusions that lead to recommendations for further action	Evidence of how you have analysed data collected, put it together and come to conclusions, and created new knowledge that will be of significance to others

B2 Self-appraisal/reflection on practice			
Level 4	Level 5	Level 6	Level 7
Self appraisal/reflection will be evident with awareness of implications for own learning	Self appraisal/reflection on practice will lead to valuable insights/enhanced awareness of own personal and professional practice	Self/appraisal reflection on practice will lead to significant insights impacting upon personal and professional development	Self appraisal/reflection on practice will lead to significant insights which are likely to make a lasting impact upon personal and professional understanding
Evidence that you have reflected on what you have done and recognised implications for your own learning	Evidence that you have reflected on what you have done and learned lessons affecting your own personal and	Evidence that you have reflected on what you have done and as a result recognised how your practice might be	Evidence that you have reflected on what you have done and how this has made you think differently about your future practice

	professional development	different in future	
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B3 Action Planning leading to effective and appropriate action			
Level 4	Level 5	Level 6	Level 7
Action planning leading to effective and appropriate action will be in a prescribed context and may be personal or have some impact on others	Action planning leading to effective and appropriate action may be wide ranging and involve the work of others in a prescribed context	Action planning leading to effective and appropriate action is likely to be complex and impact upon the work of others	Action planning leading to effective and appropriate action is complex and is likely to impact upon the work of others
Evidence of planning what action you might take within the specific context encompassed by your project which also recognizes impact on others	Evidence of planning what action you might take within the specific context encompassed by your project which is both wide ranging and involves the work of others	Evidence of planning what action you might take may be complex and impact on the work of others	Evidence of planning what action you might take will be complex and impact on the work of others

B4 Evaluation of information and ideas			
Level 4	Level 5	Level 6	Level 7
Evaluation of information used to plan and develop practice within a familiar context	Evaluation of information involves recognition of alternatives in practice within a well defined context	Evaluation of information and ideas involves critical appraisal and justification of alternative strategies within a range of contexts	Independent and critical analysis concerning alternative approaches; can justify evaluations as constituting bases for improvement in action
Evidence that you have evaluated information concerning your project in planning further action within context encompassed by your practice	Evidence that you have evaluated information concerning your project & considered alternative approaches in planning further action within context encompassed by your practice	Evidence that you have evaluated information & ideas concerning your project & critically appraised alternative approaches in planning further action in contexts that extend beyond the scope of your project	Evidence that you have evaluated information & ideas concerning your project & critically appraised alternative approaches on the basis of which you justify taking action to improve practice

C1 Application of Learning			
Level 4	Level 5	Level 6	Level 7
Application of learning is likely to be highly context specific	Application of learning beyond a specific context	Application of learning in a number of contexts	Application of learning will go beyond specific contexts
Evidence that you have applied your learning within the specific context	Evidence that you have applied your learning beyond the specific context	Evidence that you have applied your learning not just beyond the specific	Evidence that you have applied your learning to situations and contexts far

encompassed by your project	encompassed by your project	context encompassed by your project but in a number of other contexts too	removed from the specific context encompassed by your project
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C2 Effective Use of Resources			
Level 4	Level 5	Level 6	Level 7
Use of resources will be effective within a familiar context	Use of resources will normally be self-directed and effective within a familiar context	Use of resources will be effective and wide ranging	Use of resources will be wide ranging and effective and is likely to impact upon the work of others
Evidence that you have used resources effectively in the context encompassed by your project	Evidence that you have used resources effectively in the context encompassed by your project	Evidence that you have used resources effectively in a wide range of contexts	Evidence that you have used resources effectively in a wide range of contexts and that their use has impacted upon the work of others

C3 Effective Communication			
Level 4	Level 5	Level 6	Level 7
Written communication is coherent and organised and may focus on a familiar context	Communication in writing and orally is coherent, organised and demonstrates application of knowledge and understanding	Effective communication both in writing and orally will be clear, concise and persuasive	Effective communication both in writing and orally will be in appropriate format to appeal to a particular target audience and will be clear, concise and persuasive
Evidence that the write-up of your project is coherent and organised	Evidence that you have communicated in writing and orally outcomes of your project coherently and in well organised fashion which demonstrates the extent of your knowledge and understanding	Evidence that you have communicated the outcomes of your project clearly, concisely and persuasively in both written and oral form	Evidence that you have targeted a particular audience for communicating outcomes of your project and have communicated outcomes in a clear and concise way which is persuasive to this target group

C4 Working and learning autonomously and with others			
Level 4	Level 5	Level 6	Level 7
Working and learning autonomously and with others will be in a familiar context and may contribute to effective team working	Working and learning autonomously and with others will often be in a familiar context and may influence effective team practice	Working and learning autonomously and with others or within a team may span a range of contexts and is likely to challenge or develop the practice of others	Working and learning autonomously and with others and /or within a team will span a range of contexts, often in a leadership role and is likely to impact upon personal and

			professional understanding
Evidence that your learning and actions arising from your project have contributed to the effective working of your team	Evidence that your learning and actions arising from your project have influenced the practice & working of your team	Evidence that your learning and actions arising from your project have challenged/ developed the practices of others	Evidence that your learning and actions arising from your project have had an impact upon the professional understanding of your colleagues/others

Appendix 3.1 – Standard Academic Oral Presentation Assessment Sheet

Institute for Work Based Learning

Outline of Project Oral Presentation Assessment Sheet

Module Code _____

Level _____

Student Name _____ Student

Number _____

NB: You are not evaluating the presentation skills but rather the content of the project and what it is essentially about in relation to the relevant Level descriptors.

1. Clarity and appropriate section/ordering of materials (identifies context, central themes, approaches and rationale for the outcome/s and impact)	a b c d e
2. Ability to convey the essence of the project, enlarge and deepen assessors' understanding.	a b c d e
3. Ability to respond to questions. (authenticity and depth of understanding)	a b c d e

Main Strength:

Main Weakness:

General Comments:

	Name	Proposed Grade
First Assessor		
Second Assessor		
Overall Agreed Oral Grade (to be completed by first assessor)		

NB: The oral grade can confirm the grade for the written work, raise or lower it by one grade.

Appendix 3.2 - Oral Organisational Presentation Assessment sheet

INSTITUTE FOR WORK BASED LEARNING Client Project Oral Assessment Sheet

Name:	Date:
Position in Company:	Managing Director
Module Code: WBS4861	Level 7
Student name:	Student number:

From what you have learned from this presentation about the project's outcomes what contribution will it/could it make to the organisation?

Several attempts have been made by our company to put in place a clear and precise system of recovery after a fall from height or a rescue from a tower crane. As this is a complex area many discussions have been held with our clients in the approach and methods we were adopting. This presentation has outlined the procedures to be undertaken for a rescue from a fall from height or a rescue from a tower crane using equipment that has been assessed for its suitability of ease of use. The rescue procedure will be used by the company providing us with an excellent recovery plan in the event of a fall from height and may well lead to the saving someone's life.

What are the project's strengths?

The project gives the type of equipment to use, the personnel who should be trained in its use and an easy to understand step by step guide through the rescue procedure. The clarity in the explanation of the rescue is a major plus in understanding how a rescue is achieved. The presentation also provided the medical effects that a fall can have thereby increasing awareness as to how serious this can be if a rapid rescue is not carried out.

What gaps emerged for you which need to be investigated further?

How the assessment of those to be trained is to be carried out to find out how they would react in a rescue situation at height.

Recommendations for future action

The next step is for the publishing of the handbook, the purchase of the equipment and the training of the operatives. The published material will also be used in company marketing material and at client presentations.

Other comments

The project chosen is a current topical problem, which the company has been seeking a clear way forward for some time. A clear understanding of the subject has been shown and delivered in a methodical manner considering the need for necessary training and the effects a fall can have on a person.