# Supporting Personal Learning in the Workplace

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**Abstract**
*The paper focuses on the potential of a work based Personal Learning Environment. It examines relations, context, actions and learning discourses in line with Vygotsky's sociocultural approach to cognitive development, working on the assumption that "action is mediated and cannot be separated from the milieu in which it is carried out" (Wertsch, 1991). The key aspect of learning discourses it that they are fluid and relational. Vygotsky (1978) held that the learning environment "cannot be regarded as a static entity and one which is peripheral in relation to development, but must be seen as changeable and dynamic." It is this fluid and dynamic nature of learning environments and discourses which provides the central challenge to the design of a PLE, particularly in a workplace context. The final section of the paper looks at how a work based PLE might provide some solutions to changing contexts and changing relationships and examines demonstrator applications being developed through the EU funded Mature project..*

***Keywords:*** *PLE, workbased learning, learning ciontexts, learning discourses, mature project, Vygotsky, sociocultural learning environment, Boundary Objects*

## 1. Introduction - Why might PLEs be important for supporting personal Learning in the Workplace?

The idea of Personal Learning Environments emerged from a discussion over the future of Virtual Learning Environments (VLEs) in education (Wilson et al, 2006). VLEs were seen as a walled garden, unable to connect with the many different web based spaces and social software applications students were using for researching and publishing their work.

PlEs were seen as allowing students to bring together the different contexts in which learning takes place, in the home and in the workplace as well as in education institutions. And PLEs were to be owned by the user, thus shifting the balance of power from the institution to the learner.

Perhaps unsurprisingly, the discourse around Personal Learning Environments has been shaped by the Technology Enhanced Learning community, with an emphasis on institutional learning. However, arguably, the major impact of PLEs might not be for those students already undertaking planned programmes of study within schools and universities, but for those outside the institutions and particularly in the world of work. Of course, technology is already used for supporting work based learning. But research suggests the major take up of TEL in work contexts has been for the better educated professionals through the provision of course based materials, especially for those working with computers and in subjects like management and marketing which lend themselves to the development of generalised course based materials (Attwell, 2003). The emphasis on course based learning, albeit in the proximity of work, has maintained the division between practice and learning. Furthermore, in focusing on professionals, the use of TEL has failed to overcome the existing gap in provision with most opportunities for professional development being provided for the best qualified in the workforce.

In this paper we wish to examine how PLEs might be used to support practice based learning. In so doing a major focus will be the contexts in which learning takes place. The first section will look at the different forms of work based learning. The next will examine problem spaces and contexts for work based learning. The penultimate section will discuss how we can design PLEs for work based learning.

## 2. Learning in the Workplace

The recent policy focus by the European Union on Lifelong Learning has led to an increased emphasis on work based learning. However, this has been based on a limited discourse. The EU has derived such a policy from an understanding of productivity and innovation resting on qualifications and hence learning. And much of the discourse has been bound by the Anglo Saxon idea of employability, holding it to be a responsibility of workers to continually update their skills and knowledge in a period of rapid technological change. Furthermore in a period of recession and welfare cutbacks, work based learning has been advanced as both a more cost effective form of learning.

In reality, work based learning is not new and also takes a number of different forms, varying in the degree of formality and the extent to which it is integrated with practice. On the one had there are formal learning programmes which take place in the workplace such as induction training and apprenticeship. There is also an increase in formal initial and continuing professional development programmes of which a major focus is work based practice. Whilst in the past these will have been supported by a trainer, evidence suggests that more people, especially skilled workers or team leaders, are being given some responsibility for training as part of their work role (Attwell and Baumgartl, 2008). At the other end of the spectrum is the incidental or informal learning which takes place everyday, regardless of a formal training input. To this we can add short courses, for instance conducted by manufacturers around new technologies or programmes designed to introduce new work processes. And recently there has been an increasing focus on the value of internship or work experience for those in education seeking more practical work based learning. These activities may be variously structured with a greater or lesser degree of formality and with more or less integration with a formal education curriculum (Deitmer and Kamarainen, 2009).

Thus the context for learning in the workplace varies greatly, as do the conditions and precepts for designing a work based Personal Learning Environment. Innovation, learning and knowledge development within organisations are essentially social processes. It is these social processes which essentially lead to the different contexts in which learning takes place and which provide both the challenge and the opportunity for designing and introducing PLEs in the workplace. The next section of this paper will examine some of the different aspects of context and will go on to outline a number of developments taking place through the EU funded Mature project.

## 3. Problematising the learning space - Contexts for learning

A major issue on designing a work based PLE is in problematising the learning space. This involves examining relations, context, actions and learning discourses in line with Vygotsky's sociocultural approach to cognitive development, working on the assumption that "action is mediated and cannot be separated from the milieu in which it is carried out" (Wertsch, 1991:18).

The socio cultural milieu mediating actions and learning in the workplace includes a series of different relationships (Attwell and Hughes, 2010).

### 3.1 Relationships

The first is the relationships between teachers and learners. Yet, as we have already pointed out, much learning in the workplace may take place in the absence of a formal teacher or trainer. It may be more appropriate to talk in Vygotskian terms of a More Knowledgeable Other. “The More Knowledgeable Other is anyone who has a better understanding or a higher ability level than the learner particularly in regards to a specific task, concept or process. Traditionally the MKO is thought of as a teacher, an older adult or a peer” (Dahms et al, 2007),

The second relationship is that between learners themselves. The third is relationships between learners and the wider community. In the context of work based learning that community could include formal education institutions, communities of practice or local or extended personal learning networks. Institutions. And in the context of Personal Learning Environments it is important not to forget the relationships between learners and technology. Technology will play a key role in mediating both the other relationships and mediating learning itself.

### 3.2 Learning Contexts

The socialcultutal milieu also includes the learning contexts. The most obvious aspect of context is where the learning takes place. Learning takes place in wider geographical and online communities as well as in the home and in the workplace. This relates to the issue of. physical domains. We can learn through training workshops, through online communities or even through watching a television programme. A key issue here may be the distance of that domain from our practice. Learning about computing through using a computer means the learning domain is close to practice. However learning through a training workshop may be more or less close to actual practice. Some enterprises have developed training islands within the workplace with aim of lessoning the distance between the learning domain and practice. Obviously the context of practice is key to work based learning and we will return to this issue. A further aspect of context is the wider social political, cultural and sub cultural environment. This in itself contains a raft of issues including factors such as the time and cost of learning and rewards for learning.

A further and critical aspect of context is what is judged as legitimate in terms of process and content. How are outcomes defined, what constitutes success and how is it measured?

### 3.3 Learning Discourses

Another critical issue in problematising the learning space is the nature of different learning discourses. Learning discourses are dependent of different factors.

Firstly they can be viewed as a set of practices. Wenger (1999) points out that we practice is not learned individually but is dependent on social relations in communities.

“Over time, this collective learning results in practices that reflect both the pursuit of our enterprises and the attendant social relations. These practices are thus the property of a kind of community created over time by the sustained pursuit of a

shared enterprise. It makes sense, therefore to call these kinds of communities ‘communities of practice’.”

Although the nature and composition of these communities varies members are brought together by joining in common activities and by 'what they have learned through their mutual engagement in these activities' (Wenger, 1998)

According to Wenger, a community of practice defines itself along three dimensions:

- What it is about – its joint enterprise as understood and continually renegotiated by its members.
- How it functions - mutual engagement that bind members together into a social entity.
- What capability it has produced – the shared repertoire of communal resources (routines, sensibilities, artefacts, vocabulary, styles, etc.) that members have developed over time.

A community of practice involves much more than the technical knowledge or skill. For a community of practice to function it needs to generate and appropriate a shared repertoire of ideas, commitments and memories. It also needs to develop various resources such as tools, documents, routines, vocabulary and symbols that in some way carry the accumulated knowledge of the community. In other words, it involves practice: ways of doing and approaching things that are shared to some significant extent among members.

Secondly, learning discourses can be viewed in terms of processes methodologies and structures. As we said earlier work based learning may be more or less structured and formalised and the degree of interaction of learning processes with work processes may vary greatly.

Learning discourses can also be seen as taking place through the exploration of boundary objects, Boundary objects are another idea associated with Vygotsky and have attracted particular interest by those interested in Communities of Practice. The idea was introduced by Susan Leigh Star and James R. Griesemer (1989): “Boundary objects are objects which are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual-site use. They may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable means of translation. The creation and management of boundary objects is key in developing and maintaining coherence across intersecting social worlds.”

According to Denham (2003) “boundary objects serve as point of mediation and negotiation around intent” and can comprise a place for shared work. Denham goes on to say “Boundary objects are not necessarily physical artifacts such as a map between two people: they can be a set of information, conversations, interests, rules, plans, contracts, or even persons.”

As a class of knowledge artefacts their importance may lay in their role in dynamic knowledge exchange and are “associated with process, meaning, participation, alignment and reification.”

Whilst reports and documents may be considered boundary objects, they can also be seen as information spaces for the creation of knowledge. A boundary object could also be a space for dialogue and interaction. Ravenscroft (2009) has advocated "knowledge maturing through dialogue and the advantages of linking 'learning dialogues' and artefacts." Knowledge maturing, he suggests, can be "supported through setting up an appropriate dialogic space in the digital milieu.

The key aspect of learning discourses it that they are fluid and relational. Vygotsky (1978) held that the learning environment "cannot be regarded as a static entity and one which is peripheral in relation to development, but must be seen as changeable and dynamic." It is this fluid and dynamic nature of learning environments and discourses which provides the central challenge to the design of a PLE, particularly in a workplace context. In the next section of this paper we will look at how a work based PLE might provide some solutions to changing contexts and changing relationships.

## 4. Context and the design of Personal Learning Environments

How can the idea of context help us in designing work based Personal Learning Environments? First, given the varied definitions, it might be apposite to explain what we mean by a PLE. PLEs can be seen as the spaces in which people interact and communicate and whose ultimate result is learning and the development of collective know-how. In terms of technology, PLEs are made-up of a collection of loosely coupled tools, including Web 2.0 technologies, used for working, learning, reflection and collaboration with others.

As such, PLEs offer some solutions to the issue of the fluid and relational nature of context. PLEs, unlike traditional educational technology are mobile, flexible and not context dependent. They can move from one domain to another and make connections between them. Secondly PLEs can support and facilitate a greater variety of relationships than traditional educational media. These include relationships within and between networks and communities of practice and support for collaborative working. PLEs shift the axis of control from the teacher to the learners and thus alter balance of power within learning discourses. And, perhaps critically, PLEs support a greater range of learning discourses than traditional educational technology.

PLEs are able to link knowledge assets with people, communities and informal knowledge (Agostini et al, 2003) and support the development of social networks for learning (Fischer, 1995). Razavi and Iverson (2006) suggest integrating weblogs, ePortfolios, and social networking functionality both for enhanced e-learning and knowledge management, and for developing communities of practice. A PLE can use social software for informal learning which is learner driven, problem-based and motivated by interest – not as a process triggered by a single learning provider, but as a continuing activity.

So far we have stressed the utility of PLEs in being flexible and adaptable to different contexts. In a work based context, the 'Learning in Process' project (Schmidt, 2005) and the APOSDLE project (Lindstaedt, and Mayer, 2006) have attempted to develop embedded, or work-integrated, learning support where learning opportunities (learning objects, documents, checklists and also colleagues) are recommended based on a virtual understanding of the learner's context.

However, while these development activities acknowledge the importance of collaboration, community engagement and of embedding learning into working and living processes, they have not so far addressed the linkage of individual learning processes and the further development of both individual and collective understanding as the knowledge and learning processes (Attwell. Barnes, Bimrose and Brown, 2008). In order to achieve that transition (to what we term a 'community of innovation'), processes of reflection and formative assessment have a critical role to play.

Personal Learning Environments are by definition individual. However it is possible to provide tools and services to support individuals in developing their own environment. In looking at the needs of careers guidance advisors for learning Attwell, Barnes, Bimrose and Brown, (2008) say a PLE should be based on a set of tools to allow personal access to resources from multiple sources, and to support knowledge creation and communication. Based on an scoping of knowledge development needs, an initial list of possible functions for a PLE have been suggested, including: access/search for information and knowledge; aggregate and scaffold by combining information and knowledge; manipulate, rearrange and repurpose knowledge artefacts; analyse information to develop knowledge; reflect, question, challenge, seek clarification, form and defend opinions; present ideas, learning and knowledge in different ways and for different purposes; represent the underpinning knowledge structures of different artefacts and support the dynamic re-rendering of such structures; share by supporting individuals in their learning and knowledge; networking by creating a collaborative learning environment.

### 5.1 People tagging

However, rather than seeking to build a monolithic application which can meet all these needs, a better approach may be to seek to develop tools and services which can meet learning needs related to particular aspects of such needs. And in developing such a tool, it is useful to reflect on the different aspects of context involved in the potential use of such tools. The European Commission supported Mature project is seeking to research and develop Personal Learning and Maturing Environments and Organisation Learning and Maturing Environments to support knowledge development and 'maturing' in organisations. The project has developed a number of use cases and demonstrators, following a participatory design process and aiming at supporting learning in context for careers guidance advisors.

One such demonstrator is a 'people tagging' application (Braun, Kunzmann and Schmidt, 2010). According to the project report "Knowing-who is an essential element for efficient knowledge maturing processes, e.g. for finding the right person to talk to. Take the scenario of where a novice Personal Adviser (P.A.) needs to respond to a client query. The P.A. does not feel sufficiently confident to respond adequately, so needs to contact a colleague who is more knowledgeable, for support. The key problems would be:

- How does the P.A. find the right person to contact
- How can the P.A. find people inside, and even outside, the employing organisation?
- How can colleagues who might be able to support the P.A. be identified and contacted quickly and efficiently?

Typically, employee directories, which simply list staff and their areas of expertise, are insufficient. One reason is that information contained in the directories is outdated; or it is not described in an appropriate manner; or it focuses too much on 'experts'; and they often do not include external contacts (Schmidt & Kunzmann 2007).

Also Human Resource Development needs to have sufficient information about the needs and current capabilities of current employees to make the right decisions. In service delivery contexts that must be responsive to the changing needs of clients, like Connexions services, it is necessary to establish precisely what additional skills and competencies are required to keep up with new developments. The people tagging tool would provide a clear indication of:

- What type of expertise is needed?
- How much of the requisite expertise already exists within the organisation?"

At a technical level the demonstrator includes:

- A bookmarking widget for annotating persons, which can be invoked as a bookmarklet
- A browsing component for navigating annotated people based on the vocabulary
- An employee list and profile visualization of annotated people
- A search component for searching for people
- A collaborative real-time editor of the shared vocabulary that allows for consolidating tags and introducing hierarchical relationships
- An analysis component for displaying trends based on search and tagging behaviour.

The application seeks to meet the challenge of aligning the maturing of ontological knowledge with the development of the knowledge about people in the organization (and possibly beyond).

Early evaluation results suggest that people tagging is accepted by employees in general, and that they view it as beneficial on average. The evaluation "has also revealed that we have to be careful when designing such a people tagging system and need to consider affective barriers, the organizational context, and other motivational aspects so that it can become successful and sustainable. Therefore we need to develop a design framework (and respective technical enablement) for people tagging systems as socio-technical systems that covers aspects like control, transparency, scope etc. This design framework needs to be backed by a flexible implementation."

### 5.2 Technology Enhanced Boundary Objects

A further approach to supporting Personal Learning environments for careers guidance professional is based on the development of Technology Enhanced Boundary Objects (TEBOs). Mazzoni and Gaffuri (2009) consider that PLEs as such may be seen as boundary objects in acting to support transitions within a Zone of Proximal Development between knowledge acquired in formal educational contexts and knowledge required for performance or practice within the workplace. Alan

Brown (2009) refers to an approach to designing technologically enhanced boundary objects that promote boundary crossing for careers practitioners.

Careers practitioners use labour market information in their practice of advising clients about potential career options. Much of this labour Markey information is gathered from official statistics, providing, for example, details of numbers employed in different professionals at varying degree of granularity, job centre vacancies in time series data at a fine granular level and pay levels in different occupations at a regional level, as well as information about education and training routes, job descriptions and future career predictions. However much of this data is produced as part of the various governmental departments statistical services and is difficult to search for and above all to interpret. Most problematic is the issue of meaning making when related to providing careers advice, information and guidance. The data sits in the boundaries of practice of careers workers and equally at the ordinary of the practice of collating and providing data. Our intention is to develop technology enhanced boundary objects as a series of infographs, dynamic graphical displays, visualisations and simulations to scaffold careers guidance workers in the process of meaning making of such data.

Whilst we are presently working with static data, much of the data is now being provided online with an API to a SPARQL query interface, allowing interrogation of live data. This is part of the open data initiative, led by Nick Shabolt and Tim Berners Lee in the UK. Berners Lee (2010) has recently said that linked data lies at the heart of the semantic web. Our aim is to connect the TEBO to live data through the SPARQL interface and to visualise and represent that data in forms which would allow careers guidance workers and clients to make intelligent meaning of that data in terms of the shared practice of providing and acting on guidance. Such a TEBO could form a key element in a Personal Learning environment for careers guidance practitioners. A further step in exploring PLE services and applications would be to link the TEBO to people tagging services allowing careers practitioners to find those with particular expertise and experience in interpreting labour market data and relating this to careers opportunities at a local level.

There has been considerable interest in the potential of Mash Up Personal Learning Environments (Wild, Mödritscher and Sigurdarson, 2008). as a means of providing flexible access to different tools. Other commentators have focused on the use of social software for learners to develop their own PLEs. Our research into PLEs and knowledge maturing in organisations does not contradict either of these approaches. However, it suggests that PLE tools need to take into account the contexts in which learning takes place, including knowledge assets, people and communities and especially the context of practice. In reality a PLE may be comprised of both general communication and knowledge sharing tools as well as specialist tools designed to meet the particular needs of a community.

## 5. Conclusions

In seeking to design a work based PLE it is necessary to understand the contexts in which learning take place and the different discourses associated with that learning. A PLE is both able to transpose the different contexts in which learning takes place and can move from one domain to another and make connections between them. support and facilitate a greater variety of relationships than traditional educational media. At them same time a PLE is able to support a range of learning discourses including discourses taking place within and between different communities if

practice. An understanding of the contexts in which learning takes place and of those different learning discourses provides that basis for designing key tools which can form the centre of a work based PLE. Above all a PLE can respond to the demands of fluid and relational discourses in providing scaffolding for meaning making related to practice.

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