

Maturing Learning: Mashup Personal Learning Environments

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Abstract. This paper provides an overview of the work of the Connexions Kent Guidance P.A.s and considers their needs in terms of knowledge maturing and development. It goes on to examine why a PLE could assist in this process and outlines the different functions of a PLE. Then a scenario is outlined illustrating the possible use of the PLE. Finally, a Mashup approach to developing the PLE is considered looking at the different possibilities for developing services for the P.A.s and developing and supporting a sustainable community of practice.

Keywords: PLEs, knowledge, learning, organisations

1. Background

This paper describes work in progress in researching and developing Personal Learning Environments (PLE) for Personal Advisors (P.A.s) employed by Connexions Kent who give labour market information (LMI) as part of careers guidance. The work is being undertaken as part of the European Seventh Framework MATURE project, which is developing technology based tools to support knowledge maturing processes. The project is based on the idea that the organisational agility has become critical for economic competitiveness. Agility requires companies to develop the competencies of their employees efficiently in order to improve the productivity of knowledge work. The failures of organisation-driven approaches to technology-enhanced learning and the success of community-driven approaches in the spirit of Web 2.0 have shown that to achieve agility, the intrinsic motivation of employees has to be harnessed so that they engage in collaborative learning activities, which can then be combined with new forms of organisational support. For that purpose, MATURE conceives individual learning processes to be linked to organisational learning in a knowledge-maturing process in which knowledge continually changes in nature. This knowledge can take many forms and be related to tasks, processes or semantic structures. The goal of MATURE is to understand this maturing process better and build tools and services to support this process including a Personal Learning & Maturing Environment (PLME), embedded into the working environment, enabling and encouraging the individual to engage in maturing activities within communities and beyond. Additionally, the project aims to develop an Organisational Learning &

Maturing Environment (OLME), enabling the organisation to analyse and to take-up community activities, to reseed innovation processes and to apply guiding strategies. The project has a number of test – or application partners – for piloting the tools and processes being developed. Connexions Kent is one of these partners.

This paper provides an overview of the work of the Connexions Kent guidance P.A.s and considers their needs in terms of knowledge maturing and development. It examines why a PLE could assist in this process and outlines the different functions of a PLE. Then, a scenario is outlined illustrating the possible use of the PLE. Finally, a Mashup approach to building a PLE is considered considering different possibilities for developing services for the P.A.s, and supporting a sustainable community of practice. It is important to note that, in this context, the use of a Mashup PLE is for knowledge development and maturing, rather than as a traditional learning application. The paper represents an initial stage in our thinking and is work in progress. At present an ethnographic study of the work of Connexions Kent P.A.s is being undertaken, which will inform further refinement of the models presented. Nevertheless, this paper will contribute to the next generation of PLE research.

2. Connexions Kent

Connexions Kent provides free impartial and confidential advice, careers guidance, support and personal development services to all 13-19 year olds, and to those up to 25 who have learning difficulties and disabilities. The service is delivered by specially trained P.A.s who are based in schools, colleges, at Connexions Access Points and in a range of community settings. Whilst the service is not restricted to careers and learning, this is a primary focus of their work. The company works with a number of partners to deliver the service, including local councils, schools and colleges, youth services, social services, health authorities, probation services, Jobcentre Plus and the police, as well as various voluntary and community groups.

Connexions Kent, like other similar organisations, are keen to engage in processes of knowledge maturing because new legislation has required fundamental changes in the structure and delivery of services for young people in England. For instance, LMI has been given a greater profile in careers guidance. These changes mean that there is a real premium on companies demonstrating how they are at the leading edge of professional developments to give them a labour market advantage for securing future contracts. Currently, and in the foreseeable future, there is a need to develop knowledge taxonomies and ontologies to support organisational development, as well as individual and community development.

Connexions Kent is keen to gain support with a process of knowledge maturing that will improve aspects of their service delivery (for example, delivering LMI more effectively as part of CEG programmes) through a bottom-up grass root expansion of an understanding of this aspect of guidance practice. The proposed collaboration with Connexions Kent means that it will offer the MATURE project a frame within which it will be possible to test the full range of knowledge maturing services, ideas and applications within a commitment to process innovation. It is expected that

continuous process improvement will be delivered through an expansion and extension of individual learning processes across the organisation.

3. Developing a PLE to support knowledge workers

The P.A.s can be considered as information knowledge workers because of the requirements: to use, routinely, different sources to obtain current and accurate information on the labour market; to extract and extrapolate key LMI; and to interpret and manipulate that data for clients of their service. Such a process involves continuous learning and knowledge development. The work of the P.A.s not only involves accessing and processing information, or explicit knowledge, but also includes the use of tacit knowledge within the organisation and the careers guidance process, ideally with tacit and explicit knowledge being combined and shared [10]. One key task for the PLE is to support these knowledge exchange processes for P.A.s. Socio-cultural theories of knowledge acquisition stress the importance of collaborative learning and 'learning communities' [7], but Agostini *et al.* [1] complain about the lack of support offered by many virtual learning environments (VLEs) for emerging communities of interest and the need to link with official organisational structures within which individuals are working. Ideally, VLEs should link knowledge assets with people, communities and informal knowledge [1] and support the development of social networks for learning [6]. The idea of a personal learning space is taken further by Razavi and Iverson [11] who suggest integrating weblogs, ePortfolios, and social networking functionality in this environment both for enhanced e-learning and knowledge management, and for developing communities of practice.

Based on these ideas of collaborative learning and social networks within communities of practice, the notion of PLEs in the workplace is being put forward as a new approach to the development of e-learning tools [2; 13] that are no longer focused on integrated learning platforms such as VLEs. In contrast, these 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. A PLE should use social software in the workplace 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. A development route is suggested which is based on the ideas that embedded, or work-integrated, learning support based on the pioneering ideas in the 'Learning in Process' project [12] and the APOSDLE project [8], where learning opportunities (learning objects, documents, checklists and also colleagues) are recommended based on a virtual understanding of the learner's context. While these development activities acknowledge the importance of collaboration, community engagement and of embedding learning into working 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 mature. 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. The MATURE project will develop the idea of a PLE into a PLME by:

- § providing tools supporting the continuity of knowledge maturing from individual to community to organization (e.g. through raised awareness and consolidation tools);
- § broadening the scope of artefacts from just content, towards content, processes and semantics; and
- § connecting the tools in a meaningful way based on users' needs and embedded in linked processes of working, learning and reflection.

4. The knowledge maturing process in a PLE

Schmidt [12] and Maier & Schmidt [9] emphasise how we can gain an understanding of how knowledge maturing processes might operate within a PLE by looking at 'knowledge flows' across interlinked individual learning processes. The knowledge becomes less contextualized, more explicitly linked, easier to communicate, in short: it matures. The **maturing** of knowledge-in-practice at an individual level is represented in five phases:

- § Expressing ideas – New ideas are developed by individuals from personal experiences or in informal discussions. The knowledge is subjective and deeply embedded in the context of the originator. The vocabulary used for communication, or in private notes, is vague and often restricted to the person expressing the idea.
- § Distributing in communities – This phase accomplishes an important maturing step; the development of common terminology shared among community members (in, for example, discussion forum entries, Blog postings or wikis).
- § Formalising – Artefacts created in the preceding two phases are inherently unstructured, still highly subjective and embedded in the community context. Purpose-driven structured documents are created (e.g. reports about practice or process models in which knowledge is de-subjectified) and the context is explicit.
- § Ad-hoc learning – Documents produced in the preceding phase are not well suited as learning materials because no pedagogic considerations were taken into account. Now the topic is refined to improve comprehensibility in order to ease its use or re-use. The material is ideally prepared in a pedagogic way, enabling broader dissemination by linking general learning objectives with case examples.
- § Formal training – The ultimate maturity phase combines individual learning artefacts to cover a broader subject area. As a consequence, this subject area becomes teachable to novices, with assessment playing both a formative and, possibly, summative role.

However, the different levels of interaction that accompany this process need to be considered. Here, progression from the level of individuals to communities and organisations, with personal networks and professional communities ensuring that interaction goes beyond the boundaries of particular work organisations, needs to be found. Additionally, the maturing process needs to be framed by the idea of developing different types of knowledge assets that are vital for the learning, working and development in any kind of network or organisation. These assets relate to content, processes and semantics. Content such as documents, images, videos etc. can

clearly play an important role in e-learning. Process development can include reflection and formative assessment in ways that enable recording and sharing of individual work practices. Finally, for the linkage of assets it is necessary to take the semantics into account (how the different assets can support individual and collective learning processes by providing the basis for mutual understanding). This is especially important as we will be facilitating bottom-up development of ideas about effective practice, with practitioners contributing their individual views, experiences and insights. Without semantic integration, such an approach could embed misinterpretations. Overall, this approach to developing a workplace PLE for careers guidance practitioners offers the prospect of deepening and contextualising knowledge and understanding of how to apply a range of technical-communicative skills in careers guidance delivery with a stronger focus upon LMI. Such an approach has processes of critical reflection and formative assessment embedded within it.

A PLE should also support social learning through groups [5] and the mapping of contextual knowledge by the P.A.s. The project aim is not to develop an information environment, but to develop a tool, or set of tools, to allow personal access to resources from multiple sources, and to support knowledge creation and communication. Based on an initial 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. It should be noted that these knowledge development activities are not linear and that: one will precede another; people will undertake different groups of activities; activities are discrete; or that one feeds into another. This initial scoping was progressed by developing a scenario of how a PLE tool, or Mashup, might be used within Connexions Kent.

5. The Connexions Kent scenario

The P.A. at the centre of this fictional scenario is recently qualified and new to Kent, working in a school near Sittingbourne. The young person featuring in this scenario is one of many young people who have been referred to the P.A. for a one-to-one interview by the school's careers coordinator. This particular young person is 15 years old (in Year 11 in her school) and does not wish to stay at school to undertake any higher level qualifications, beyond the compulsory school leaving certificate (General Certificate in Secondary Education), usually taken at age 16. She tells the P.A. that she wants to go into the construction industry, to train to become a plumber as she wants to do a practical job. Her father has told her that plumbers are paid well.

Access/search – To respond to the specific query about plumbing as a potential job prospect for this young person, the P.A. needs to identify relevant sources of LMI.

Given that the P.A. is recently qualified and new to the area, this might include, for example: a job description of a plumber; information about the requirements (both qualifications and/or experience) for entry to plumbing; details on relevant regional training courses; data about the workforce share of women in the industry; regional labour demand forecasts for plumbers over the next 2/3 years; and rates of pay for qualified plumbers. During this process (which might involve disparate sources from the internet, other media or professional colleagues), the P.A. will (ideally) apply criteria to enable them to select sources of reliable, quality LMI.

Aggregate & scaffold – The P.A. will need to aggregate the results of their various searches in a meaningful way. For example, there may be two or three sources of information which relate specifically to entry requirements for plumbing, perhaps in different parts of the country or with different companies. Information from some sources may even contradict that from others and any differences will need to be resolved or presented in a way that helps the young person to understand their options (and issues related to risk and uncertainty). Then, there will be a learning process during which new knowledge about plumbing will be integrated with their existing knowledge. This may require the accommodation of new perspectives.

Manipulate – Having identified valid and reliable sources of LMI and started to make sense of (that is, interpreting) the data, a further phase of organising, or rearranging, data may follow. The P.A. may, for example, wish to develop and expand this new knowledge for use in the future with other young people, at different stages of transition, with different needs. For example, they may wish to integrate the new knowledge about construction with other knowledge (previously acquired) about similar occupational roles in other sectors. This knowledge could also be used to support learning about the new vocational Diploma lines being offered in the County from September, 2008 (the introduction of these Diplomas represents a major overhaul of 14-19 education and training and young people, so parents may know even less than normal about possible options available to their children).

Analyse – The P.A. may subsequently wish to expand their newly acquired knowledge about plumbing with other sources of LMI about the construction industry in the local area for different purposes. So, they may wish, for example, to integrate their new knowledge into a group work presentation to Diploma students in Construction. For this, a process of analysis is needed during which the P.A. discusses the requirements for such a session with the relevant tutor on the Diploma course, during which he consolidates his own learning about the construction industry with that of the Diploma tutor. This process of peer discussion may well include discussion with other P.A.s involved in similar activities across the county of Kent.

Reflect – As part of their professional role, P.A.s will routinely reflect on their learning so that they can improve their own performance, with the overall aim of improving the services offered to their clients. These processes of reflection are likely to relate to an established (or even newly stimulated) interest in employment opportunities in construction in the local area in which they operate. This will typically involve questioning and seeking clarification around some aspects of plumbing in particular, and construction in general. This may subsequently result in further research and consolidation of new knowledge into, for example, a written resource to make available to schools and/or students in the locality.

Present – In this scenario, the target for the presentation of the new knowledge about construction will be the young person who is the subject of the original referral. The P.A. will need to make professional judgements about the form and manner in which the newly acquired intelligence about the prospects for local plumbing apprenticeships will be conveyed, together with pay rates and employment prospects.

Represent – A more sophisticated mediation of the newly acquired knowledge may be produced, subsequently, for different purposes: for example, in the development of an information sheet for parents showing different possible learning and development pathways for young people leaving school at 16.

Share – This phase of knowledge maturing depends on the context in which the P.A. is operating. For example, they may have the opportunity to share their emerging understanding, with other P.A.s, labour market specialists or senior managers within Connexions Kent and teachers across various organisations.

Network with other people – Finally, networking will be a key challenge. In contexts where there is an increased awareness of the importance of LMI for the guidance process, together with support from the management to engage in a systematic dissemination of new knowledge, this should occur on a systematic basis. Where this is not occurring formally, it may well be occurring in ways that are more serendipitous and *ad hoc* (for example, over lunch or a coffee break).

6. A Mashup PLE

It should be stressed that the scenario outlined above is only illustrative of how a PLE would be used in practice. As was stated earlier, P.A.s have wider responsibilities than utilising LMI to advise young people about careers and it is intended that the PLE will assist them in the other aspects of their work too. Nevertheless, we believe that the idea of a Mash-up PLE may offer an initial opportunity to support the scenario. The Mashup may take different forms. It may involve bringing together distributed data from different sources and allowing the aggregation and manipulation of that data. It may also involve the use of public web APIs (for instance, for social networking and for providing access to individual resources), and also the creation of tools for authoring, creating and editing artefacts. It will certainly involve the use of services for developing and exposing semantic knowledge structures and supporting P.A.s in developing models and maps of contextual knowledge. It is not argued that a single application is capable or sufficiently flexible to achieve such aims, but rather we view a Mashup PLE as providing the glue to support the different knowledge maturing processes. A further approach could be the development of a PLE Mashup kit to assist the P.A.s in developing their own Mashup PLEs. Furthermore we are aware that many of the knowledge processes described are collaborative and take place within an organisational community. Whilst we are still unclear about the relationship between the PLE and such a wider Organisational Learning and Maturing Environment it would appear that we need a seamless movement between the individual and collective environments, which may be a further facet of services provision or a Mashup approach. The next steps in our work will be to finalise the ethnographic study into the work of the Connexions Kent P.A.s and to refine and

extend the scenario outlined above. This in turn will feed the work in producing an initial mock-up of the PLE leading to a cycle of user centred development work.

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