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## A University Online Portal for Enterprise Learning Communities

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# A UNIVERSITY ONLINE PORTAL FOR ENTERPRISE LEARNING COMMUNITIES

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## ABSTRACT

This paper describes the Programme for University Industry Interface Semantic Web Portal project that supports the efforts in enterprise training units to upskill the employee in the company and facilitates the creation and reuse of knowledge in online communities. The main purpose of this project is to support on-line learning communities and monitor the changing needs and skills of the work force in enterprise environments.

The development of the new PUII Semantic Web Portal has been motivated by the growing demand for formalised semantic representation of online resources to improve search results in online documents and the lack of interoperability between resources of communities of practice. Both areas are challenging research fields that build on each other and at the same time are pre-requisites for a novel view of and approach towards collaborative online knowledge communities.

Web-based on-line communities, supported by educational institutions, can act as a platform to bring together distributed actors and secure quality of learning through reviewed expert community communication. The goal of the project is to make explicit and formalised knowledge that is created in the community accessible to all members of that community in a personalised fashion. Furthermore, this shared environment enables members to link resources in order to create new relationships between users, documents and concepts. The focus is on educating and developing the individual from within the company. The motivation is to create an environment that bridges the gap between learning and work in the organisation and learning and work in the community; an environment that meets the learning needs of the individual and provides economic value for the organisation.

## KEYWORDS

On-line communities, e-learning, social networks, semantic web, knowledge communities, web portals

## 1. INTRODUCTION

PUII is an Action Research project, funded by the Higher Education Authority (HEA) and based in the University of Limerick. The main purpose of the PUII Semantic Web Portal project is to support on-line learning communities and monitor the changing needs and skills of the work force in enterprise environments. It forms a strong link between third level institutions and industry and is working to prepare the workforce for next generation employability in manufacturing and service by promoting the development of the competencies necessary to succeed in a knowledge-based economy. PUII has adopted a community of practice approach that builds on social participation [WENGER1998]. This enables the members of the group to share knowledge that is not easy to express.

## **2. AIMS**

The principal aims of PUII are to identify the skill sets and technical competencies needed by individuals in Ireland and to research and pilot new and innovative learning models that will deliver in-company education and training for future employability

The semantic web portal to the PUII Community allows the gathering of field information from CoPs. It will build up the knowledge base to cover the areas of interest emerging from the CoPs. Resources thus identified or created will be available to all member of the project in the form of controlled vocabularies and meta data enhanced documents.

Specifically, the online portal will:

- identify the requirements of collaborative knowledge creation
- find appropriate methods to discover new information through meaningful annotation and reusability for the Community of Practice.

Furthermore the participants of the program will actively shape the portal structure through the creation of IT-supported social networks appropriate to the needs of participants. For example, in practice, the user will not only be able to search and gather information, but to add content to the knowledge base. In addition, the user can create new relationships regarding available data to administer his particular view on some subject within the knowledge base. Special interest groups will be able to identify the most relevant and useful relationships and concepts to deepen a topic in form of meta data feeds, new links and structure the information to turn it into an e-learning environment based on best practice methods.

## **3. PUII Objectives and CoP**

PUII believes that the process or the capacity to integrate more knowledge is as important as the specific knowledge gained. The organisation must have a culture, systems and structures that welcome innovation, are open to critical thinking and, most importantly of all, have the capacity to absorb information and knowledge across the organisation. Very many organisations have individuals and unconnected systems that continually search for new knowledge and new insight. The problem is that existing organisational culture and management structures have, to date, not succeed in absorbing this knowledge throughout the organisation.

PUII uses a CoP methodology. It views a COP as an informal network of community peers brought together by a common sense of purpose. Members share knowledge and use creativity and resourcefulness to solve problems and identify best practice. Each CoP that involves large companies run for a maximum of 30 weeks. During this time, 3-5 official CoP meetings take place. Some are hosted by the company of a participating member; others will take place in the University of Limerick. The CoP typically focuses on one or more major themes. Organisations and individuals that are invited onto the CoP would be considered to have an active interest in the theme and benefit from outcomes and findings.

CoPs inviting the participation from small companies will take a different approach. Due to the time restrictions on small operations, information is gathered using a questionnaire and analysis. This is followed by a brief interview, either face-to-face or by telephone. This final stage is the setting up of a meeting of the group. The duration of the COP and number of meetings is determined by the time availability of the participants. PUII will facilitate approximately ten COPs over the course of three years. These will address areas such as the competencies required for future employability, collaborative learning in large organisations, in-company, technology enhanced, Instruction, Learning and Training and Moving Small Companies towards Next Generation Employability. As well as company-based COPs, PUII also facilitate some CoPs with third level institutions in an attempt to identify a potential solution.

CoPs face the challenge of sharing and expressing their expertise in ways appropriate to allow all members of the group to access relevant information and participate to identify new topics that act as

knowledge resources. It is of particular importance to present and facilitate such knowledge, embodied in the CoP, based on current efforts to improve overall web navigation, the ability to express social agreements on concepts and relationship properties in forms appropriate to the community and external actors, to support the interactions in the group. The role of the technology is to enable the community to create relationships between activities, concepts groups and individuals in ways currently not available to online communities.

#### **4. Social Networking and Semantic aspects of the PUII Web Portal**

Online social networks become increasingly popular and can it can be envisioned that they enhance the value of collaborative online environments. Online social networking sites draw on the power of social participation to motivate users to contribute to the online community of practice. The development of the PUII Semantic Web portal aims to combine the functionalities of ontology driven web portal and the attractiveness of online social networks.

Social Networks connect and present people based on data about them, stored in user profiles. These user profiles determine the way users are able to access content or view other users on the network. The main purpose of social networking sites is the explicit representation of relationships.

The concept of semantics in context of the PUII Semantic Web Portal implementation describe the relations between things and their varying meaning for the receiver based on controlled vocabularies. An attempt to implement this technique for web resources is the Semantic Web, representation of data on the World Wide Web based on the Resource Description Framework (RDF) [RDF99].

RDF integrates applications using XML for syntax and URI for naming. The Semantic Web therefore extends the current web where information is given well-defined meaning to better enable computers and people to work in cooperation.

The increasing amount of web documents in the World Wide Web exhausts the conventional search approaches. Current search procedures only account for simple string matching and boolean combinations of keywords. To search for particular question in the current web architecture, the user is restricted to keyword matching or category browsing. The documents bear no explicit semantic information about themselves. To query documents on the web, search engines have to index available documents and this happens to be in most cases by parsing the complete document for keywords and Boolean combinations.

The semantics of documents and their respective knowledge domain relevance for the search-system is most cases unused. Adopted approaches from artificial intelligence and knowledge management research promise to assist in exploiting the semantic value of online documents. Mainly the application of ontologies dominate present research where controlled vocabularies and relationship properties are used for the construction of specialized domain area constraints to enhance query results.

The main characteristics of the development of the new PUII Semantic Web Portal are:

- formalised semantic representation of online resources to enhance search results
- information tailoring and linking based on user profile
- semantic interoperability between communities of practice [FRIESEN02].

these fields are pre-requisites for a novel view of and approach to collaborative online knowledge communities.

An area of particular interest within the project is the ability to build ontologies, which are described as the backbone of semantic web applications, based on social network interaction [KIM02]. An assumption is that this collaborative space stimulates the motivation to learn in the Community of Practice (CoP). The semantic web technologies can help to enable communities to evolve, use and manipulate more intuitively emerging knowledge structures. The user can adjust how to view and interacts with ontologies, taxonomies and links that act as the query framework for community content.

The limitation of formalisation of current online communities prevents semantic interoperability between communities. The PUII Semantic Web Portal does address this important ability and considers the user of social networks in the construction of ontologies and associative rules to enhance collaborative work in web based environments. The fusing of enterprise training and semantic web portal development offers new opportunities for universities in post third-level education to act as guides and innovators in online educational communities.

An assumption is that this collaborative space stimulates the motivation to learn in the CoP. The semantic web technologies can help to enable communities to evolve, use and manipulate more intuitively emerging knowledge structures.

The user can manipulate how he sees and interacts with ontologies, taxonomies and links. These act as the query framework for community content. On the server application, the main ontology, taxonomy and resource description will be maintained by the PUII management in cooperation with the community of practice. In case of major changes this could be implemented in the form of user request polls.

## **5. Conclusion**

The project PUII program for university-industry interface addresses the growing need in enterprise learning communities to ensure the quality of enterprise education of employees and to guarantee that the knowledge already existing in the company is circulated throughout in the group. The limitation of formalisation of current online communities prevents semantic interoperability between communities. The PUII Semantic Portal does addresses this important ability and considers the dynamic behaviour of social networks in the construction of ontologies and associative rules to enhance collaborative work in web based environments.

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