

# ***Designs for learning with the Semantic Web:***

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## **Introduction**

This symposium aligns with the first conference theme of ‘Theories, methodologies, perspectives and paradigms for Research in Networked Learning’. Within this theme we have assembled three papers relating to designs for learning with the semantic web (Web 3.0). We plan to start the symposium with the presentation of each paper then follow with discussion of the key themes running through them. These are: 1) the emergent nature of semantic web technologies, 2) how participatory research practices like DBR are affected during the development of semantic web technologies and 3) how both of these concepts may find a new place as we move forward into increasingly complex and changeable educational environments.

Each paper critically reflects on the experience of research and development of semantic web technologies in different educational settings. We specifically focus on methodologies for research in networked learning; linking the nature of an emergent networked learning technology like the semantic web to critical reflections on our participatory research practices across multiple disciplines. This process of reflection on design for learning is described by Jones and Asensio (2002) as critical to enable us to be aware of the influences of social and cultural change in education, our own assumptions about learning, design and development and to uncover any previously unspoken issues for the field of networked learning. We draw on empirical data and experience to contribute to a research field which is concerned with aligning practice with values (Hodgson, 2012). Interestingly, very few papers presented at past networked learning conferences have explicitly considered the role of semantic web technologies in this field and none have linked this to methodological considerations for their design and development. In many ways it could be argued that the semantic web expands the potential of Web 2.0 for ICT to ‘promote connections’ in learning, which is central to the definition of the networked learning process (Goodyear, Banks, Hodgson and McConnell, 2004, p1.).

The semantic web is not a new technology; Berners-Lee et al. brought the concept to public attention in 2001 as ‘a new form of Web content that is meaningful to computers [which] will unleash a revolution of new possibilities’. But the take up of this grand vision has been patchy and development activity has been disconnected (Carmichael and Jordan, 2012). Outside of specialist fields the notion of the semantic web or Web 3.0 is not well known and the researchers in this symposium are used to the challenge of explaining the concept without a familiar online technology to which it can be associated. Much of the work of the semantic web is hidden and described in the language of the information sciences. Never the less, the potential of the semantic web has been realised for acting as a framework offering advanced search tools, flexibility in visualising data and integration of digital repositories with user-generated content (Martinez-Garcia, et al., 2012). This potential can be exciting but the ethical implications of its use in educational environments should be considered at all times as an integral part of research and development (Tracy and Carmichael, 2011). The case can be made for describing semantic web technologies as ‘emergent’ in line with the definition by Stahl (2011:p364) of ‘a technology that shows high potential but hasn’t shown its value or settled down into any kind of consensus’. However, a strict definition of emergent is hard to tie down due to the uncertainty and ambiguity of predicting future impact (Rotolo, Hicks and Martin, 2015). The impact of the emergent nature of the semantic web is considered in line with research methodologies in the papers for this symposium. Along with the challenges and responsibilities posed by developing a technology that is in continual transition and change come the possibilities for redefinition and configuration of the educational pedagogies and practices with which it can be associated. In line with participatory research methods like Design Based Research and in increasingly fractured educational systems this may have the capacity to empower staff and students in the work of knowledge management in Higher Education.

The paper by Jesper Jensen & Nina Bonderup Dohn specifically considers a Design Based Research (DBR) project where semantic web technologies were developed for teaching Biology and Chemistry in an Upper

Secondary School in Denmark. The case is made that the emergent nature of the technology posed methodological challenges to the implementation of a DBR approach but also created new opportunities for flexibility in the creation of unique solutions to suit the pedagogical practices of the educational environment. This encourages stronger involvement of practitioners in the development process. Furthermore, the paper argues that DBR projects like the one described in this paper, are actually paradigmatic for investigation of educational contexts in rapid technological and pedagogical change because they not only take this change into account, but fundamentally and significantly build on them.

The participatory nature of research and development of technologies is considered further in the paper by Fran Tracy, which problematizes participatory research for the development of semantic web technologies. Here the uncertainties and contingencies that are created in the use of participatory research methods are highlighted. Empirical data from an interdisciplinary, multi-institutional technology enhanced learning (TEL) research project is used to reconsider who or what was participating in the research and also when and where that participation took place. The case is made that uncertainty and contingency in technological solutions and methodological approaches allow for enrichment of the development process and subsequently the research outcomes. Through the process of participatory research for this project new teaching practices were developed, pedagogical reflection was inspired and new technologies were developed.

The third paper by Patrick Carmichael takes an alternative approach to the analysis of the design practices used in the research and development of semantic web technologies. The neglected tradition of operaismo or 'workers enquiry' is used to reframe some of the activities and findings of a research project which sought to explore the potential of semantic web technologies in Higher Education where case-based learning was the pedagogy of choice. Operaismo has recently begun to receive attention and its potential has begun once again to be recognised as a framework for exploring the experiences of 'precarious' workers, including those in high-tech industries and education. This paper explores some of the insights it might offer for the design of semantic web technologies, with design being seen as a particular kind of work-based enquiry that benefits from contextual understanding and participation of multiple stakeholders and user groups.

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