



Modeling Collaborative Design Competence with Ontologies

Vladimir Tarasov, Jönköping University, Sweden
Magnus Lundqvist, Jönköping University, Sweden

ABSTRACT

Collaborative design in dispersed groups of engineers creates various kinds of challenges to technology, organization, and social environment. This article presents an approach to description and representation of the competences needed for a planned collaborative design project. The most important competence areas are identified starting from the nature of design work, problem solving in design teams, and working in distributed groups. The competence model is built structuring these areas according to three perspectives: general, cultural, and occupational competences. An ontological representation is proposed to implement the described model for collaborative design competence. Using an ontology language for representation of collaborative design competence models makes it possible to identify those individuals who are best suited for the collaboration by ontology matching. Finally, a software design team consisting of two persons was interviewed and two competence profiles were created using the developed ontological representation of the model. The modeling of the team members has proved that the proposed approach can be applied to modeling competences needed for collaborative design in engineering fields.

Keywords: collaborative design; competence modeling; competence supply; information demand; ontologies

INTRODUCTION

Collaborative design in dispersed groups of engineers creates various kinds of challenges to the technology, organization, and social environment.

Selected examples are knowledge sharing, coordination support, and secure tool integration (Jacucci, Pawlak, & Sandkuhl, 2005). Work presented in this article is located in the area of formation

of teams for collaborative design. The challenge addressed is how to describe and represent the competences needed for a planned collaborative design project in a way that those individuals best suited for the collaboration can be identified. The proposed approach is to apply ontology engineering to modeling competences of individuals including different competence areas like cultural, professional, or occupational competences.

This article is an extended and improved version of the paper presented at the CCE06 Conference (Sandkuhl, Lundqvist, & Tarassov, 2006). The presented approach is based on earlier work in the field of competence modeling, both of enterprise competences (Hench & Sandkuhl, 2002) and of individual competences (Tarassov, Sandkuhl, & Hench, 2006). Furthermore, earlier work has addressed the formation of networks for collaborative engineering (Blomqvist, Levashova, Öhgren, Sandkuhl, & Smirnov, 2005), but with a focus on identifying suitable enterprises for a given task description.

The next section will present selected results from an empirical investigation in the field of information use, which confirms the importance of competence when selecting partners for collaboration activities. Then we will introduce the structure of competence models with focus on specific elements for collaborative design. The representation of competence models with ontologies is described afterward. The results of the modeling of a software

design team are described next, and the conclusion presents a summary and an outlook on future work.

IMPORTANCE OF COMPETENCE: FINDINGS FROM AN EMPIRICAL INVESTIGATION

During March—June 2005, an empirical investigation was carried out in Sweden aimed at studying how information is used in Swedish authorities and small- and medium-sized enterprises (SMEs). Even though the main objective of this investigation was to identify the connection between information use and different work-related aspects, such as work processes, resources, and organizational structures, for the purpose of better understanding the information demands that motivate demand-driven information supply, rather than focusing on collaborative design or the formation of teams in collaborative design, it resulted in some interesting findings regarding the importance of competence in the creation of informal information exchange channels.

The investigation, which comprised 27 interviews with individuals from three different organizations—the Swedish Board of Agriculture, Kongsberg Automotive, and Proton Engineering, the latter two operators within the automotive industry—was performed as a series of semistructured interviews. For purposes relevant to the intended use of the results in other research projects, these 27 individuals were chosen in such a way that they constitute a sample

15 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the product's webpage:

www.igi-global.com/article/modeling-collaborative-design-competence-ontologies/1966?camid=4v1

This title is available in InfoSci-Journals, InfoSci-Journal Disciplines Communications and Social Science, InfoSci-Select, InfoSci-Select, InfoSci-Communications, Online Engagement, and Media eJournal Collection, InfoSci-Journal Disciplines Business, Administration, and Management. Recommend this product to your librarian:

www.igi-global.com/e-resources/library-recommendation/?id=2

Related Content

Recommendations for Natural Resources Conservation in the Influence Areas of Cities: A Case Study of Bucharest, Romania

Mihai Rzvan Ni, Mihi Iulian Niculae, Diana Andreea Onose, Maria Ptroescu, Gabriel Ovidiu Vânu and Cristiana Maria Ciocnea (2018). *E-Planning and Collaboration: Concepts, Methodologies, Tools, and Applications* (pp. 130-153).

www.igi-global.com/chapter/recommendations-for-natural-resources-conservation-in-the-influence-areas-of-cities/206002?camid=4v1a

Monitoring Urban Sprawl and Sustainable Urban Development Using the Moran Index: A Case Study of Stellenbosch, South Africa

Walter Musakwa and Adriaan van Niekerk (2018). *E-Planning and Collaboration: Concepts, Methodologies, Tools, and Applications* (pp. 561-581).

www.igi-global.com/chapter/monitoring-urban-sprawl-and-sustainable-urban-development-using-the-moran-index/206023?camid=4v1a

Web-Based Template-Driven Communication Support Systems: Using Shadow netWorkspace to Support Trust Development in Virtual Teams

Herbert Remidez Jr., Antonie Stam and James M. Laffey (2007). *International Journal of e-Collaboration* (pp. 65-73).

www.igi-global.com/article/web-based-template-driven-communication/1956?camid=4v1a

The Normative Base of Local Government: Progress in Local Democracy and the Reformation Process

Rusen Keles (2018). *E-Planning and Collaboration: Concepts, Methodologies, Tools, and Applications* (pp. 416-433).

www.igi-global.com/chapter/the-normative-base-of-local-government/206015?camid=4v1a