Chapter VI
Methodologies for Active Knowledge Modeling

John Krogstie
NTNU, Norway

Frank Lillehagen
Commitment, Norway

ABSTRACT

Innovative design is the most important competitive factor for global engineering and manufacturing. Critical challenges include cutting lead times for new products, increasing stakeholder involvement, facilitating life-cycle knowledge sharing, service provisioning, and support. Current IT solutions for product lifecycle management fail to meet these challenges because they are built to perform routine information processing, rather than support agile, innovative work. Active Knowledge Modeling (AKM) provides an approach, methodologies, and a platform to remedy this situation. This chapter describes the AKM-approach applied by manufacturing industries and consultants to implement pragmatic and powerful design platforms. A collaborative product design methodology describes how teams should work together in innovative design spaces. How to configure the AKM platform to support such teams with model-configured workplaces for the different roles is described in the visual solutions development methodology. The use of this approach is illustrated through a case study and is compared with related work in the enterprise modeling arena to illustrate the novelty of the approach

INTRODUCTION

The Active Knowledge Modeling (AKM) (Lillehagen and Krogstie, 2008; Lillehagen, 2003) technology is about discovering, externalizing, expressing, representing, sharing, exploring, configuring, activating, growing and managing enterprise knowledge. Active and work-centric knowledge has some very important intrinsic properties found in mental models of the human mind, such as reflective views, repetitive flows, recursive tasks and replicable knowledge architecture elements. One approach to benefit from these intrinsic properties is by enabling users to perform enterprise modeling using the AKM platform services to model methods, and execute work using role-specific, model-generated and configured workplaces (MGWP). Visual knowledge modeling must become as easy for designers and engineers as scribbling in order for them to express their knowledge while performing work, learning and excelling in their roles. This will also enable users to capture contextual dependencies between roles, tasks, information elements and the views required for performing work.

To be active, a visual model must be available to the users of the underlying information system at execution time. Second, the model must influence the behavior of the computerized work support system. Third, the model must be dynamically extended and adapted, users must be supported in changing the model to fit their local needs, enabling tailoring of the system's behavior. Industrial users should therefore be able to manipulate and use active knowledge models as part of their day-to-day work (Jørgensen, 2001; Jørgensen, 2004; Krogstie, 2007).

Recent platform developments support integrated modeling and execution in one common platform, enabling what in cognitive psychology is denoted as "closing the learning cycle".

AKM APPROACH

The AKM approach has at its core a customer delivery process with seven steps. The first time an enterprise applies AKM technology, we recommend that these steps are closely followed in the sequence indicated. However, second and third time around work processes and tasks from the last five steps can be reiterated and executed in any order necessary to achieve the desired results.

The AKM approach is also about mutual learning, discovering, externalizing and sharing new knowledge with partners and colleagues. Tacit knowledge of the type that actually can be externalized, is most vividly externalized by letting people that contribute to the same end product actually work together, all the time exchanging, capturing and synthesizing their views, methods, properties, parameter trees and values, and validating their solutions. Common views of critical resources and performance parameters provide a sense of holism and are important instruments in achieving consensus in working towards common goals. The seven steps of the approach are shown in Figure 1. The steps are denoted C3S3P and have briefly been described earlier in (Stirna, Persson, & Sandkuhl, 2007). Concept testing, performing a proof-of-concept at the customer site, is not included in the figure. The solutions modeling stage is vital for creating holistic, multiple role-views supporting work across multi-dimensional knowledge spaces, which in turn yield high-quality solution models.

Description of Methodology Step

1. Concept testing is about creating customer interest and motivation for applying the AKM technology. This is done by running pilots and by assessing value propositions and benefits from applying the AKM approach.

14 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/methodologies-active-knowledge-modeling/23786

Related Content

The Impact of Media Richness on the Usage of Web 2.0 Services for Knowledge Transfer
Albert Gyamfi (2018). *Application Development and Design: Concepts, Methodologies, Tools, and Applications (pp. 928-946).*
www.irma-international.org/chapter/the-impact-of-media-richness-on-the-usage-of-web-20-services-for-knowledge-transfer/188241

Is Modeling a Treatment for the Weakness of Software Engineering?
Janis Osisand Erika Asnina (2011). *Model-Driven Domain Analysis and Software Development: Architectures and Functions (pp. 1-14).*
www.irma-international.org/chapter/modeling-treatment-weakness-software-engineering/49151

New Approach to Speedup Dynamic Program Parallelization Analysis
Sudhakar Sahand Vinay G. Vaidya (2014). *International Journal of Software Innovation (pp. 28-47).*
www.irma-international.org/article/new-approach-to-speedup-dynamic-program-parallelization-analysis/120517

How to Systematically Embed Cycles in Balanced Hypercubes
Hsuan-Han Chang, Kuan-Ting Chenand Pao-Lien Lai (2017). *International Journal of Software Innovation (pp. 44-56).*
www.irma-international.org/article/how-to-systematically-embed-cycles-in-balanced-hypercubes/169917

A Robust and Lightweight Key Management Protocol for WSNs in Distributed IoT Applications
Muhammad Ranaand Quazi Mamun (2018). *International Journal of Systems and Software Security and Protection (pp. 1-16).*
www.irma-international.org/article/a-robust-and-lightweight-key-management-protocol-for-wsns-in-distributed-iot-applications/232746