KNOWLEDGE WORK MANAGEMENT: 
INTEGRATION OF WORK AND E-LEARNING PROCESSES 
IN KNOWLEDGE ORGANISATIONS

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The paper presents a new work paradigm: knowledge work management (KWM) that is focused on the integration of work and e-learning processes in knowledge organisations. There are identified the challenges connected with the design of knowledge work and present fields of action in KWM: new work organisation, knowledge product management, organisational learning, competence development, knowledge worker performance & productivity, and performance management. The article also presents some investigation activities of the researchers of the Romanian Academy Institute for Artificial Intelligence that are connected to this area and some challenges and open questions concerning the implications for the design of technology enhanced learning (TEL) solutions. Business needs are seen as key driver for learning and knowledge management (KM). One future direction of technology-enhanced learning is to integrate learning technologies into business platforms as well as combine it with competency management and formal/informal learning methodologies. Knowledge Management is seen as a business process that formalizes management and strategic advantage of a firm’s intellectual assets.

Keywords: KWM (Knowledge Work Management), Knowledge Worker, Knowledge Product Management, Organisational Learning, Competence Development, Performance Management, TEL (Technology Enhanced Learning), KMS (Knowledge Management System).

1. Introduction

World economies are experiencing dynamic transformations that require substantial adjustments in the way and manner public and private organizations operate. Thus, new, elaborate techniques in managing organizations have emerged to help mediate this transition, and re-engineering has been offered as among the more prominent systems of mapping and adapting to the realities of this new and complex order.

Survival and prosperity in the competitive market place requires the creative application of information technology and the continuous improvement of organisations and business processes in order to achieve significant strategic objectives. Instituting change through well-planned and executed projects is a key organisational capability.

Network technologies and models of the distributed collaborative software are evolving to support an efficient knowledge management (KM) of
virtual organisations. On-line communities may include any group sharing interest on a website. Communities of practice are a specific kind of community. They are focused on a domain of knowledge and over time accumulate expertise in this domain. They develop their shared practice by interacting around problems, solutions and insights, and building a common store of knowledge.

These technologies enable a “behavioural change” of virtual workteams: peer cooperation and collaboration in ways that raise productivity and economic efficiency. Technologies and infrastructures are making people aware of the difference between the transmission of information and the sharing of expertise.

Groupware and KM maximize human interaction while minimizing technology interference. A layered configuration of the collaboration technologies includes networks infrastructure, network applications, collaborative applications (groupware), and knowledge management. Functioning of each layer relies on the operating of the previous and the latter is improved to assure a suitable interface to the former.

XML (Extensible Markup Language) technology steps up integrating network collaborative technologies. The functionalities of XML are two: to increase the degree of control over how documents are presented on the Web and to explicate the standards for exchanging information that is structured for further processing.

The Web pages will include XML-based process descriptions and, in this way, people and organisations will be helped in organising their work, preventing “information overloading”. Therefore, project management systems integration will be facilitated by the new XML technology standards.

Practicing an efficient management means more than using sophisticated software packages. The leader has to use his/her knowledge, experience and intuition in designing a good frame for gradually management planning. Complex design problems require more knowledge than any single person possesses because the knowledge relevant to a problem is usually distributed among participants. The individual participants involved in a design process are called stakeholders; they can be sponsors, users, customers, creators, technical experts, and others.

In traditional knowledge management approaches, management collects and structures an organisational memory’s contents as a finished product at design time and then disseminates the product. Such approaches are top-down in that they assume that management creates the knowledge and that workers receive it.

The design perspective assumes a culture in which management and workers see the workers as producers and managers of knowledge, rather than as consumers. KM is a cyclic process involving three related activities: creation, integration and dissemination.
The employees become "knowledge workers" and embrace new knowledge by taking personal responsibility for continued learning, including the mastery of new technological skills, and the adoption of new tools.

2. The Concept of Knowledge Work Management

*Knowledge organizations* are seen as intelligent, complex and adaptive systems constituted by networked people, knowledge workers and intelligent agents that together are able to combine knowledge and solve problems, creating business value and adapting functioning of that organization, according to environment changing, increasing the competence of the organization.

The conditions under which knowledge based work is done are clearly different from those of the traditional industrial and/or service work and therefore the established criteria of work design cannot be simply copied. New approaches, concepts and methods are necessary to create optimum conditions for productive, healthy and attractive knowledge work at the organizational, team and individual level.

At the present time we are facing a paradigmatic change in developing learning assisted systems: in the last years their development was technology cantered, but nowadays their development centres on the application of specific human behaviour concepts in using the new learning, communications and business technologies.

*Knowledge work* (KW) is a central part of work in a number of jobs, for example, in research, development and consulting. People working in these fields are permanently required to go beyond the limits of their own knowledge — of their own discipline even, sometimes — in order to develop new concepts and solution approaches.

Work is increasingly or exclusively based on information. KW is a creative work and requires creation, acquisition, application and distribution of knowledge, using intellectual abilities and specialized knowledge, requiring a high level of education, training and experiences resulting in workers’ skills and expertise and a strong and flexible support by ICT (Information and Communication Technologies).

The term *knowledge work management* (KWM) denotes all activities of a company, on a strategic and operational level, that aim to create optimal conditions for efficient, effective, and attractive knowledge work [Ganz & Hermann, 1999].

*Knowledge Management* (KM) can be seen as a business process that formalizes management and strategic advantage of a firm's intellectual assets.

Definitions and practical applications of performance measurement, knowledge management and business intelligence differ between organizations.
Business intelligence (BI) is a broad category of application programs and technologies for gathering, storing, analyzing, and providing access to data to help enterprise users make better business decisions. The concepts of competencies and competency management are the new blueprints for merging leading edge technology approaches to business objectives.

Technology enhanced learning approaches and new generation knowledge management systems reveal a new context for the promotion of strategy in business solutions.

The Table 1. [Maier, 2006] exemplifies some KM instruments, tools and instruments.

<table>
<thead>
<tr>
<th>Focus Area</th>
<th>Examples for KM Instruments</th>
<th>Examples for KM Tools and Systems</th>
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</thead>
<tbody>
<tr>
<td>Intellectual asset</td>
<td>Management of patents and licenses, KM scorecards</td>
<td>Management information system, reporting system</td>
</tr>
<tr>
<td>People</td>
<td>Competence management, communities, knowledge networks, coaching, mentoring</td>
<td>Skill management system, yellow pages, social software, Wiki, Web based training</td>
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<td>Enterprise</td>
<td>Lessons learned, good/best practices, knowledge process reengineering</td>
<td>Lessons learned data base, case-based reasoning, process warehouse</td>
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<td>effectiveness</td>
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<td>ITC</td>
<td>Semantic content management, instruments for discovery, publication, collaboration, learning, personalization, adaptation</td>
<td>Knowledge portal, enterprise knowledge infrastructure, learning infrastructure</td>
</tr>
</tbody>
</table>

The discipline of work design faces a fundamental dilemma: increased productivity involves specialisation, standardisation and an increased degree of routine, i.e. reduction of complexity. On the other hand, the innovative ability of knowledge-intensive enterprises and the competence development of knowledge workers require an increased complexity of tasks. It is necessary to consider the complete working system (competence, staff, work, technology, organisation). The working area will therefore focus on and improve the currently insufficient integration of work and (e-)learning processes in companies.

There are six fields of activity that are of special relevance in the realm of knowledge work management and learning arrangements [Hermann, et all, 2005]: new work organisation, knowledge product management, organisational learning, competence development, knowledge worker performance &
productivity, and performance management. The following lines give a short description of these key issues:

- **New work organization**: new forms of work division in and between companies (e.g. knowledge work and decision making in interlocking learning environments; designing of socio-technological systems to assist knowledge workers to acquire knowledge and collaborate together).

- **Knowledge product management**: selection, design and implementation of knowledge management tools to support knowledge work as key elements; embedding of individualized learning into the normal, everyday activity of knowledge workers in public and private institutions in the needed granularity; incorporating richer and well-structured metadata, so that knowledge workers will be able to leverage the benefits of the Semantic Web vision, an environment in which human and machine agents communicate on a semantic basis.

- **Organisational learning**: regarding the interaction between competence development and the mutability of companies; incorporating further semantics into the corporate learning-cycle and enrich the shared understanding of all elements within the process (learning objects, student profiles, competencies, etc); developing technologies that enable efficient, just-in-time, personalized learning.

- **Competence development**: design of new Human Resources (HR) management for knowledge workers including new career concepts, skill management and life-long learning; definition of new ways of HR management based on information and requirements related to the organisational, social and psychological issues of the new ways of working.

- **Performance & Productivity**: definition of knowledge e-work including quality criteria and standardization of knowledge e-work processes, in order to evaluate economic and usability aspects.

- **Performance management**: establishing an evaluation and benchmarking model for knowledge work companies; development of an optimised and standardized business & service engineering process model for knowledge work management approaches, evaluating usability aspects.

### 3. Some Investigation Activities of RACAI in the Field of KWM

RACAI stands for the Research Institute for Artificial Intelligence of the Romanian Academy [RACAI, *] and its main research projects are in the areas of natural language processing, machine learning and knowledge acquisition, computer-aided instruction and structural-phenomenological modelling.

Here are some investigation activities of RACAI researchers in the field of KWM:
Defining models for Project Management Information Systems (PMIS) integration, aimed to manage knowledge used in design projects for capitalization and reusability.

A multi-disciplinary research approach is demanded to improve understanding about corporate memories and their use, how to develop them, how to manage them, and how to integrate them into the on-going practice of a company.

Definition of semantics and ontologies for cooperative learning material in sustaining project management activities (defining learning objects for a didactic ontology in PMIS activities).

All project management knowledge areas are integrated with real issues associated with information system projects:

- project management terms and concepts,
- project life cycle (planning, analysis, design, assembly, testing/training, and deployment phases and maintenance),
- project management principles and techniques (integration, scope, time, cost, quality, human resources, communications, risk, and procurement management),
- project management software.

Find solutions for problems faced by the knowledge acquisition process and they require special tools during collaboration between team members:

- capture and retrieve tacit knowledge,
- retain context along with information stored,
- capture and reuse of knowledge created during the collaborative process,
- create well indexed knowledge.

Developing methods in designing socio-technological systems that assist stakeholders to acquire knowledge and collaborate over computer networks for decision-making, during project management activities; designing a pilot cooperative system in sustaining project management activities.

The findings of our researches will be used to improve the basic concepts in the field of managing large projects, on which our resulting framework will rely. Development of such projects is not to be conceived without an interdisciplinary view on the problems. It requires virtual team working, communication, cooperation and coordination of the participants. The manager has to be assisted by new technology facilities and the new ideas and even decisions are emerging from collaboration, by synergy of competences.

The knowledge management system (KMS) has to be linked to the organisation model. It empowers people within and outside the company to learn as they work. The efficient knowledge work teams represent the key of success in the future.
The KM perspective presented in this topic requires a cultural change, in which all stakeholders must learn new relationships between practices and attitudes.

Technology enhanced learning (TEL) [TEL, *] covers a broad range of experiences and environments in which technology is used to enhance teaching and learning. Technologies are relentlessly and seamlessly merging, and the lines separating the traditional classroom, the technology-enhanced classroom, and distance learning are disappearing rapidly. TEL initiatives use technology-based resources – video, audio, images, simulations, and library tools – to enrich the learning environment and to extend it from the classroom to the residence hall, the home, the workplace, and the mall.

RACAI is an associate partner of PROLEARN Network of Excellence [NoE PROLEARN, *]; in this context, researchers of RACAI participated in the works of Prolearn WP 7, performing investigations in the area of „Knowledge Work Management and Learning Arrangements“.

The first result of this work package is an integrated model outlining the links between KWM and TEL and pointing out the challenges in these fields (Figure 1.).

The next step in the project will be to use this framework to collect resources and case studies that could serve as examples of good practice. These case studies will be analysed by experts from industry and research, so that at the end of the running time of the project we will able to come up with some recommendations on user-centered design of technology enhanced learning arrangements for knowledge workers.
4. Final Remarks

Performance should not be considered only from the point of view of financial performance. It is also essential to regard customers and other stakeholders, as well as business processes, when monitoring organizational performance. Furthermore, especially today, when the business environment is changing rapidly, it is important to examine the success factors affecting the future performance, such as the knowledge of personnel and new innovations.

In the private sector, the organizational goals are business driven. In the public sector, the goals are related to different, specific outcomes [Moore, 2006]. There is a whole set of government problems where one just can't measure the business benefit. There are IT benefits—and they are sensitive to those things—but there are other benefits that are so enormous that you can't put a value on that in any meaningful way, such as saving lives, or preventing an attack.

References


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