CHAPTER 6

Knowledge Maturing

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MATURE makes use of bottom up activities in social media and explores how to align these activities towards organizational goals. At the core of MATURE is the knowledge maturing process as an integrated perspective on knowledge development in organization that highlights the varying characteristics of knowledge and learning, and how they interrelate. This perspective redefines enterprise systems in the areas of competence management, business process management, or content management and promotes a learning rich workplace.

They need to be more open, participatory, and allow for continuous evolution by the users of these systems. But this also requires transformation of culture and mindsets to realise its potential. MATURE has piloted three solutions in the areas of competence management, business process management, and content management to explore their usage as part of everyday practice.

1 Introduction

The agility of organisations has become the critical success factor for competitiveness in a world characterised by an accelerating rate of change. Agility requires that companies and their employees together and mutually dependently learn and develop their competencies efficiently in order to improve productivity of knowledge work. Organisations have increasingly recognised the importance of knowledge and its development. But their success has been limited. They have introduced knowledge, learning and competence management systems. But their approaches to systematically supporting learning have largely failed to live up to their promises [1]. They lack employee acceptance and all too often degenerate into administrative exercises. On the bright side, social media approaches have shown that individuals are willing to collaborate, are willing to share their knowledge and are willing to help others.

But how can organisations make sense of social media activities? The challenge for organisations is to create an environment that makes use of these individual activities and that aligns them to a shared organisational objective. Existing knowledge and competence management models such as [2] or [3] do not sufficiently explain the link between bottom-up and top-down activities. And the supporting tools which use them as a blueprint do not satisfy the needs as they do not acknowledge the manifold forms of learning in organisations.

MATURE has investigated knowledge development processes within and across organisations both from an empirical and a design perspective [9]. This has resulted in a model landscape of knowledge maturing, i.e., the development of knowledge on a collective level. This has identified phases, activities, motivational factors, and indicators for knowledge maturing. They formed the basis for designing a family of tools that redefine enterprise systems from a social media perspective, particularly competence management, content management, and process management, and integrate learning opportunities into them. Using an empirically grounded workplace learning analytics approach, the effects of these tools were evaluated as part of everyday work practice for an extended period of time.

2   MATURE Innovation

At the core of MATURE is the knowledge maturing process as an integrated perspective. It follows the development of knowledge from an (immature) initial idea vague thought through the discussion in communities and the transformation for wider distribution, via piloting up to institutionalisation and standardisation. It consists of interconnected individual learning activities where the output of the first is input to the next.

2.1 Knowledge maturing model landscape

A key observation is that along this process the characteristics of knowledge and corresponding learning activities change significantly and that alongside the process, characteristic barriers need to be overcome. This influences the requirements for learning support, and shows the links ("transitions") between different learning activities. MATURE has conceptualised this into a phase model that is shown in Figure 6.1, which consists of the following phases [4]

- *I. Emergence.* Individuals create personal knowledge by pursuing their interests. Knowledge is subjective, deeply embedded in the originator's context. It consists of two sub phases: a) Exploration and b) Appropriation.

- *II. Distribution in communities.* The phase includes discussing the new knowledge, negotiating its meaning and impact, co-developing knowledge, convincing others and agreeing plus committing to the knowledge as collective. A common terminology is developed and shared among community members.

- *III. Transformation.* Knowledge is restructured and put into a form appropriate for moving it across the community's boundaries. Structured documents are created in which knowledge is de-subjectified.

- *IV. Introduction.* We found two primary interpretations of introduction, i.e. (1) an instructional setting ("ad-hoc training") in which didactical aspects are added and (2) an experimental setting ("piloting") in which a limited scale trial (preceding a larger scale roll-out) is the vehicle for further knowledge development.

- *V. Standardisation.* The knowledge is further solidified and formally established in the organisation to be used in repeatable formal trainings, work practices, processes, products or services. As in phase IV, we distinguish (1) an instructional setting with standardised training activities ("formal training"), and an experimental setting turning pilots into standard organisational infrastructure, processes and practices ("institutionalisation"). This leads to the ultimate maturity sub-phase Vb (external standardisation).

Figure 6.1 Knowledge Maturing Phase Model [4].
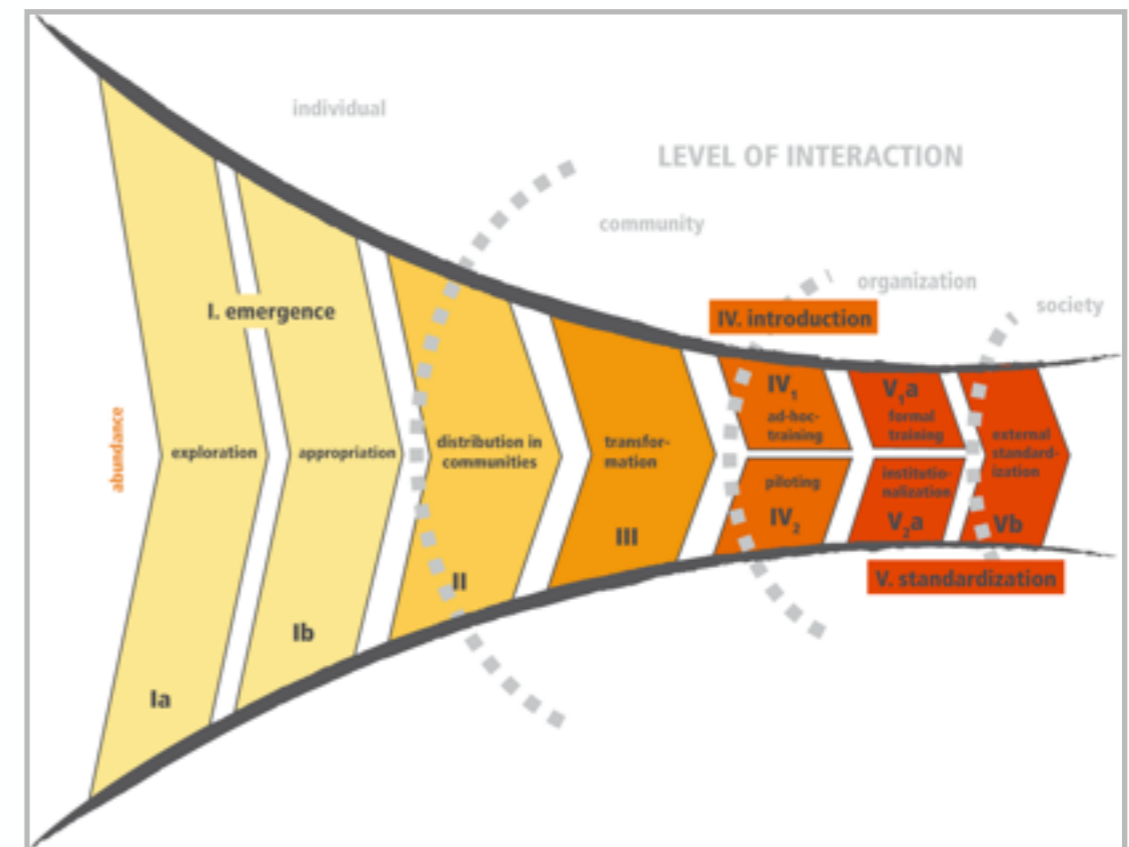
This model provides a landscape of the manifold forms of learning in organisations. It allows for locating human resource development through trainings (phases IV and V), document-centric knowledge management (phases III and IV), idea management (phases I-IV) or social media (phases II and III). The model has proven useful and it is an instrument for analysing connections and barriers in between them.

From this nucleus, a knowledge maturing model landscape has been developed in intertwined empirical research activities (ethnographically informed, interview-based, and case study driven) and participatory design activities. This has resulted in:

- *Knowledge Maturing Activities [5]*, identifying key employee activities that contribute to knowledge maturing which have different characteristics based on the maturing phase.

- *Knowledge Maturing Indicators*, making knowledge maturing traceable, either based on interactions with the system or direct quality measures, some of which can be automatically calculated by Maturing Services that form the basis for learning analytics at the workplace.

- *Guidance Activities*, describing possible interventions from various perspectives to promote knowledge maturing.

- *Motivational Aspects and Barriers [8]*, pointing towards possible measures on the individual, collective, and organizational level.

2.2 Knowledge Maturing Tool Support

This redefines many company processes and tools. A closer investigation of why enterprise systems for supporting collaboration, competence development, or process management fail to live up to their promises, reveals that such systems tend to 'over-formalise', put too much emphasis on access control, or a-priori quality control. All of these are symptoms for a misalignment of the underlying artefacts with the actual (collective) knowledge about real-world aspects. In this respect, MATURE has particularly focused on the barriers in early phases that hinder wider participation.

One area is *competence management* and the knowledge about others' expertise. Competence management systems are based on competence catalogues that are created by expert groups in long and expensive processes. However, these competence catalogues are only rarely updated and thus do not contain up-to-date emerging competencies. Furthermore, competence scales often suggest an accuracy for competence profiles that does not reflect the ambiguity of the underlying competence notions. From a knowledge maturing perspective, these systems do not take into account the dynamic nature of competency notions as cultural constructs. MATURE has used a lightweight people tagging approach [6] where individuals can assign topic tags to each other. And by giving employees the opportunity to collaboratively develop a competence catalog, it bridges the early, highly informal phases with the later phases that

require formal definitions. And it allows for topics appearing much earlier than before.

Another area is *business process management*. Business process support systems are based on highly formalised business process models. A common problem is that these process models are not appropriate for the situations encountered in daily work practice so that employees do not comply, create shortcuts or similar. In most cases, the issue is not that the process model is wrong. In the light of the knowledge maturing model, the underlying problem is that the actual knowledge is not mature enough to be specified in a process model. As a solution, a task management based tool was developed [7]. It starts from the assumption that the development of process knowledge does not start with formal process models, but with individual and collaborative task management. By detecting and sharing patterns and adding experiences to them, it evolves into reusable guidelines that could eventually turn into prescriptive processes.

Document-centric systems have been viewed as the key instrument to knowledge management in the past generation of knowledge management systems. While documents can be useful for distributing knowledge to a large audience, they are only an efficient approach if the knowledge represented in them has the same maturity. It is comparably much less useful to document ideas that are too heavily contextualised. Also we need different types of functionalities for different phases: the earlier phases need easy collaboration, while the latter phases are more about quality control. A one- size-fits-all approach is not possible, although it would be desirable to have a single system, also to ensure continuity. Here a flexible widget-based environment with low- barrier support for various knowledge maturing activities has been developed [10].

3 A possible future from the perspective of MATURE

MATURE has successfully trialled new solutions that create more agile and dynamic environments. Key to these solutions was designing learning and knowledge development into enterprise systems: the development of a collective knowledge how to describe individuals' expertise, the development of knowledge how to execute and coordinate activities (process knowledge), and the development of artefacts representing knowledge. This forms part of a vision of creating a learning rich workplace, which delivers companies the advantage that topics disseminate much quicker into the organisation, the creation of documents, taxonomies, or process models is much more agile. This increases the company's capacities to innovate.

But it is also obvious that the knowledge maturing perspective challenges traditional company approaches and cultures. Systems that are centred around administrating learning need to turn into systems facilitating learning. Instead of control, their internal models (such as catalogs, or process models) needs to be much more open to change by the individuals using the system. And these systems need to connect within a Learning and Maturing Environment.

The increasing adoption of enterprise 2.0 approaches is a promising sign that companies realise the importance of participation, but from a knowledge perspective, they still lack a conceptual and technical framework for making sense of social media in the long run. This is delivered by MATURE. A crucial part is formed by Knowledge Maturing Indicators which pave the way for productive learning analytics at the workplace. A Knowledge Maturing Scorecard [11] integrates it into management processes. While there are a lot of technical issues in moving to a more dynamic and interconnected perspective, it is not only about technology. As the empirical studies have shown a change of the mindset on all levels of an organisation is crucial.

4 Conclusion

MATURE has developed the Knowledge Maturing Model Landscape to describe how knowledge development on a collective level takes place. The Knowledge Maturing perspective views the various learning activities within an organisation as interconnected. It helps to move away from isolated approaches to learning. It shows that it is not only about formal learning or informal learning, it is about viewing these two as interconnected, bridging departments and responsibilities. Through transforming enterprise systems, across which currently learning is scattered, we can create a learning rich workplace that fosters knowledge maturing activities.

This addresses key challenges in the research field of technology enhanced learning. It gives a conceptually sound and practically relevant model and tool vision for bridging informal and formal contexts to create a unified learning landscape. Its learning rich workplace contributes to Personalized Learning Environments and promotes Interest-driven life-long learning. Through its knowledge maturing indicator framework, it also represents a landmark in learning analytics, for Making use and sense of data for improving teaching and learning.

Key to success of the knowledge maturing approach is that technology introduction is complemented by and synchronised with a transformation of mindset and culture in an organisation. This includes many aspects, including the understanding of the role of IT in an organization, and leadership. As a catalyst for change, MATURE has initiated a Knowledge Maturing Consulting Network (http://knowledge-maturing.com) to realise its vision of a learning rich workplace beyond the project's lifetime.

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