CONCEPTS AND FINDINGS ON KNOWLEDGE MANAGEMENT IN SOFTWARE ENGINEERING

This briefing reports evidence on concepts and major findings of knowledge management initiatives in software engineering based on scientific evidence from a systematic review

FINDINGS

Findings are grouped under each identified concept related to knowledge management in software engineering.

Development of knowledge repositories and initial use:

- It is an approach to support risk in project management and design activities.
- Users should be involved in development.

Use of knowledge repositories over time:

- Benefits can be realized quickly, tool remains useful over time, and more benefits accrue over time.
- This type of tool can be used for different kinds of knowledge than originally intended.

Use of cartographic system:

- This kind of tool was used for: allocating resources, searching for competence, identifying project opportunities and upgrading skills.
- It was observed that it enabled learning practice at both individual and company level.

Managing knowledge on the software development process:

- It is feasible to use knowledge management as underlying theory to develop key process areas to supplement the CMM.
- No matter what knowledge management approach you pursue in SPI, you need to create both tacit and explicit knowledge. Tacit is necessary to change practice, explicit is necessary to create an organizational memory.
- A technocentric approach to SPI may impose unnatural work practices on an organization and fails to take account of how process improvements might occur spontaneously within a community of practice.
- The iterative approach of Unified Process ensures large effects in terms of learning, but Unified Process also improves on communication and work distribution in the company.
- It is possible to define and implement software process in a beneficial and costefficient manner in small software organizations. Special considerations must be given to their specific business goals, models, characteristics, and resource limitations.

Managing knowledge through formal routines:

- Formal routines must be supplemented by collaborative, social processes to promote effective dissemination and organizational learning.

Mapping of knowledge flows:

- Knowledge mapping can successfully help an organization to select relevant focus areas for planning future improvement initiatives.
- Causal maps for risk modeling contributes to organizational learning.

Process for conducting project reviews to extract knowledge:

- Creating a suitable environment for reflection, dialogue, criticism, and interaction is salient to the conducting of a postmortem.
- The organizational level can only benefit from the learning of project teams if the knowledge and reasoning behind the process improvements is converted into such an explicit format that it can be utilized for learning in organizational level also.

Implications of social interaction on knowledge sharing:

- Increasing the level of reflection in mentor programmes can result in more doublelooped learning.

How networks are used in software engineering:

- Networks should be used in addition to other activities when introducing new software engineering method.
- Studies show that networks built on existing informal networks are more likely to be successful.

Factors that contribute to successful knowledge management:

- Suggested model, including technological, organizational and human resource factors

Learning processes used in practice:

- Researches suggest that ongoing interaction between different learning processes is important to improve practice

Strategies that exist for managing software engineering knowledge:

- Evidence was found of using codification and personalization in software companies

The impact of knowledge management initiatives:

- Knowledge pull leads to more effective knowledge management than knowledge push.
- Knowledge needs to be internalized to improve processes.

Factors that enable effective knowledge management:

- Leadership is the most important enabler for knowledge management.

Factors that contribute to use of knowledge artefacts:

- Perceived complexity, perceived advantage and perceived risk contribute to the use of knowledge management artefacts.

Keywords:

Software engineering
Knowledge management
Learning software organization
Software process improvement

Who is this briefing for?

Software engineers practitioners who want to make decisions about agile software development based on scientific evidence.

Where the findings come from?

All findings of this briefing were extracted from the systematic review conducted by Bjørnson and Dingsøyr.

What is a systematic review?

cin.ufpe.br/eseg/slrs

What is included in this briefing?

The main findings of the original systematic review.

What is not included in this briefing?

Additional information not presented in the original systematic review.

Detailed descriptions about the studies analised in the original systematic review.

To access other evidence briefings on software engineering:

cin.ufpe.br/eseg/briefings

For additional information about ESEG:

cin.ufpe.br/eseg

ORIGINAL SYSTEMATIC REVIEW REFERENCE

Finn Olav Bjørnson, Torgeir Dingsøyr, Knowledge management in software engineering: A systematic review of studied concepts, findings and research methods used, Information and Software Technology, Volume 50, Issue 11, October 2008, Pages 10551068, ISSN 09505849, http://dx.doi.org/10.1016/j.infsof.2008.03.006.