14 Steps Toward Lean Knowledge Management

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Abstract

We present 14 learning principles supporting a lean approach to knowledge management. These principles are discussed in relation to research on competence development strategies. Further, we also relate them to advice and lessons learned from the agile and lean software development communities. The principles focus on learning as a team activity, and learning focused on needs. They also suggest a perspective where inventories of knowledge can be seen as waste, and where learning is potentially a wasteful activity. We argue that the learning principles are significant steps towards lean knowledge management.

Keywords: Lean Knowledge Management, Learning Organization, Knowledge Perspectives, Competence Strategies, Organizational Learning, Software Development, Knowledge Flow, Collective Learning

1 Introduction

Equinor is a multinational energy company with more than 21000 employees. Lean thinking [10] and agile ways of working [4] are well established and have a long history in the company.

In 2020, Equinor updated their IT competence strategy. A small, but significant part of this competence strategy was a list of 14 learning principles:

1. Information, knowledge and learning are corporate assets
2. Advanced learners and experts should lead
3. A critical mass of in-house knowledge is often enough
4. Do intermediate and advanced training first
5. Focus learning on current needs
6. Team up with learning buddies
7. Engage with professional networks
8. Establish knowledge bridges
9. Share your expertise – invite others to follow
10. Diversity is a key to fast learning
11. Seek to build secondary and tertiary skills
12. Establish repeatable learning opportunities
13. Prefer collective learning and team building
14. Learn to unlearn

These learning principles generated a lot of curiosity and was very well received by the organization. Other parts of the company are now adapting similar principles into their own competence strategies [5].

In this paper we will first present an explanation of these learning principles. We then discuss the learning principles in relation to research on competence development strategies, lessons learned from agile ways of working and lean software development. Finally, we conclude on the significance of these learning principles as steps towards lean knowledge management.

2 Learning Principles Explained

Here are the learning principles explained, exactly as presented in a public article by Equinor [5]:

1. Information, knowledge and learning are corporate assets. New insights, competence and learning capacity gained during working hours is supposed to be made available to the rest of the organization. It shouldn't be used to make yourself or your team a more indispensable resource.

When a team is building competence in some area, they should also start thinking about how they can make new insights and abilities available to the whole organization by offering to teach, lead, mentor and help other teams. Encouraging teaching just as much as learning is key for a thriving knowledge organization.

2. Advanced learners and experts should lead. It is imperative that a knowledge organization prioritizes advanced learners and experts when it comes to learning opportunities. In return the advanced learners and experts are supposed to invite and lead – this includes identifying, initiating, asking for, and often organizing both internal and external learning opportunities for others.

3. A critical mass of in-house knowledge is often enough. If individuals and teams actively make their knowledge, competence and learning capacity available, there is a limit to how much other teams and individuals actually need to invest into learning things up front before tackling hard problems. A team can often assume that they can learn required things quickly from other teams when needed.

This enables an important discussion of what teams and individuals should not spend time learning more about, allowing them to focus their learning capacity towards something that is more useful for the organization.

4. Do intermediate and advanced training first. Do intermediate and advanced training first, later you may consider setting up introductory classes. Trying to build organizational competence by focusing on beginners does not work – advanced learners and experts will feel unprioritized and undervalued.

A very common reaction is that your strongest knowledge workers and teams ignore the competence building activities, or sometimes start to work directly or indirectly against the learning effort.

5. Focus learning on current needs. When work is learning, and learning is work, it is imperative to focus most of your capacity on learning things your current need. These days, especially within IT, there is a surplus of available, effective and efficient ways for a team to learn new things quickly when needed.

In addition, you should rely on other teams and experts in your organization to be eager to support your immediate learning needs. Teams working in fast-learning organizations should be confident enough to delay many learning activities until they are strictly needed.

6. Team up with learning buddies. Learning new stuff and carry knowledge into an established organization is usually too difficult for an individual to do alone. Taking a course? Reading a book? Going to a conference? Not alone – find some learning buddies!

Learning activities should be coordinated among a collaborating group of knowledge workers with a common learning need, so that they learn approximately the same things at approximately the same time for approximately the same reason.

7. Engage with professional networks. Professional networks, also known as discipline networks and communities of practice, are very powerful and useful mechanisms for increasing the collective learning capacity of the organization.

Everyone should be encouraged to actively engage, contribute or start their own network of learners. The more the better! However, it is important to keep the networks open and inclusive, so they make their expertise available to others.

8. Establish knowledge bridges. When switching focus from one problem and solution domain to another, it is important that the organization allow knowledge workers to build an effective path to bring their existing knowledge, enthusiasm, competence, and learning capacity from the old into the new.

Sometimes this requires extra investment in the old to enable a successful transition over to the new. Expecting advanced learners and experts within one domain to go back to "kindergarten" and relearn everything from scratch in a new domain is unnecessary, demotivating and counterproductive.

9. Share your expertise – invite others to follow. Sharing is caring – but it doesn't have to be daring! You can share through lunch talks, teaching courses, or organize learning events. It can also be as simple as updating some documents, engaging in online discussions, replying to emails, or just give a nod of recognition to someone that's trying to learn something.

However, some experts and advanced learners should be encouraged to do much more; give talks at conferences, publish articles, participate in external professional networks. For any organization that

would like to learn fast, it is essential to take an active part in the industry dialogue.

10. Diversity is a key to fast learning. Diversity comes in many forms: gender, race, religion, sexual orientation, age, abilities, culture, education, background, mindset. Diversity is essential for building a healthy organization, but it also leads to better solutions as it brings different perspectives and counteracts monoculturalism. Collective learning benefits a lot by diversity – different perspectives and abilities accelerates the learning process.

11. Seek to build secondary and tertiary skills. A knowledge organization should encourage teams and professionals to build secondary and tertiary skills. Encouraging multiskilled knowledge workers and teams improves the communication lines inside the organization, and this will strengthen the collective intelligence significantly. To allow this to happen, advanced learners and experts must give space to others, and start to mentor, lead and teach with their primary skills.

12. Establish repeatable learning opportunities. If learning opportunities becomes a scarce resource, you may end up with the wrong people taking up the slots to learn the wrong things at the wrong time for the wrong reasons. To counter this, whenever organizing a potentially popular learning opportunity, make sure to repeat the same or similar opportunities later if it is a success.

Once this is a well-established practice, knowledge workers and teams will attend to learn the right things at the right time – and for the right reasons.

13. Prefer collective learning and team building. A team of knowledge workers that are used to learning things together are much better equipped to deal with upcoming challenges without requiring organized learning activities. When organizing a course like a team building event, students with different backgrounds and competence will start helping each other to achieve a collective result.

Soon, the attitude switches from "what can I benefit from this?" to "how can we learn to learn things together as a team?".

14. Learn to unlearn. An organizations knowledge capacity is limited – so it must learn to unlearn. One fascinating definition of intelligence says that it's "the ability to get rid of unnecessary information and knowledge". Scaling this up suggests that merely collecting information and creating large databases with knowledge is not optimal for an organizations ability to learn new things – it will actually slow you down. Some even say that learning to unlearn is the highest form of learning.

3 Discussions and Related Work

A fair share of employees in organizations like Equinor are knowledge workers. Typical for knowledge work is that it is mostly dominated by the challenge of learning new things fast and inventing unique solutions to non-trivial problems together with a team of other knowledge workers [11]. Once a task is properly understood the task is often completed. But, as the world is rapidly changing in unforeseen ways, combined with a continuous demand of new business needs, there is always a long line of new, hard problems waiting to be solved. There is a need to optimize the collective intelligence of the organization for reliably learning things fast, effectively, and efficiently.

The Equinor IT competence strategy and the learning principles attempts to address the challenge described above. The learning principles constitute a major departure from traditional knowledge management by taking a "knowledge as inventory" perspective (term inspired by [1]) to optimize for knowledge flow and increase the speed of learning.

In the following, we will try to link the learning principles up to competence development strategies and a lean mindset:

3.1 Competence development strategies

Most companies have strategies to develop employee competence. A study on learning strategies describe enterprise learning strategies as consisting of three parts: Learning systems and incentives, work design and organization of work, and competence development [2]. Such learning strategies can include policies, systems and practices used in development of personnel. These strategies used to consist of vocational training, education and certification but are increasingly informal and practice-based. Examples include "on-the-job and job-rotation training, online network knowledge exchange and communities of practice" [2]. Based on a study across 53 industries in 22 countries, Brandi and Iannone [2] lists several recommendations which include that competence development should focus on "soft skills" such as teamwork which could be embedded in core values, mission statements, workplace policies and practices. Further, Brandi and Ionne [2] recommend informal learning activities as part of the learning strategy, encourage peer-to-peer learning either self-initiated or through team-based work arrangements. Comparing the principles

Table 1: Initial attempt to categorize waste in knowledge management

Toyota Production System	Software Develpment	Knowledge Management
Waste of overproduction	Extra Features	Knowledge not needed
Waste of time on hand (waiting)	Delays	Time to learn
Waste in transportation	Handoffs	Documentation
Waste of processing itself	Relearning	Relearning
Waste of stock on hand (inventory)	Partially Done Work	Unapplied knowledge
Waste of movement	Task Switching	Unfocused learning
Waste of making defective products	Defects	Incorrect knowledge

to findings reported in the study on competence development strategies [2], we note that the focus on learning as a team activity in research findings are present in several of the principles, such as 6 and 13. They recommend that learning should be triggered by work-related processes, industry standards, client needs and innovation objectives – gaps are identified when facing a problem, new requirement or from competitive benchmarks.

Another finding is that enterprises rely on employees to identify knowledge and skill gaps, and should foster activities "that uncover needs and learning potential through formal and informal evaluations". The most successful types of learning were identified as "short and demand-driven responses". The view on a competence strategy in that it should focus on current needs and be "demand-driven" is reflected in learning principle 5. They recommend to ease access to training and development, establish communities of practice, integrate problem identification and solving in work arrangements and to encourage "peer-to-peer, in-house learning activities by providing space for employee-led workshops, for example". Such ideas are captured in principles 7 and 9.

Another principle which is related to studies on organizational learning, is the principle 14 of un-learning. In the introduction to a special issue in "the learning organization" [6], the editors state that "unlearning, e.g. purposefully discarding knowledge that has been deemed obsolete, serves as an efficient way to initiate and facilitate successful learning and change in organizations". They argue that learning can be hampered as new knowledge compete with existing knowledge, and this can evoke cognitive dissonance and resistance in people. Unlearning then involves purposefully discarding elements such as assumptions, routines and procedures.

3.2   Lean knowledge management

When searching for literature on lean and knowledge management, we were only able find a few studies in the literature. A literature review on recent lean research found eight studies connecting lean practices with theories from organizational learning [3]. We have not seen studies we think addresses strategies for competence development in a "lean" fashion. The literature review [3] further suggests that future work on lean should include clarifying terminologi on lean concepts which could include "lean knowledge management" or "lean learning organization".

However, we find examples of studies which focus on lean as a "learning system" [10], where the authors argue that learning in corporate lean programs must be seen as a "process of deep thinking, reflection and improvement".

We argue that the learning principles summarize discussions in the software development community on agile methods [4] and lean software development [8]. The ideas in lean software development provides emphasis on learning for example through focus on speed of delivery, where fast delivery leads to feedback which gives more insight into product requirements. Learning principle 5 is about allowing knowledge to flow. Lean software development and agile methods, have a focus on teamwork, through organizing in self-managing teams (agile) and focusing on "team empowerment" (lean). Learning principle 11 is about amplifying learning, and to avoid delays, task switching, and handoffs.

Taiichi Ohno and The Toyota Production System further provides advice on reducing "waste" [7]. Inspired by how Mary and Tom Poppendieck translated ideas from lean manufacturing to lean software development[9], it is tempting to take this idea further and make an attempt to categorize waste also for knowledge management (Table 1).

From this waste perspective there are many similarities between lean manufacturing and the 14 learning principles. Here are some examples: For knowledge-based work, waiting for others to help you

can cause delays and it might be better to learn it yourself (principle 3 and 11). Focused learning on current needs is essential to increase learning capacity, and to avoid creating and maintaining knowledge not needed (principle 5, 12 and 14). Creating communities of practice and teaming up with learning buddies reduces the need for documentation and handoffs (principle 1, 6, 7 and 13). Allowing advanced learners and experts to invite and lead learning activites reduces the creation of incorrect knowledge (principle 2, 4 and 9). Bridging knowledge built in one context so that it can be used in another context might reduce relearning (principles 8). And finally, encouraging diversity will increase organizational learning capacity and reduce risk of incorrect knowledge (principle 10).

4   Conclusion and Further Work

We have presented 14 learning principles that we argue are significant steps towards a lean approach to knowledge management. These principles comply well with findings in studies on competence development strategies. We have further linked the principles to previous work on agile and lean software development. We hope these principles can inspire others who seek to renew their competence development strategy with a focus on speed of learning, learning as a team activity and learning focused on needs. The focus on needs seeks to avoid "wasteful" learning and creating inventories of knowledge.

The new learning principles were well received in Equinor. In the future we would like to learn more about how the principles are perceived to support speed of learning, focus on learning as a team activity and as a way to reduce wasteful learning. If we place the current work in the improvement cycle of Total Quality Management, we see the learning principles as in the "do" step and approaching a "check". Discussing the principles also with the lean community could lead to insight to decide on what to act on next.

While working on this paper we discovered and discussed several additional links between knowledge management, software development, and lean manufacturing. For example, if we consider modern agile software development as a method for codification of a collective learning process, then it becomes particularly interesting to compare lessons with recent work on lean as a learning system. Also, the "knowledge as inventory" perspective needs to be studied further. Finally, more work is needed to further define key characteristics of "lean knowledge management".

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