Agile Coaching: The Knowledge Management Perspective

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Abstract. Currently, almost half of IT projects are managed in a traditional, sequential, plan-based manner. The leading development methods, successful for decades, are based on the so-called waterfall model. However, rapidly changing business environments push software development companies to adapt newer, leaner and more agile development methods. They promise development teams to welcome changing requirements, deliver software quickly and respond to new customer requests instantly. This is why transition to agile, mostly scrum-based development methods have been common lately. In order to avoid learning from their mistakes, companies usually seek help while adopting agile practices, related knowledge and experiences. Professionals, Agile Coaches, offer it.

This paper summarizes the rationale for adopting agile methods, the role of an Agile Coach in this area, and the knowledge needed and offered by Agile Coaches. The correct selection of knowledge management facilities is critical in this process; this is why we also present them. We present our own experiences as an example of a successfully executed coaching project. The outcome is rather interesting: A novel agile development method implies lowering the degree of ICT support in an application's development lifecycle. On the other hand, we managed to level up the communication between employees. As a result, general project-related knowledge increased.

Keywords: Agile software development · Agile Coaching · Agile adoption
ICT support · KM support

1 Introduction

The agile manifesto [1] has almost reached full two decades since its introduction. In 2001, the manifesto was the result of years of efforts to introduce new approaches to the software engineering area as a response to faster changing requirements and growing demand for efficient software development. Several development methods appeared to implement manifesto ideas. They include XP (eXtreme Programming), Crystal, DSDM (Dynamic Systems Development Method), FDD (Feature-Driven Development), Scrum and others. Today, more than 70% of all agile methods are derivates of Scrum [7, 8].

At first glance, agile approaches seem to be a strong deviation from several decades of established process models based on strictly defined long-term plans, a clear

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sequence of activities, well-defined processes and roles of participants, etc. However, agility in practice also means a strongly regulated set of rules and methods that, by using engineering approaches, leads to fully functional, well-documented information solutions and services. Agile approaches are also not a magic wand that is capable of addressing a number of challenges within the development cycle, but merely an important tool for minimizing the risks associated with the size, cost, and quality of the final IT solutions and services.

For several years now, we know that, for successful agile methods introduction in companies, among other things, the key is in leadership support along with changing the mindset of involved employees. Today, many company leaders understand the many advantages of leaner developmental methods. Business agility has even become an indicator of company maturity.

Taking all this into account, it is not surprising that advocating agile methods and introducing them to daily routine at many companies is not considered as additional, unnecessary work. It is a full-time employment, namely Agile Coaching. It is insignificant if a company employs their own Agile Coaches in order to achieve agile transformation or simply hire external coworkers. In both cases, an Agile Coach is confronted with a need to analyze the current state of processes, current level of employees' knowledge on processes, current satisfaction and obstacles, as well as the advantages offered by current development practices. To sum up, agile coach have to extract implicit and explicit knowledge in order to propose and introduce a novel (or appropriately adapted) leaner and agile development method. During adoption of a new method, there are also many knowledge management-related issues. They are linked with educating employees, measuring their confidence in new methods and based on this to fit new methods to the target company. In this paper, we would like to give an overview of the Knowledge Management (KM) approaches that we used during our last Agile Coaching project. We also present some interesting observations on perceived knowledge level of involved individuals and how it corresponds with the level of using ICT.

The structure of his paper is as follows. In the next section, we give a brief overview on current state-of-the-art in Agile Coaching. We focus on KM-related issues, which every Agile Coach has to overcome. During the coaching process overview (Sect. 3) we firstly summarize the goals of Agile Coach. Before conclusion (Sect. 4) we present important points in our experience on the latest coaching project (Subsect. 3.2). The focus is on knowledge transfer, related to ICT support.

2 Agile Methods and Agile Coaching – Literature Review

Since two decades of agile methods consolidation [1] they have become mainstream. Companies employing agile practices are no longer considered to be "outliers", but rather companies of the norm. Newly emerging development teams primarily chose agile development methods for their practice [8]. On the other hand, more and more established companies try to incorporate new, leaner approaches completely od partially. A relatively new role of agile coaches emerged with their high demand for professionally executed transformation.

The coaching profession is relatively well-known and consolidated now. There are also specialized consulting companies and bodies of knowledge, specialized in Agile Coaching, e.g. the Agile Caching Institute [6]. In addition to offering their services, they also publish valuable information on both opportunities and threats while adopting agile methods. An example is also cited in this paper [2]: "Developing an Internal Agile Coaching Capability: A Cornerstone for Sustainable Organizational Agility".

Authors, such as Sidky et al., promote their own approaches to adopting agile methods properly [3]: "A disciplined approach to adopting agile practices: The agile adoption framework". They do not necessarily expect transition to be executed by Coaches. Another example is Gandomani and Nafchi in "An empirically-developed frame-work for Agile transition and adoption: A Grounded Theory approach" [5]. They provide a novel empirically developed transition framework to facilitate transformation. They also report empirical evaluation of the findings, and the theoretical and practical implications of them. The framework can also incorporate Agile Coaches, but they are not strictly required.

The area of coaching has also been exposed to research. O'Connor and Duchonova in "Assessing the Value of an Agile Coach in Agile Method Adoption" [4] explores the value of Agile Coaching for companies adopting agile methods. They base their research on Return On Investment (ROI) and conclude that there is direct financial value in using an Agile Coach for agile adoption.

3 The Coaching Process

3.1 The Goals of the Agile Coach

In order to implement agile transition successfully, companies usually hire Agile Coaches. They offer much more than just standing up and training some teams. Even with training, self-organized teams don't just magically appear and hit their full stride. Just as important, organizations need solid Agile Coaches to help establish the deep, institutional capability required to become a truly agile organization. With a strong Agile Coaching capability, it would become possible to [2]:

- Enhance product delivery flow throughout an organization,
- Scale safely by ensuring that Agile Coach skills and gravitas are a match for a given team/program/organization,
- Ensure team performance,
- Create a sustainable agile capability that lasts long after key players move on,
- Reduce or eliminate reliance on external Agile Coach Consultants.

Agile Coaches are also a guarantee to avoid a situation where organizations or development teams pick only popular agile approaches to their daily routine, which can become a long-term obstacle. In addition, to avoid this 'a la carte' agile adoption and to do it properly, the coaching supported agile adoption process contains the following steps [3]:

- Set business goals (e.g. reduce time to market, reduce errors in production etc.),
- Choose (a) pilot project(s),
- Analyze the company's and project's characteristics (size, criticality, etc.) and
- current practices,
- Choose the method(s) to adopt,
- Choose the practices to adopt and their interrelation,
- Train the development team and the management,
- Start applying the chosen practices.

3.2 The Case - Practical Experience

Lately, we conducted an agile transition project in a medium-sized international development company. In addition to numerous offices around the world, they have several development divisions in four countries, including Hardware, System and Consumer Software divisions.

The three decades old heavyweight sequential development method showed many advantages to date and it enabled the company to prosper. However, since competition in every domain is growing, excellence, high adoptability and fast delivery times are becoming inevitably needed. This is why their management, with a strong bottom-up demand, decided to address issues which originate from rather outdated development processes. They performed it via renewing their existing processes on the one hand and in parallel, started to introduce an appropriate, tailor-made agile method to selected projects on the other hand.

Our role in this transition was twofold. Firstly, they asked us to design and introduce a tailor-made agile method with all their specifics taken into account. Secondly, we were in charge for coaching three selected projects in agile adoption and preparing teams to proceed on their own to spread the method all over the company – if the method would prove itself. We were involved in the transition for roughly one year.

We are presenting activities, transferred knowledge, supporting management facilities and lessons learned in the following subsections with focus on knowledge transfer and its methods and facilities.

Part 1: Developing an Agile Method. After initial meetings with development leads, intended to identify preliminary drawbacks in existing development processes and potentials for going agile, the activities began for selecting and potentially adopting an appropriate agile method. Before achieving general agreement on which agile method to choose as the basis and how it needs to be adopted, we organized two presentation and brainstorming workshops for key employees to clarify the ideas. The activities that followed were directed towards creating the best possible development method with common agreement. They are summarized in Table 1, which also shows involved deliverables and their types, and the knowledge that was transferred. For every activity we performed, we also show related deliverables to the customer and the knowledge associated with it.

Table 1. Activities, deliverables and knowledge transfer during agile method development.

Activity	Deliverable	KM facility involved	Knowledge prerequisite in the company	Knowledge transferred to/from the company
Review of methods state-of-the art & workshop #1	– Printed presentation – Digital presentation – Report on current methods usage	Internal documentation repository	Current development methods Current activities that address existing method issues	The range of methods Positives and negatives according to the company's domain
Systematic review of best practices in the industry	– Report on best practices – Presentation material (printed and digital) – Checklists on selecting practices	Internal documentation repository	/	Current best industry practices Practices that could work in the company
Designing and documenting the adopted agile method	– Initial version of the adopted agile method (report) – Presentation (printed and digital)	Internal documentation repository		Main ideas on the adopted agile method
Designing transition process	Transition presentation (printed and digital)	Internal documentation repository		Main ideas on how to start using the method
Workshop #2			Critical overview on practices	Current view in new method Critical responses Possible modifications
Designing and documenting camera-ready version of novel agile method	New agile development method (report)	Internal documentation repository		New development method: roles, meetings, handouts etc.

As shown in the Table above, we can see that creating a novel development method was primarily an incremental process. We started with a general method, combined with best-of-the-best approaches. After a few report and idea exchanges on Workshops we created, we agreed on the final agile method.

This paper is not about the method itself, but rather about introducing the method to the company and KM related issues. However, the content of the method also dictates which KM facility developers use, when, why and how. This is why we would like to summarize just a few KM-related aspects of the new method:

- Customer requirements are collected in the same repository as in the old method. However, we do not imply an advanced usage of the existing requirements repository – we simply consider it to be a digital representation of requirements.
- Managers do not monitor project progress via existing systems for managing tasks, but via personal involvement and communication on a daily and weekly basis with development leads and developers.
- Developers primarily use agreed over written information in order to complete their tasks.
- Development teams have the freedom to choose the method of managing their tasks that they agree on before the iteration.
- The team coordinate themselves weekly with a short meeting. They do it informally. Managers use simple spreadsheet documents to monitor shared functionalities.

With aspects that we mentioned, we would like to stress a very important shift in processes. We put IT-based KM facilities to the minimum. Even when we require it, involved people are (in the beginning) free to choose what and in which way they use it. On the other hand, we have introduced frequent, short and focused meetings where those involved exchange their ideas in person. Developers do it daily, development leads and management on a weekly basis. One could say we exchanged high usage of KM facilities with more focused communication in order to increase knowledge flow during development.

Part 2: Agile Coaching. In addition to designing and documenting a novel agile development method, they also invited us to help with its introduction. This is to perform Agile Coaching to the point, where company employees could spread the word on their own. This is why we were with developers in person for several months – in the beginning several times during the week in every development team, later just occasionally.

Before coaching three typical projects (involving several in-house, abroad and outsourced development teams – from both System and Management Software and Hardware Development divisions), we performed several short focused hands-on Workshop sessions in order to introduce novel approaches. Involved employees welcome some approaches (e.g. more focused work on new functionalities, less bureaucracy), but some approaches raised a lot of distrust (e.g. using a pair of scissors, pen and paper for planning a week to come). We overcame most of the dilemmas by working together. On a weekly basis, we measured satisfaction and perception of changes. Based on this, we also altered the method to reflect gained experience. Table 2 summarizes activities that we performed for several months during the coaching period.

Table 2. Activities, deliverables and tools, used during the coaching.

Activity	Deliverables/tools involved	KM facility involved
Presenting different aspects (developers, QA, managers) on the method – several workshops	Presentation (printed and digital)	Internal documentation repository
Facilitating project planning meetings	Printed meeting roadmap	/
Facilitating team planning meetings	Printed meeting roadmap	/
Facilitating team coordination meetings	Printed meeting roadmap	/
Facilitating demonstrations	Printed meeting roadmap	/
Measuring developers and managers' satisfaction with process changes	Online questionnaire	Questionnaire repository (Google forms in our case)
Reporting the progress	Report on activities, method perception and proposed improvements	/
Adopting the method as needed	Development method with approved improvements	Internal documentation repository

We also show in Table 2, that we minimized our distant, virtual cooperation while coaching. We rather involved ourselves in personal contact with people, practicing the novel method. However, it is clear that we were not present at all teams in coordination sessions, which usually took place as an online conference calls.

In Table 3, we would like to stress which KM facilities (namely Application Lifecycle Management, Requirement Management etc.) were used heavily by employees, regarding the new method.

Table 3. Activities, deliverables and tools, used by development teams.

Activity	Deliverables/tools involved
Gathering requirements	Existing system for managing requirements –content-related functionalities (estimates, progress etc. are left blank)
Planning project – current iteration	Spreadsheet for monitoring progress of selected high priority functionalities
Planning iteration	Selected method for managing tasks – we encouraged teams to use physical kanban table
Daily development	/
Coordinating teams	Spreadsheet for monitoring progress
Demonstrations	Existing system for managing requirements, Spreadsheet for monitoring progress

In Tables 2 and 3 we demonstrated how little knowledge management solutions are used in the new method. However, it supports sufficient knowledge transfer from content workers to developers while it also enables a strong digital trace on what was going on during the development.

During the coaching process, we transferred knowledge and practices to employees that uses them on daily basis successfully. In order to be sure that we are on the right track, periodically we measured employees' perception, satisfaction and subjective productivity via questionnaires. We would like to give an insight on changes during the coaching by exposing some data from the last questionnaire. Some questions were general, some questions compared the old development method with the new one, and the last questions were on subjective thoughts, if and what would be good to change. We will make a rationale on results in the Conclusion Section. Figure 1 shows the developers' perception on how they understand requirements, compared to the old development method. An important shared of involved employees shared their perception that it had improved. Figure 2 demonstrated several communication-related improvements (with Quality-Assurance, with other teams and overall). Figure 3 shows that the majority of employees can now focus their work more towards developing new features. Figure 4 is rather surprising, which says that developers like physical boards

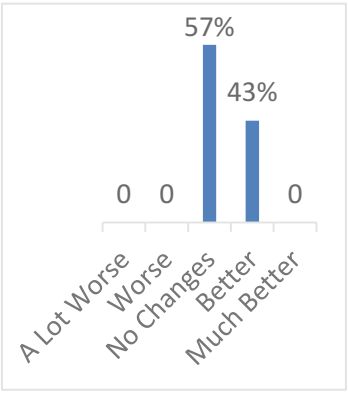

Fig. 1. How did the understanding of the requirements change?

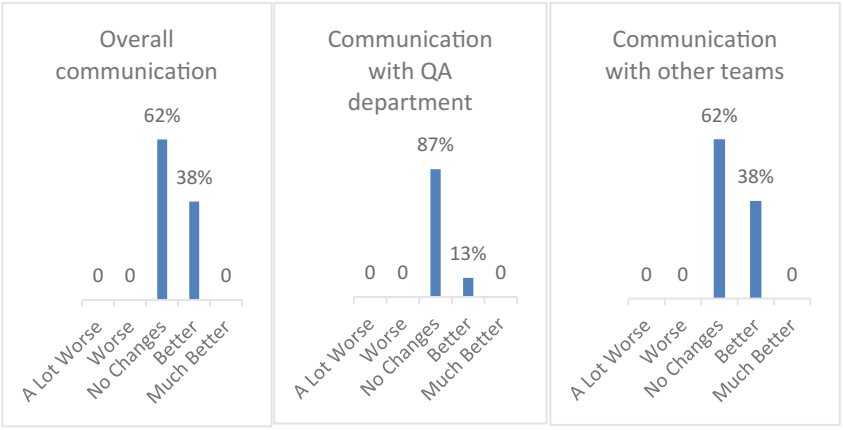

Fig. 2. How did the communication change?

more than digital versions in Jura, YouTrack etc. At the beginning, there was a huge resistance to "childish" tools like the physical kanban board.

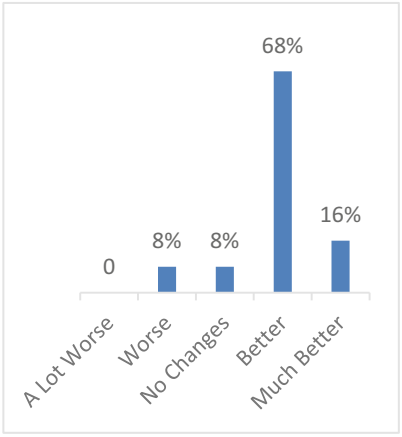

Fig. 3. How did the focus on work change?

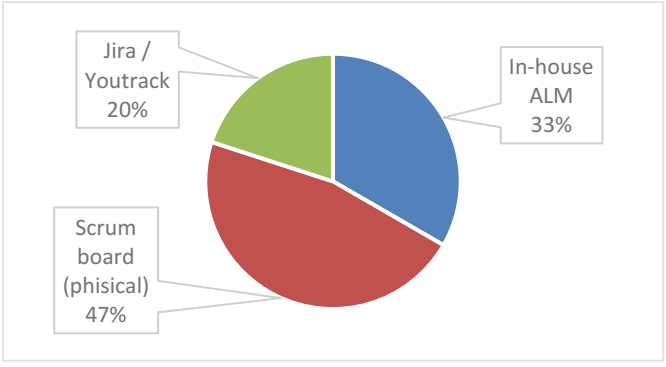

Fig. 4. What facilities do you like to manage project-related daily tasks?

Part 3: Fine Tuning After Coaching. Based on the proposed, introduced and during coaching, adopted agile development method, we prepare some final resources in order to accelerate company-wide method introduction. They include several documents:

- Simple-to-follow roadmap on project meetings,
- Checklists for every meeting,
- TODO lists for every project role,
- Frequently Asked Questions (FAQ) and lessons learned from three pilot projects,
- A set of possible KPI (Key Performance Indicators) metrices for reporting project health and progress to management.

During the coaching activities, employees also upgraded their internal application lifecycle management software to meet all new method requirements. They include a simplified requirement to solution tracking, online kanban boards and support for task estimates. Developers really started to like the physical Kanban board, but in order to meet management requests to report project KPIs easily, they decided to introduce a digital version of the boards with features like automatic measuring progress. Those are also used now by the Quality Assurance team to adjust their testing activities with development ones. Documenting teams also use the same tools in order to integrate their work with development. This is why we can state that the novel development method captures the process from requirement analysis until production-ready solution.

4 Conclusions

In this paper, we summarized the rationale for adopting agile methods, the role of an Agile Coach in this area and knowledge needed and offered by Agile Coaches. If we sum up our own experiences, we can do it by observing the results of questionnaires (some of the most representative are shown in Figs. 1, 2, 3 and 4).

What was proved in practice is the following: The new method really sidelines numerous KM facilities in the company. However, it brings development teams and permanent focused communication to the center. As a result, despite lowering traditional KM activities, we can see a major shift towards increased knowledge flow in the project, and increased project-related knowledge in every single individual. One could argue at this point, that people generally dislike (too many) ICT support in the project, as long as understanding the goals is not a problem. Obviously having proper communication, where possible, can be an even better option than ICT-supported KM facilities. However, we always need a lot of small, but yet important amount of digital support. They include easy-to-follow roadmaps, checklists, live FAQ and lessons learned documents and others. We would also like to stress, that it is not our intention to state that KM facilities, a lot of documentation, and a large digital footprint of development activities are necessarily a bad thing. It depends on the nature of the project and, importantly, the people involved. In some cases, our approach might not work – for those cases the company also preserved the traditional method, proved over decades. It will be used in projects where the novel agile method would not, judged by people involved, give appropriate results. This also aligns with the trend in so-called bimodal development companies, which combine traditional development approaches in one set of projects, but like to employ agile, leaner methods where applicable.

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