

# Challenges on Adopting Scrum for Distributed Teams in Home Office Environments

Marlon Luz, Daniel Gazineu and Mauro Teófilo

**Abstract**—This paper describes the two actual tendencies in the software development process usage: ‘Scrum’ and ‘work in home office’. It’s exposed the four main challenges to adopt Scrum framework for distributed teams in this cited kind of work. The challenges are mainly based on the communication problems due distances since the Scrum encourages the team to work together in the same room, and this is not possible when people work distributed in their homes.

**Keywords**—Agile, Scrum, Distributed Work, Home Office.

## I. INTRODUCTION

TECHNOLOGICAL advances and changes in the global economy are motivating and enabling an increasing demographic distribution of work. However, neither this phenomenon, nor its causes and effects, are clearly understood. In contrast to the detailed statistics that the U.S. government collects and analyzes about other work conditions, there is no measure of the reliance of organizations on communications and computer technologies to get work done across distance [1].

In accordance with this increasing tendency, distributed work is currently the object of considerable attention from the academic and popular presses [2], [3].

Distributed Work environments are characterized by the lack of proximity between co-workers. Although proximity refers to the physical distance between people measured in units such as inches, meters or miles, in the research literature, concepts like proximity, physical distance, collocation and dispersion have been operationalized differently over time [4].

According to researches, people working at more than 30 meters of distance have spontaneous communication prejudiced; this leads to lack of mutual trust and commitment [5], [6]. When this distance increases, team can start experiencing different time zone challenges and meeting schedules can be drastically affected.

Another characteristic of Distributed Work environments is that co-workers do not share the same workspace. As stated by Barker, people sharing the same environment tend to have similar behavior, while different places drive people to different behaviors. People with whom we share social settings also share similar expectations, experiences and perspectives. Shared work environments bring identity to the team [7].

According to Sillince [27], interactive, face-to-face communication is the cheapest and fastest channel for exchanging information. Cockburn states [10] that as face-to-face communication becomes more difficult to arrange, the cost of communication increases, the quality of communication decreases, and difficult of developing increases. He also discusses this theory in his story “Videotaped Archival Documentation”, which describes documentation of a design by videotaping two people discussing that design at a whiteboard.

Figure 1 shows a graph comparing richness of different communication channels. Paper, for example, is a cold communication channel, as it does not have questions and answers, so is not interactive. On other hand, two people exchanging ideas at a whiteboard is a hot (rich) communication channel. Thus it would be preferable to use warm to hot communication channels to reduce the cost of detecting and transferring information in software development projects.



Fig. 1. Effectiveness of different communication channels, based on [10]

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## II. HOME OFFICE FUNDAMENTALS

Distributed Work can occur in many situations, when a company acquires another and key workers refuse to relocate or when relocation is not a cost effective option. Other possibilities are companies trying to increase global presence or even looking for tax breaks.

Home Office is a kind of Distributed Work in which the worker perform his/her work partially or fully from his/her home.

One of the key differences between Home Office and other Distributed Work environments is that in the Home Office, the group can be (and normally is) completely individually distributed, while other settings allow small local teams integrating bigger distributed groups.

An advantage of home office is as following: decreasing population of large cities, economizing high cost office space, and giving a chance to the people who are not able to work outside. Nevertheless, the disadvantage of home office includes problems such as burden from less communication, and an exclusion from society [28], [29].

In the software development field, Home Office environments became popular with the growth of Open Source communities, where people contribute in their free time, from different locations, to build even powerful systems like Linux Kernel and distributions, along many others that can be found at Sourceforge, Apache Foundation and Google Code, just to mention a few.

Nowadays, software development companies' adoption of Home Office concept is increasing, following market tendency.

## III. SCRUM FRAMEWORK FUNDAMENTALS

Also a market tendency, Scrum Framework is composed by a simple set of practices and rules based on the Agile Manifesto that encompasses the transparency, inspection and adaptation [8]. The heartbeat of Scrum is the Sprint; a time boxed period, which generally vary from 2 to 4 weeks, where the team must build and deliver some amount of working software. There are in Scrum only three roles: Product Owner, ScrumMaster and Team Member.

The Product Owner is the person responsible for the success of the product and he is committed to represent the interests of everyone involved in the project like sponsors and stakeholders. The Product Owner is responsible for managing the project budget, release plans and list of project requirements as well as providing to the team all necessary information related his/her expectations on the software.

The Scrum Master is responsible for the Scrum process, for implementing it in the project and for ensuring that everyone in the project follows and respects the set of practices and rules.

Team Members are responsible for developing the project. They have to work collectively, managing and organizing themselves.

There are also in Scrum three artifacts: Product Backlog, Burndown Chart and Sprint Backlog.

The Product Backlog is a prioritized list of requirements, features and functionalities of the project or product. The Product Owner, according to what is most valuable, defines this prioritization. The most valuable approach is a good practice to have a better return of investment.

The Sprint Backlog is a subset of functionalities from Product Backlog chosen by the team. The functionalities chosen by the team come from the top of Product Backlog in order to allow the most important requirements to be first developed. The Sprint Backlog does have also the detailed tasks about the functionalities to be implemented; these tasks are defined and estimated by the team. In the end, the Sprint Backlog is a list of functionalities to be built and the tasks necessary to build them. A common implementation of Sprint Backlog is a Task Board where Stickies are used to write the tasks and can be placed in columns to identify the progress [9].

The Burndown Chart is about transparency and visibility because the chart shows the amount of estimated work to finish the tasks planned. On the x-axis is the time box of the sprint and on the y-axis is the estimated work. The Figure 2 is an example of Burndown chart.

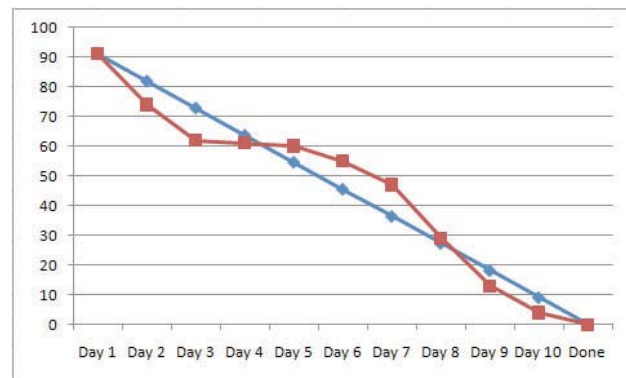


Fig. 2. Example of Burndown chart

The Scrum defines also three ceremonies: Sprint Planning meeting, Daily Scrum meeting and Sprint Review meeting. These meetings guarantee the inspection and adoption of Scrum practices in the routine of the software development team.

In the Sprint Planning meeting the Product Owner presents the highest priority items and the team questions him/her about how the item should work, and then the team chooses the functionalities that will be developed in the next interaction according of their time estimation. After that, the team plans the strategy to achieve the goal of the sprint, discussing and defining necessary tasks to be accomplished during the next iteration.

The other ceremony is the Daily Scrum that is a fifteen minutes standup meeting where each Team Member answers three questions: "What have you done since last Daily Scrum?", "What will you do before the next Daily Scrum?" and "What impediments are in your way?". The purpose of this meeting is to each one knows the work of each other, synchronizing the work of all team members daily and getting

impediments to be solved by the Scrum Master, so that the team can work fluently.

The last ceremony of iteration is the Sprint Review meeting, which is divided in two parts. In the first half the Team Members present the work done to the Product Owner and other stakeholders. This is the moment when people involved in the project can check how the project is increasing. After the Team presentation there is a second half of the Sprint Review where the Team discuss the process and techniques used in the past Sprint and how they can improve their process.

The framework Scrum works fine when all members of the Team are in the same site because they can discuss a lot about the work to be developed and they communicate with each other quickly about any needed changes in the strategy to achieve the goal. The agile methodology recommends the Team Members should sit together to facilitate the communication and to not waste time moving between floors, keeping a good work rhythm [10].

#### IV. SCRUM AND HOME OFFICE CHALLENGES

Research from over forty years ago to the present suggests that physical proximity can have powerful and positive effects in everyday life as well as in science, government and business [11]. As mentioned by Cockburn [10], Agile Software Development methodologies and frameworks like Scrum also benefit from these effects. Successful implementation of such process on Distributed Work and Home Office environments challenges every member of the team. Then, it is following the four main challenges to use Scrum framework with home office environment.

##### A. Product Owner Role Challenge

First challenge is related to Product Owner role. Team Members need their constant inputs regarding software functionalities and expectations. This includes a huge amount of information to be transferred from one side (the Product Owner and the stakeholders he/she represents) to another (the Team Members). Many different researches already proved that the most information rich medium is face-to-face communication [12]-[16], so, the challenge lies in transferring Product Owner's vision of the project to Team Members.

##### B. Share Scrum Visual Elements Challenge

Kiesler and Cummings argue that sharing social settings in physical spaces influences the likelihood of establishing a shared territory [17]. This can be observed in collocated Scrum teams through the common usage of Sprint Backlog and Burndown Chart over a physical task board wall, as shown in Figure 3. This way, the second challenge is related to Scrum visual elements and the difficulty to share those between distributed Team Members.

##### C. Scrum Meeting Challenge

Kniberg states in his book that Sprint Planning meeting is the most important event in Scrum. It is usually a half-day meeting, which requires participation of all Team Members, Product Owner and Scrum Master. Moreover, Scrum also defines Sprint Review meeting, which is another half-day event. He also recommends realizing both, Sprint Planning

and Sprint Review meetings in the same day [9]. A research from 1973 shows that presence of others, increases attention, social impact and familiarity. That is, Distributed Work environments that cause people to be out of one another's sight may lead also to their comparative inattention to coworkers [18]. This leads to the third challenge: How to keep attention of so many people during so many hours across different places and even possibly different time zones without face-to-face?

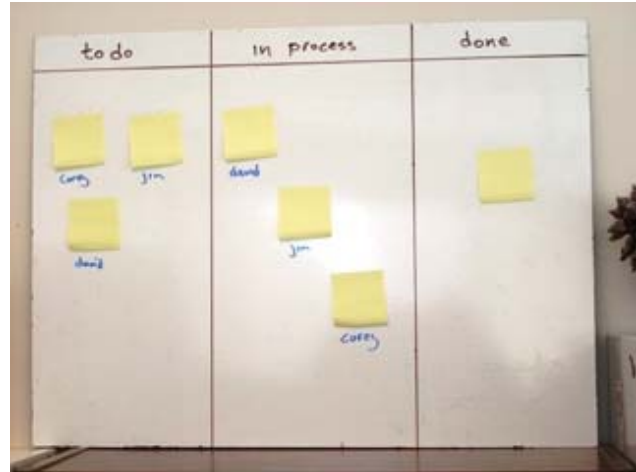


Fig. 3. Typical physical setting for collocated Scrum team

##### D. Information Share Challenge

Knowledge sharing has an important role in software development process. As the Agile Manifesto states, Agile Software Methodologies (such as Scrum) should prioritize individuals and interactions over processes and tools [19]. This means that the most important knowledge-sharing medium in these projects is peer communication. Distance between workers has its highest impact on group functioning through their effect on informal, spontaneous communication opportunities [6], [20]-[23]. Casual contact is important to relationships. People tend to like and be influenced most by people they encounter and talk frequently [24], [25]. That is, people tend to develop strongest ties with those they have chance to communicate spontaneously. According to Hansen it is more difficult to transfer complex knowledge from one location to another when ties are weak [26]. This brings the forth and last challenge on adopting Scrum for Home Office environments: How to transfer complex information between Team Members when they do not have opportunity to create and maintain strong relationships among each other?

#### V. CONCLUSION

Although there is the premise that Scrum works better in collocated environments because of the gain in communication caused by proximity among collaborators, the list of challenges to adopt Scrum for distributed teams in Home Office settings is not big. There is space for further case studies on teams trying to overcome these challenges. As future work, all cited challenges will be fully analyzed and possible solutions for each case will be provided.

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