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Agile Coaching: Effectiveness and Best Practices for Successful Scrum Adoption, and Identification and Analysis of Challenges in Scrum

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Abstract
Agile coaching plays an important role in successfully adopting Scrum and overcoming challenges associated with its implementation. Agile coaches support teams by providing resources, tools, and frameworks that allow them to solve problems independently and make data-driven decisions. This article reviews the effectiveness of Agile coaching, discusses the Scrum and Agile adoption challenges, outlines best practices for successful Scrum adoption, and examines the problems Organizations face when implementing Scrum. Scrum has been the most widely adopted Agile methodology over the past decade. While Scrum plays an important role in the success of Agile development, it does come with challenges. A custom model that was transformed from the Diffusion of Innovation theoretical model was developed to detect the Scrum adoption challenges referred to as the Scrum Adoption Challenges Detection Model (SACDM). This model consists of four constructs: i) Individual factors, ii) Team factors, iii) Organizational factors, and iv) Technology factors. Agile has become a hot topic among stakeholders over the last few years. Out of many agile methodologies, Scrum has become at the top of the list as a framework.

Keywords: Agile Coaching, Scrum Adoption, Information Systems, Software Development Lifecycle

1. INTRODUCTION

Agile coaching serves as a bridge, guiding teams and organizations through the cultural and operational shifts required for successful Scrum adoption. Scrum refers to an Agile methodology emphasizing project management structure and communication between all stakeholders, including clients and business representatives, regularly setting sprint time limits for software completion, reviewing changes, and applying retrospection before working on the next product backlog requirements. Scrum was developed in the early 1990s by Ken Schwaber and Jeff Sutherland. Scrum is currently the most widely adopted Agile methodology, based on the 2017 VersionOne survey [3]. Its high adoption rates could be due to its simplicity, as both business and Scrum teams can easily understand it. To get an overview of adoption challenges faced by individuals within software organizations, it is necessary to get to the core of the difficulties, i.e., what are the Scrum adoption challenges experienced in practice? Is there a relationship between the adoption challenges and Scrum adoption outcomes that need to be discovered? Will the

knowledge and understanding point to a potential correlational or causal outcome? Multiple theories, models, and frameworks, such as the Diffusion of Innovation (DOI), Technology Acceptance Model (TAM), Perceived Characteristics of Innovations, and Theory of Planned Action, have been used to understand better the adoption and implementation of methodologies in software development. The DOI theoretical model was chosen instead of the alternate

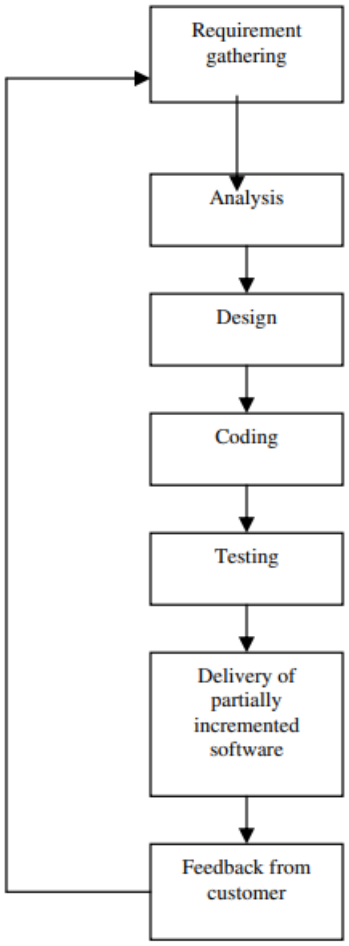

Fig. 1. Phases of Agile Process [1].

theories because it was the only theory at the time used at the individual and organizational levels of IT adoption research.

A. Scrum Adoption

Scrum is a framework rather than a process. As in all project life cycles, there are also different phases that a project team must go through to develop a software project. The team decides how the whole process will go on a series of iterations known as a sprint' it will determine the time limits for each phase and the progress of the project. Scrum addresses those projects that are facing quick changes and requirements [4].

B. Scrum Roles

The roles actually are people who are involved in the scrum for developing the projects, giving guidance, and keeping things according to the requirements of projects.

C. Product Owner

The person decides the business value and determines the order and type of work to be done at each phase and is responsible for recording all these activities in the product backlog. He is responsible for providing funding when required, creating all types of requirement return on investment objectives, and release planning.

D. Scrum Master

The scrum master manages a self-organizing team to facilitate the team's daily scrum but not control the team and make the team productive. Ensures close cooperation among different roles and functions. He removes hurdles faced by the team or process. He is the custodian of the scrum values, practices, and rules and tries to implement them in true spirit. It is a link between management and the team [5].

E. Scrum Team

It is the project development team having up to 10 members with a specific skill. The team is responsible for implementing all functionalities laid down in the requirements. It will be a self-organized, self-managed, and Crosse functional team. All team members will be equally responsible for the project's failure and success.

F. Scrum Artifacts

These are the documents created by people before or during a sprint in the project development using Scrum.

G. Sprint Backlog

It contains the highest priority item from the product backlog to be subdivided into small tasks (explain enough), at least 16 hours for each task to complete. Team members define these tasks in planning meetings. All team members can view and be changed during daily scrum meetings [2].

H. Scrum Ceremonies

The scrum ceremonies consist of Daily scrum meetings. The daily scrum of scrum meetings includes Sprint planning meeting, a Sprint review meeting, and a Backlog refinement meeting.

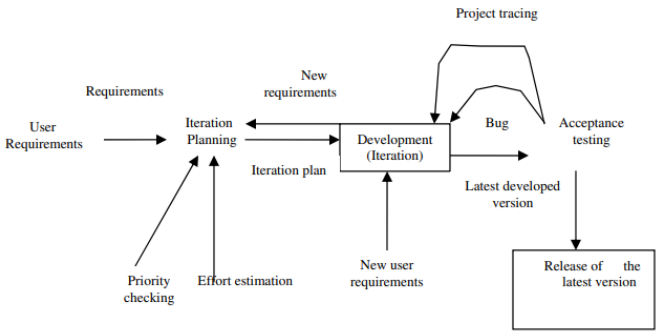

Fig. 2. Method of Developing Agile Processes [1].

2. CHARACTERISTICS OF AGILE PROJECTS

Agile process requires less planning and it divides the tasks into small increments. Agile process is meant for short term projects with an effort of team work that follows the software development life cycle. Software development life cycle includes the following phases:

- Requirements gathering
- Analysis
- Design

- Coding
- Testing
- Maintenance

The involvement of software team management with customers reduces the risks associated with the software. This agile process is an iterative process in which changes can be made according to customer satisfaction. In agile process new features can be added easily by using multiple iterations [6].

a. Iterative

The main objective of agile software processes is satisfaction of customers, so it focuses on single requirement with multiple iterations.

b. Modularity

Agile process decomposes the complete system into manageable pieces called modules. Modularity plays a major role in software development processes.

c. Time Boxing

As agile process is iterative in nature, it requires the time limits on each module with respective cycle.

d. Parsimony

In agile processes parsimony is required to mitigate risks and achieve the goals by minimal number of modules.

e. Incremental

As the agile process is iterative in nature, it requires the system to be developed in increments, each increment is independent of others, and at last all increments are integrated into complete system.

f. Adaptive

Due to the iterative nature of agile process new risks may occurs. The adaptive characteristic of agile process allows adapting the processes to attack the new risks and allows changes in the real time requirements.

g. Convergent

All the risks associated with each increment are convergent in agile process by using iterative and incremental approach.

h. Collaborative

As agile process is modular in nature, it needs a good communication among software development team. Different modules need to be integrated at the end of the software development process.

i. People Oriented

In the agile processes customer satisfaction is the first priority over the technology and process. A good software development team increases the performance and productivity of the software [1].

3. EFFECTIVENESS OF AGILE COACHING

1. Role of Agile Coaches: Agile coaches support teams by providing resources, tools, and frameworks that allow them to solve problems independently and make data-driven decisions. Agile coaches act as change agents, facilitators, and mentors, enabling teams to understand Agile principles. Their responsibilities include:
   - Guiding teams on Agile values and practices.
   - Coaching stakeholders to align organizational goals with Agile principles.
2. Impact on Team Performance: Agile coaching significantly improves team performance by fostering collaboration, enhancing communication, and promoting continuous improvement.

3. Organizational Transformation: Agile coaches are instrumental in driving organizational transformation. Working with leadership ensures that Agile principles are integrated into strategic decision-making [7].

4. BEST PRACTICES FOR SCRUM ADOPTION

1. Establishing a Clear Vision: A well-defined vision is critical for successful Scrum adoption. Agile coaches should work with stakeholders to ensure alignment on goals and objectives, which helps provide clarity and direction.
2. Create a product backlog: A list of priorities according to business values, required functionalities, and user stories as a basic unit of work. The product owner makes the list. The product owner can change priorities during or end of a sprint. The priority item should be written with enough detail to help the team with the effort and time estimations.
3. Training and Skill Development: Effective training ensures that team members understand their roles within the Scrum framework.
4. Conduct sprint planning meetings: The sprint planning meeting is a monthly meeting attended by the product owner, scrum master, and team to discuss what will be done for the next sprint. It usually lasts for 30 days. In this meeting, team members divide the project into small, manageable tasks in order to complete the tasks in one sprint.
5. Run daily standups: Scrum master and development team members conduct a daily 15 minutes meeting at the same time and place. The three questions to be discussed:
   - What has been completed since the last meeting?
   - What items should be done before the next meeting
   - What problems do team members have?

   These meetings facilitate communications, identification, and removal of abstractions in completing tasks, quick decision-making abilities, and improvements in visibility.
6. Use burndown charts: They show the total remaining work hours in one sprint on a daily basis. The team becomes self-organized using the chart.
7. Conduct sprint review meetings: A Sprint review meeting is a monthly meeting held at the end of the sprint. It is a 4-hour time-bound meeting where team members present incremental working models completed to the product owner and everyone else. At the end, the product owner reviewed and revised the sprint planning meeting if required.
8. Conduct Backlog refinement meeting: Sprint retrospective meeting is conducted after the completion of each sprint. Team members generate and reflect on their own process after inspecting the behavior. They take proper action for future sprints to find the answers to the questions. Is everything ok? Is any improvement required?

5. CHALLENGES IN SCRUM IMPLEMENTATION

Although there are several challenges with traditional project management principles, two are especially important for the management of software projects: complexity and uncertainty. Project complexity means that the many different actions and states of the software project and its environmental parameters interact, so the effects of actions are difficult to assess. In complex software an adequate representation of all the technological, organizational, and environmental states that might have a significant influence on the project's outcome of value, or of the causal relationships, is simply beyond the capabilities of the project team. Most of the classic problems of developing software derive from this essential complexity and its

exponential increase with size; for example, it is estimated that for every 25 % increase in problem complexity, there is a 100 % increase in complexity of the software solution. A further challenge is that the information needed to understand most software problems depends upon one's idea for solving them. The kind of problems that software projects deal with tend to be unique and difficult to formulate and solutions tend to evolve continually as developers gain a greater appreciation of what must be solved [8]. To list some of the Challenges and Limitations as following:

1. Resistance to Change: Resistance from employees and management is a common hurdle. Some team members may resist change and prefer to work in traditional ways.
2. Misunderstanding Scrum Roles: A lack of clarity regarding Scrum roles—Product Owner, Scrum Master, and Development Team—can lead to confusion and inefficiencies.
3. Insufficient Stakeholder Engagement: Scrum requires active involvement from stakeholders to define and prioritize the product backlog. However, stakeholders often struggle to dedicate the necessary time.
4. Communication breakdown: Lack of communication can lead to misunderstandings and delays in project completion.
5. Lack of time management: Scrum teams worked in time boxed sprints and the work should complete within sprint's timeframe. Sometimes, team members not able to manage their time, lead to work delays.

6. CONCLUSION

Agile coaching is pivotal for successful Scrum adoption, helping organizations navigate the complexities of cultural change and operational transformation. Scrum is the most widely used SDM now a days to complete project management tasks. The inability to easily detect Scrum adoption challenges can lead to teams and individuals for not using Scrum correctly or not adopting Scrum altogether, which could potentially limit the successful outcomes of a project. It is proposed that a practically applied Scrum adoption challenges detection model such as SACDM, will aid in the awareness of the challenges faced by software organizations, and thus potentially limit the negative effects these adoption challenges might have on the individuals and organizations using Scrum. The SACDM was developed to detect Scrum adoption challenges with the objective of equipping adopters with the knowledge and awareness to overcome them. From this research we can conclude that the implementation of Scrum frame work in its true sense ,active participation of management proper training of the scrum team effective communication and coordination between team members will minimize problems in scrum implementation.

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