

# Behavior-Driven Dynamics in Agile Development: The Effect of Fast Feedback on Teams

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**Abstract:** This paper with the title "*Behavior-Driven Dynamics in Agile Development: The Effect of Fast Feedback on Teams*" was published as full paper [KKS19] in the proceedings of the International Conference on Software and System Processes (ICSSP) in 2019.

Agile software development teams strive for fast and continuous feedback. Both the quality of the resulting software and the performance of the team require feedback. The performance of development teams is often addressed in retrospectives, which are not only part of the SCRUM framework, but also in various customized development processes. Reflecting on incidents during the last sprint helps the team to increase its performances, expressed by, e.g., efficiency and productivity. However, it is not only essential to identify volatile sprint performances, but also to characterize the root causes. The main reasons for low performance are often not visible, in particular when they are related to social-driven team behavior, such as communication structures, mood, or satisfaction. In this paper, we analyze whether automated team feedback about retrospective sprint-behavior can help the team to increase performances by additional awareness about the dynamic effects over time. In a comparative case study with 15 software projects and a total of 130 undergraduate students, we investigated the sustainable impact of feedback on human aspects. Our results indicate that automated feedback positively affects team performances – and customer satisfaction.

**Keywords:** Team dynamics; Agile; Retrospectives; Pro-active feedback; Information transparency

## 1 Introduction

The performance of agile software development teams mainly bases on effective processes, a culture of team balance, trust as well as constructive feedback. The study describes an approach that supports proactive feedback realized in JIRA involving the development team's behavioral dynamics during sprints. Investigations of human factors are actively in need of understanding the development and organizational team performances better. Awareness of potential dependencies with a focus on productivity and social-driven team factors is essential. While progress metrics in agile projects are simple to trace, e.g., by using issue tracking software like JIRA, the human factors are often difficult to capture and interpret. In an iterative knowledge discovery process, system-aided feedback support in ongoing projects is realized as an integrated plugin-solution for JIRA. The team-specific feedback

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comes along with visualization graphs about interdependencies and textual implications according to team dynamics and development performances during sprints.

## 2 Methodology

The plugin was evaluated in a case study with 15 student software projects over four consecutive Sprint iterations. For comparability, some teams could actively access the *ProDynamics* features. We investigated whether the system-aided feedback involving behavior dynamics and progress metrics showed positive or negative effects for the organizational structures and development performances over time. *ProDynamics* integrates the elicitation of human factors through a self-adapting survey that grants feedback implications after each Sprint. Weekly gathered information about communications, meetings, and emotional metrics, together with standard development metrics, were automatically analyzed, visualized, textually implicated, and made available within the projects. Customers and Scrum master provided additional feedback about their perceived team and development performances. Teams without access only received insights from Sprint reports in JIRA.

### ProDynamics – Overview

### Sprint Retrospectives



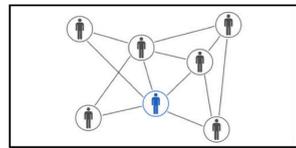
#### Communication & Meetings

Characterizes communication and meeting behavior in teams. Sprint analyses resolve implications for positive and negative tendencies.



#### Group Spirit & Emotions

Characterizes the atmosphere and emotional situation during sprints. Teams gain insights about customer satisfaction on sole performances.



#### Productivity Comparison

Review of workload balances in teams and development performances. Sole productivity measures are visualized and compared with average outcomes.

Fig. 1: *The ProDynamics JIRA-Plugin*: Enables Sprint Feedback on the Human Factors in Teams

## 3 Research Results

The study results are statistically significant and revealed that the groups with access to the additionally provided *ProDynamics* feedback had a consecutive increase in the development performances over time. Meanwhile, teams without access tend for more error-gaps when estimating Sprints. The study shows that 68% of 130 developers believe that team feedback takes a crucial position in agile software developments, while 59% of the *ProDynamics* participants noticed a supportive effect in Sprints. Therefore, the plugin simplifies complex data elicitation and activates awareness in teams also for human factors in software projects.

## References

- [KKS19] Kortum, Fabian; Klünder, Jil; Schneider, Kurt: Behavior-driven Dynamics in Agile Development: The Effect of Fast Feedback on Teams. In: Proceedings of the International Conference on Software and System Processes. ICSSP '19, IEEE Press, Piscataway, NJ, USA, pp. 34–43, 2019.