DMAP: An Artifact for Identifying Scrum Antipatterns in Software Projects

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Abstract. *Identifying software project management antipatterns in practice remains difficult because their evidence is often dispersed and hard to interpret. This paper presents DMAP, an artifact for detecting Scrum antipatterns and mapping them to management antipatterns. DMAP integrates a case-selection protocol, a dichotomous questionnaire, and an NPLF mapping scale. Evaluated on 164 case studies, the artifact selected 5 for detailed analysis and identified 7 Scrum antipatterns (12 occurrences) mapped to 5 management antipatterns. The results suggest that Scrum deviations can serve as indicators of underlying management problems.*

1. Introduction

Software projects often exhibit recurring but counterproductive practices known as antipatterns, i.e., seemingly appropriate solutions applied in unsuitable contexts that ultimately affect planning, control, and communication [Brown et al. 1998]. In project management, recurrent dysfunctional behaviors such as *Fire Drill*, *Glass Case Plan*, *Inflexible Plan*, *Road to Nowhere*, and *Project Mismanagement* have been reported as management antipatterns [Stamelos 2010]. However, their practical identification remains difficult because diagnosis from project documentation is often subjective and hard to replicate [Perkusich et al. 2013]. In Scrum-based projects, partial or incorrect adoption may generate antipatterns in roles, events, and artifacts [Wolpers 2023]. These observable dysfunctions can therefore be used to infer underlying management problems. Based on this gap, this paper addresses the following research question: *How can evidence of antipatterns be systematically detected in software project management in projects applying Scrum?* To answer this question, we propose DMAP, an artifact for identifying Scrum antipatterns and mapping them to management antipatterns.

2. DMAP Artifact

DMAP was conceived as a systematic diagnostic artifact for reducing subjectivity in the identification of management problems from documentary evidence. The artifact integrates three components. First, a case-selection protocol retains only projects focused on software-product development, based exclusively on Scrum, and supported by sufficient evidence of the main Scrum activities. Second, a dichotomous questionnaire identifies Scrum antipatterns through yes/no questions derived from Scrum antipattern catalogs [Wolpers 2023]. Third, an NPLF mapping scale relates the detected Scrum antipat-

terns to management antipatterns through four evidence levels: Not linked, Weak, Possible, and Firm. This structure provides a systematic and transparent mechanism for linking observable Scrum dysfunctions with project management antipatterns [Stamelos 2010].

3. Evaluation and Results

DMAP was evaluated on 164 academic case studies obtained from an institutional repository. After applying the first-stage selection criteria, 44 cases satisfied the minimum requirements. A second review focused on the availability of documentary evidence for Scrum activities led to the selection of 5 cases for detailed analysis. These cases provided sufficient methodological evidence to support the application of the dichotomous questionnaire.

The application of the artifact to these five cases identified 7 Scrum antipatterns with 12 total occurrences. The most frequent finding was Planning too detailed, detected in SC47, SC52, SC86, and SC94, followed by #NoDocumentation, identified in SC31, SC86, and SC94. The remaining antipatterns were No routine in SC94, Not enforcing the time-box in SC31, Outdated issues in SC86, Over-sized backlog in SC94, and Unfinished business in SC52. These findings were mapped to five management antipatterns through the NPLF scale. The strongest relations were between Planning too detailed and Inflexible Plan, and between Over-sized backlog and both Fire Drill and Inflexible Plan. The remaining Scrum antipatterns showed possible or low-level links with Glass Case Plan, Project Mismanagement, and Road to Nowhere. Overall, the results indicate that deviations in Scrum execution can serve as evidence of underlying management problems in software projects.

4. Conclusions

DMAP provides a systematic and replicable way to detect management problems from documentary evidence of Scrum execution. By combining a case-selection protocol, a dichotomous questionnaire, and an NPLF mapping scale, the artifact transforms Scrum dysfunctions into observable indicators of project management antipatterns. The evaluation on academic Scrum projects shows that this approach supports a more traceable and reproducible diagnosis, even when the available evidence is limited.

References

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