Applying Distributed Cognition in Teams to Agile Processes

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1 INTRODUCTION

Prioritizing customer requirements and communicating the value of stories with stakeholders is not an uncommon challenge to anyone who has served as a product owner, proxy product owner, or even a Scrum master of a Scrum team. The attendees of a backlog refinement and/or sprint planning session can have vastly different perspectives, knowledge, backgrounds, and experience — not to mention individual stakes in the work being performed. Without a common framework for prioritization, this makes prioritizing stories and tasks challenging as the relative requirements of tasks are subjective. This is the problem Buchan, Zowghi, and Bano set out to solve.

In a theory, the customer or designated stakeholder could be deferred to to resolve every single one of these conflicts. In practice, however, the customer is rarely available to attend every single Scrum backlog refinement session. Furthermore, the customer (nor any single individual) is unlikely to possess all of the technical and domain knowledge required to actually make an informed decision to deconflict the priorities.

For example, if a database team attends a backlog refinement meeting, they may be inclined to view the stories pertaining to the database as the highest priorities, as that is the component that they interface with on a daily basis. However, a network team may feel strongly that the network tasks are a higher priority. Management can attend without the technical insight and background to understand either of these tasks, and request that a metrics reporting task takes precedence. This example illustrates a common example of the challenges of a refinement session when working within service teams.

Applying the principles of DC (Distributed Cognition), the DiCoT framework, and the knowledge gleaned from previous experiments using the DiCoT framework, “Can the criteria identified by DiCoT analysis be distilled down to a (relatively) simple set of rules for prioritizing product backlog items?” The aim of this research is to identify such a set, if one exists, or at the very least determine the feasibility of identifying such a set.

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2 BACKGROUND

3 SUMMARIES

3.1 Distributed Cognition

3.1.1 Problem. Distributed Cognition (DC) theory is a branch of cognitive science that aims to understand cognition beyond the basic sense in which it is usually viewed. Normally, we view the concept of cognition as something that is limited to a single individual's "skin or skull" as the paper puts it. DC aims to understand cognition that is distributed among individuals in groups. More specifically, the goal of DC in Hutchins' paper was to identify how tasks that are commonly only done by a single individual could be distributed to a group.

3.1.2 Proposed Solution. In his research, Hutchins did not identify a solution, but rather explained the concepts as he identified them, and proposed some interesting questions that warranted further investigation.

3.2 DiCoT: A Methodology for Applying Distributed Cognition to the Design of Teamworking Systems

3.2.1 Problem. Many systems are traditionally designed by envisioning a single person sitting at their desktop or laptop computer, but in practice, we know this is not the way many systems are used. In certain circumstances, for example, an ambulance or emergency room, systems are simply workstations for whoever needs them. The workspaces don't have dedicated users like we think of in a typical office setting.

3.2.2 Proposed Solution. Distributed Cognition is a framework that aims to solve this problem by considering the bigger picture. Specifically, it aims to solve design problems, but the idea proposed by the authors of this paper is that Distributed Cognition may also apply to the distribution of labor. This is what is being coined as 'DiCoT' (Distributed Cognition for Teamwork).

This was attempted in a case study using the London Ambulance Service (LAS). Data was gathered through various different roles in the organization and analyzed using DiCoT. The core principles of DC were applied to the data gathered and two alternative redesigns of the system were proposed.

3.2.3 Validation. Because the proposed methods were not implemented at the time the paper was written, there was no validation done to determine the effectiveness of the proposed modifications. Instead the author proposes that it is simply a 'proof of concept."

3.2.4 Limitations. The largest limitation of the study was the lack of any concrete proof that the methods were successful. Although the ideas generated using the DiCoT framework look promising, there is no actual implementation to gauge whether or not they improved the workflow of a team.

3.3 Applying Distributed Cognition Theory to Agile Requirements Engineering

3.3.1 Problem. In this paper[2], the authors are trying to solve the problem of story backlog prioritization with stakeholders that can commonly occur in Agile settings.

Prioritizing requirements and communicating the value of stories with stakeholders is not an uncommon challenge to anyone who has served as a product owner, proxy product owner, or even scrum master. The attendees of a backlog refinement and/or sprint planning session can have vastly different perspectives, knowledge, backgrounds, and experience — not to mention individual stakes in the work being performed. This can create a challenge without a common framework for prioritization as the relative requirements of tasks can be vastly different depending on who you ask.

If the database team attends the refinement, they may tend to view the story that benefits the database as the highest priority, as it is what they are most familiar with and interface with regularly. However, the network team may feel strongly that the network tasks are a higher priority. Management can attend without the technical insight and background to understand either of these tasks, and request that a metrics reporting task takes precedence. This example illustrates a common example of the challenges of a refinement session when working within service teams.

3.3.2 Proposed Solution. To begin to solve the problem, the authors sought to determine two important things: 1. What aspects of Agile Requirement Prioritization are cognitively significant? 2. What principles from the DiCoT framework are important in the prioritization process? One solution to this problem is to utilize a common prioritization criteria. In the paper being discussed[2], a criteria was developed by applying DiCoT[1]: a methodology for applying Distributed Cognition (DC)[3].

The analysis identified six criteria for prioritization and three areas of distinct cognitive effort during a field study of two backlog refinement sessions for an undisclosed product.

3.3.3 Validation. There were some potentially identified threats to the validity of the study. Selection bias can not be ruled out, as the project studied was chosen by a single contact. External validity is also low, in the words of the authors, and applicability to other projects is likely to be inconsistent. Observer bias was also a possibility, as the team studied was aware that they were being analyzed during their backlog refinement meeting and may have behaved differently. The observer did attempt to mitigate the impact of this, however, by building a repertoire with the team prior to commencing the study.

3.3.4 Limitations. One limitation conceded to by the authors of the paper was that the process of applying the DiCoT framework and collecting data for analysis was very time consuming, and likely not practical to be conducted regularly.

3.3.5 Research Question. Can the criteria identified by this analysis be abstracted into a common framework? Is there some commonality between the requirements of all projects that can be quantified into a simple set of rules for prioritizing backlog items? The aim of this research is to attempt to identify such a set.

4 DISCUSSION

5 CONCLUSION

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