Using Kanban to Reshape Communication and Collaboration Across Teams

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Abstract. *Communication and collaboration remain challenges in software teams in contexts that require coordination across multiple actors. Visual workflow approaches such as Kanban may support in implementing organizational changes. In this sense, we implemented Kanban within a project documentation team. Then, we conducted an empirical study using a questionnaire in which participants rated communication and collaboration before and after Kanban adoption and justified their assessments. We found statistically significant improvements in perceived communication and collaboration after Kanban adoption, and our qualitative findings suggest that increased work visibility, the use of visual resources, and reduced dependence on intermediary communication contributed to these improvements. We also highlight our lessons within this experience, which we expect to help practitioners understand potential benefits associated with Kanban adoption.*

1. Introduction

Effective communication and collaboration remain challenges in software teams [Hoffmann et al. 2022]. In the context of project documentation, an activity involving multiple actors, challenges related to limited visibility into work progress, and the centralization of information flow may create bottlenecks that affect team autonomy and the delivery of results. To address them and improve project documentation activities, we implemented organizational changes grounded in Kanban [Anderson 2010] to support teams in coordinating their activities and sharing information within *FPFtech*, a Research and Development Organization.

We conducted an empirical study to evaluate how communication and collaboration were affected after Kanban adoption from the collaborators' perspective. We used a questionnaire as the data collection instrument, asking participants to rate communication and collaboration before and after Kanban adoption and to justify their ratings. Based on this data, we performed statistical tests to assess whether a statistically significant difference emerged in the improvement of communication and collaboration. In addition, we analyzed their justifications to understand the phenomenon.

Regarding the results, we identified a statistically significant difference in participants' scores for communication and collaboration after Kanban adoption. Overall,

they attributed higher scores for communication and collaboration after adopting Kanban. Factors associated with this improvement include greater visibility of team members' progress, the use of visual resources, accelerated progress, and improved collaboration among the different teams involved. As contributions, we highlight our insights as lessons learned, which we expect to help practitioners understand the communication and collaboration improvements they may find when adopting Kanban.

2. Background

Kanban. Kanban is a workflow management approach for managing and coordinating software development work through visual mechanisms[Ahmad et al. 2018]. Among Kanban's principles, *Anderson (2010)* highlight its ability to provide visualization on workflow, limit work in progress, support on measuring and managing flow, and explicit process policies [Anderson 2010]. Kanban boards have been used in different contexts, such as improving work visibility and control of project activities [dos Santos et al. 2018], or being integrated with other agile methodologies to enhance its use in development teams [Meireles et al. 2025, Bhavsar et al. 2020]. In our context, we emphasize the importance of understanding its use in processes related to software development from a project documentation perspective, so as to examine how Kanban supports communication and collaboration among the actors involved.

Communication and Collaboration. In our work, we adopted *Oza et al. (2013)* definition on communication and collaboration. In their work, they define that communication reflects the information exchange to achieve a goal or accomplish a task. Regarding collaboration, it represents behaviors that occur when relevant people are involved in an activity, aiming to address specific problems [Oza et al. 2013]. We adopted these definitions because they align with our activities during project documentation, as we describe in the following section.

3. Empirical Context: The Team

In this section, we describe the empirical context of our investigation, focusing on the team's activities before and after Kanban adoption. The team, known as the *demonstrative reporting team*, acts as the technical governance layer for the research and innovation projects executed at *FPFtech*. The team ensures that project execution is properly documented and aligned with regulatory requirements. The team comprises 13 professionals, nine of whom are dedicated to technical documentation activities. They work across multiple projects and collaborate with executing teams and project managers to gather technical and operational information. Their work involves reviewing project scope, ensuring traceability of activities, and maintaining alignment with applicable regulations. The team consolidates the collected information into monthly technical reports. On average, each documentation professional works on four to five projects per month. The team also holds two weekly meetings, similar to daily meetings, to discuss activity status and possible difficulties.

Team Activities before Kanban. The professionals responsible for project documentation prepared different reports and forwarded them to the team manager, who was in charge of storing them in a shared folder. In parallel, whenever a project manager needed to access data from the reports, or to have access to any member of the documentation

team, they also had to request it from the manager. Such arrangement created a communication bottleneck, as the entire operational workflow depended directly on the manager's role. In unforeseen situations in which the manager was unable to act, the continuity of activities was compromised. As such situations led to recurrent failures in meeting deadlines agreed with project clients for delivering the reports, it compromised their overall satisfaction.

Team Activities after Kanban. We adopted Kanban to decentralize the manager's role. We also considered other communication tools such as Teams, WhatsApp, and email. However, concerns about potential information loss discouraged these alternatives. During brainstorming sessions to identify possible solutions, some professionals proposed structuring a Kanban board tailored to the process followed by the responsible actors. We began by defining all the stages a report goes through during its development, which would allow us to establish a traceable flow across different lanes on a Kanban board.

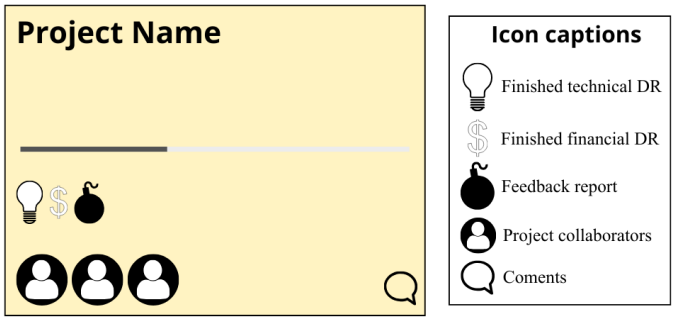


Figure 1. Kanban card example.

We established policies for using Kanban, and Figure 1 illustrates the defined card structure. Each card follows a specific structure that defines the current components of a report. We specified rules for the project name associated with the report, the identification of collaborators involved in the report development process, the indication of report status (e.g., technical and financial report completion), and the use of colors to differentiate the managers responsible for each project. Once we established a delivery deadline for a given report, we created a card to provide visibility into the report development process. Each card includes a completion due date. We also follow a priority policy that triggers report development based on the nearest delivery date. We defined the Project Assistant as the responsible role for maintaining the Kanban flow. However, other professionals can also move cards across lanes, which preserves visibility of stage completion when the Project Assistant cannot act.

We adopted the KanbanX tool [1] to define our board, and Figure 2 illustrates the current workflow. In this context, the board comprises four lanes:

- **Reports Backlog:** indicates cards whose reports have already been mapped but do not yet have delivery priority.
- **Reports Under Development:** divided into three sub-lanes that indicate the current state of technical report development: *"Data Collection"*, *"Data Analysis"*, and *"Ready for Review"*.

[1] https://about.kanbanx.com/

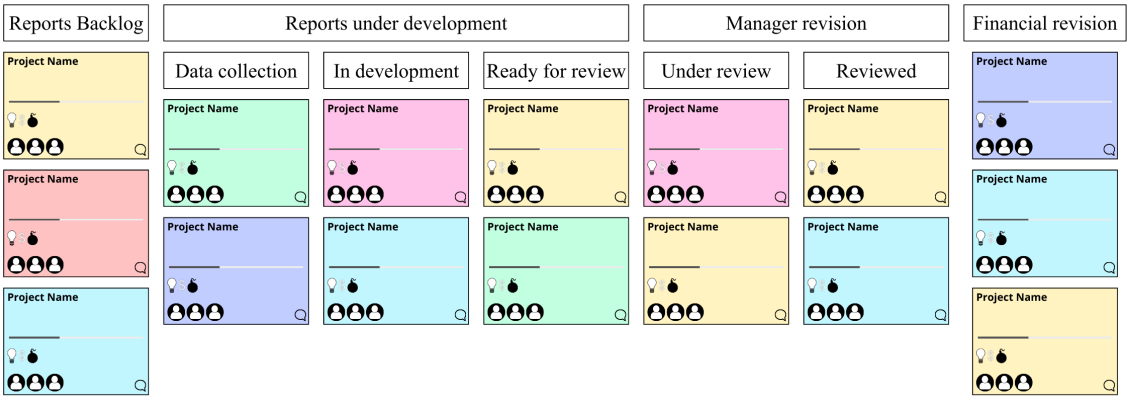


Figure 2. Activities workflow after kanban adoption.

- **Manager Revision:** when a report is ready for review, a Project Assistant becomes responsible for moving the card to the *"Manager Revision"* lane, which follows a simple flow to indicate whether the manager is reviewing or has completed the review.
- **Financial Revision:** once the manager completes the review, the card moves to Financial Revision, indicating that the finance team has started preparing the project's budget section.

Once finalized, the Project Assistant forwarded the report to the clients of the respective associated projects. After we restructured our project documentation process, clients began receiving reports within the previously agreed deadlines, which improved their overall satisfaction.

4. Empirical Study

Seven of the nine professionals responsible for technical documentation were part of the team during the institutionalization of Kanban. Given this context, we assessed perceived improvements in communication and collaboration from the perspective of report developers and other involved actors. We conducted this investigation to understand whether the changes led to perceived organizational improvements. To guide our investigation, we defined the following research questions (RQs):
RQ 01 - Is there a significant difference in the perceived improvement of communication between teams before and after the adoption of Kanban?
RQ 02 - Is there a significant difference in the perceived improvement of collaboration between teams before and after the adoption of Kanban?

As our investigation focused on providing an answer to **RQ 01** and **RQ 02**, we defined four hypotheses derived from our RQs, which we describe in the following:
H'_0 - There is no significant difference between the perceived improvement scores regarding communication between teams before and after the adoption of Kanban
H'_a - There is a significant difference between the perceived improvement scores regarding communication between teams before and after the adoption of Kanban.
H''_0 - There is no significant difference between the perceived improvement scores regarding collaboration between teams before and after the adoption of Kanban.
H''_a - There is a significant difference between the perceived improvement scores regarding collaboration between teams before and after the adoption of Kanban.

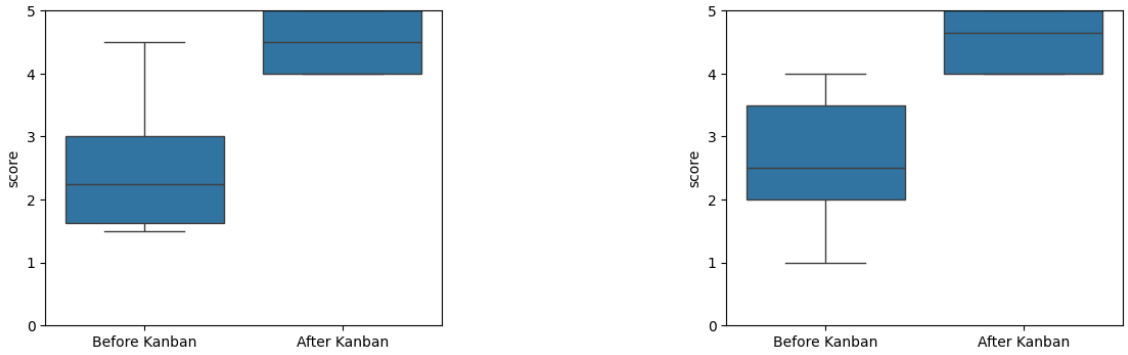
To evaluate the hypotheses, we developed a questionnaire with three sections: respondent profiling, and the assessment of communication and collaboration. Participants assigned scores for both aspects before and after Kanban adoption and justified their ratings. The use of real values enabled hypothesis testing, while their justifications supported understanding the phenomenon from the collaborators' perspective. The full questionnaire is available in the supplementary material.

Analysis and Interpretation Method. To analyze the quantitative data, we organized the scores for communication and collaboration before and after Kanban adoption into four paired samples. We first applied the Shapiro–Wilk test ($\alpha = 0.05$) to assess normality and select the appropriate statistical test. When normality held, we applied the paired Student's t-test; otherwise, we used the Wilcoxon signed-rank test. In both cases, we adopted $\alpha = 0.05$ and rejected the null hypothesis when $p < 0.05$. This procedure allowed us to determine whether a statistically significant difference emerged in perceived communication and collaboration after Kanban adoption.

Regarding the qualitative data, we grouped participants' comments and conducted an open coding process [Strauss and Corbin 1998], a data analysis technique commonly used in qualitative research [Stol et al. 2016]. We examined the participants' responses and identified relevant excerpts that supported our analysis of the phenomenon. Due to page limitation, we included our full codebook in our supplementary material.

5. Quantitative findings

Regarding the quantitative analysis, Figures 3a and 3b present the score distributions assigned by participants to communication and collaboration before and after Kanban adoption, respectively. We assessed normality using the Shapiro–Wilk test (Table 1) and found that the post-Kanban communication and collaboration samples were non-normal ($p < 0.05$). Therefore, we applied the Wilcoxon signed-rank test to compare the paired scores before and after Kanban adoption. Table 2 summarizes the Wilcoxon results. As both p-values were lower than $\alpha = 0.05$, we reject H_0' and H_0'', indicating statistically significant differences in perceived communication and collaboration before and after Kanban adoption, thus answering **RQ1** and **RQ2**.



(a) Communication **(b) Collaboration**

Figure 3. Boxplots comparing respondents' scores for communication and collaboration before and after Kanban implementation.

Table 1. Shapiro–Wilk results

Scores	p-value
Communication before Kanban	0.210134
Communication after Kanban	0.006010
Collaboration before Kanban	0.179173
Collaboration after Kanban	0.001006

Table 2. Wilcoxon results

Scores	p-value
Communication	0.001953125
Collaboration	0.001953125

6. Qualitative findings

To contextualize the quantitative results, we present the main qualitative findings in the following paragraphs. To facilitate comprehension, we format codes in **bold** and quotations in *"italic"*. When a code corresponds directly to a quotation, we highlight it using ***"bold and italic"*** formatting. Due to page limitation, we included our full codebook in our supplementary material.

Communication and collaboration intrinsically associated. P6 states that ***As communication did not flow, collaboration was impacted."*** In this sense, **communication breakdowns hindered collaboration due to the lack of visibility into colleagues' work in progress**, as P4 highlights that *"communication occurred through emails and messages on Teams, where in some cases they went unnoticed or communication breakdowns occurred frequently, hindering collaboration, since there was no visibility into colleagues' work in progress."* Without such visibility, **the RDR and Finance teams could not see each other's activities, including prioritized tasks, before Kanban adoption**, as P7 describes that *"the teams responsible for preparing the Technical DR and Finance could not 'see' each other's activities and, especially, activities that could be classified as 'priority' between the teams."* Before adopting Kanban, communication issues constrained collaboration among the actors involved in performing activities.

Visibility of work progress. P1 states that the team has ***"complete visibility of all processes,"*** which P8 reinforces by stating that ***"communication between DR, Finance, and Management became more structured and transparent."*** In this sense, P2 explains that ***"Kanban provides a view of projects, status, team, and assignees."*** P5 contextualizes this by stating that ***"The visualization of project progress regarding deadlines, client feedback, and the sequence of report preparation activities became clearer."*** In addition, P2 mentions the team's ability to act on the ***"identification of bottlenecks"*** that may affect task progress. These findings indicate that, within this team, Kanban supported visibility into the progress of ongoing activities.

Visual resources. Regarding non-verbal communication, that is, communication mediated by visual elements, P4 states that ***"Communication improved, becoming visual and more effective."*** In this sense, P7 highlights that ***"A well-filled card provides status information quickly and with quality."*** In addition, **the visual indicators used on the cards supported prioritization without requiring formal communication from managers**, as P7 explains that *"through the indicators adopted on the cards, information such as feedback from a client or consultancy becomes automatically visible and can be prioritized by the teams without waiting for formal communication from managers."* These findings indicate that the visual resources implemented in the team's Kanban board improved communication among the different actors involved in the process.

Accelerated progress. P9 states that ***"everyone can quickly and clearly track the progress of the DRs."*** In this sense, P3 emphasizes that ***"it is possible to visualize the project status without needing to ask the person responsible"***, while P8 reports ***"less dependence on ad hoc alignments."*** These factors show how Kanban reduced the need for unnecessary communication. In addition, P1 highlights that team members ***"can respond to emergencies much faster."*** These findings indicate that, in this team, the use of Kanban supported agility across different processes involved in their activities.

Improved collaboration between teams. We found that **Kanban enabled collaboration between teams to improve**, as P7 denotes that *"the use of the KanbanX tool allowed the collaboration factor between teams to improve significantly."* Among aspects that influenced collaboration, P1 states that it ***"improved because teams know each other, meet, and collaborate when eventual issues arise."*** In addition, **team members can visualize and collaborate with colleagues who need support**, as P3 emphasized to *"visualize and sometimes collaborate with a colleague if they need help."* P6 also highlights that ***"now everyone knows which problems require attention, and each person contributes as they can to solve them."*** These findings indicate that, within this team, Kanban acted as a mechanism that enabled different actors to identify issues and work collaboratively to address them.

7. Lessons Learned

Visual workflow may reduce communication bottlenecks: Prior to adopting Kanban, the manager was the main communication interface, which constrained information flow across teams. By structuring a visual Kanban board, we reduced the need for intermediaries and gained more autonomy in our activities. We recommend that practitioners map their workflows on Kanban boards to avoid communication issues within their context.

Explicit card structures support shared understanding of work status: Defining a standardized card structure supported team members in interpreting the state of each report quickly. Teams aiming to implement Kanban may define well-defined card templates to improve clarity and coordination among practitioners involved in an activity.

Visual indicators can replace part of ad-hoc communication: Participants reported that visual cues on the Kanban board allowed teams to identify priorities and client feedback without waiting for formal communication. It reduced unnecessary exchanges and accelerated decision-making. Practitioners may use visual mechanisms on their kanban cards to facilitate coordination when dealing with processes that depend on frequent status updates.

Decentralizing board management increases process resilience: Although in our context, the Project Assistant maintained the Kanban flow, allowing other practitioners to move cards, preserving workflow continuity. Teams should avoid concentrating board operations in a single role, as providing autonomy to team members can sustain the process's existence.

Work visibility fosters cross-team collaboration: After Kanban adoption, participants reported improved awareness of colleagues' activities and greater willingness to provide support when issues emerged. It allowed teams to identify dependencies and collaborate on their activities when needed to. Organizations using Kanban for cross-team collaboration may use it to foster collaborative behavior among practitioners.

8. Final Considerations

In this paper, we reported our experience adopting Kanban to support communication and collaboration across teams. Our quantitative results indicated a statistically significant improvement in participants' perceptions after Kanban adoption, and the qualitative findings indicated that increased work visibility, the use of visual resources, and reduced dependence on intermediary communication supported understanding the underlying reasons. Regarding limitations, we highlight the specific organizational context and the number of participants involved. Future work may replicate this investigation in other settings and explore additional factors that influence communication and collaboration when using Kanban. We expect our lessons learned to inform practitioners seeking to understand the potential effects of Kanban adoption in software teams.

Data Availability. We provide our supplementary material, which includes full qualitative analysis and instruments in the following link: figshare. **Acknowledgments.** We thank all the participants of the empirical study, and FPFtech for their support. We acknowledge the use of generative AI for reviewing the texts and support on translating.

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