Integration of User-Centered Design into the Scrumban Framework: A Case Study on the Groovoo Platform

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Abstract: This paper explores the integration of User-Centered Design (UCD) guidelines into the Scrumban framework in the development of the Groovoo platform, an application for ticket sales and issuance developed by the startup Atena Solutions. While agile methodologies, such as Scrum and Kanban, promote flexibility and efficiency, the speed of iterative cycles can compromise a deeper understanding of user needs. In this context, the hybrid Scrumban framework, which combines elements of Scrum and Kanban, was complemented with UCD practices to ensure that users remained at the center of design decisions, delivering a more satisfying and intuitive experience. Using a qualitative case study, data were collected through interviews, focus groups, and usability testing with end users. The applied UCD techniques, such as personas, customer journey mapping, and usability testing, helped identify areas for improvement in user experience and enabled continuous adjustments during the agile process. The results indicate that the integration of UCD into Scrumban brought tangible benefits to usability and user satisfaction without compromising development agility. This work contributes to the literature by demonstrating how combining UCD with agile methodologies can strengthen user-centered development in dynamic and consumer-driven environments.

1 INTRODUCTION

Since the creation of the Agile Manifesto in 2001, software development has prioritized collaboration and delivering value focused on people, breaking away from the traditional, document-driven, and rigid process-oriented model. This shift represents a new mindset in software creation, where teams and clients play central roles, shaping processes that must quickly adapt to specific changes and needs (Soares, 2004)(Patterson and Carlson, 2017). Within this new paradigm, Scrum has emerged as one of the most adopted agile methodologies, promoting transparency and flexibility by segmenting work into short incremental delivery cycles. Conversely, Kanban introduces a visual management approach to software development, limiting work-in-progress to prevent overload, facilitating workflow continuity, and enabling quick, constant responses to change (Schwaber, 1997)(Mircea, 2019).

The combination of these two frameworks gave rise to Scrumban, a hybrid methodology that seeks to reconcile Scrum's iterative organization with Kanban's fluidity and adaptability. This methodology allows development teams to work incrementally and visually while maintaining a collaborative and transparent structure essential for managing the complexities of user-focused software development (Sensuse and Ramadhani, 2017)(Alqudah and Razali, 2018). Thus, Scrumban solidifies itself as a robust approach to integrating agile practices in contexts requiring agility while meeting end-user expectations.

In this study, the Groovoo Project, developed by the American startup Atena Solutions, serves as the object of analysis. Groovoo is a platform for event ticket sales and issuance that uses Scrumban to manage its development process. Recently, the platform incorporated technological innovations such as NFTs (Non-Fungible Tokens) and NFC (Near Field Communication) to improve the security of digital tickets and combat fraud, a growing issue in the online sales sector (Alger, 2022)(Leonhardt, 2018). The company's commitment to innovation is reflected in its ability to keep up with new market

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demands and adapt to the security and experience needs of its users.

However, the rapid iterative cycle characteristic of agile methodologies, while allowing flexibility, can compromise a deep understanding of user needs. This speed reduces the time for detailed investigations into the user journey, which can result in a less satisfying experience for the target audience. For Groovoo, this aspect is even more sensitive, as the startup serves a diverse audience with distinct preferences and limitations. This context creates the need to incorporate User-Centered Design (UCD) guidelines, which prioritize user involvement and needs throughout the development process, promoting an intuitive and satisfying user experience (Patterson and Carlson, 2017)(Gulliksen et al., 2003).

This work proposes and validates UCD guidelines integrated into Scrumban to improve the user experience on Groovoo. This integration is carried out considering the team's geographical and resource limitations while seeking practices easily adaptable to the agile cycle. Unlike conventional approaches that focus on isolated usability improvements, this study stands out by proposing a methodological adaptation combining UCD and Scrumban, creating a user-centered process that simultaneously maintains the agility needed to meet the demands of a dynamic and competitive market. By the end of the process, Groovoo aims to offer a more intuitive and accessible experience, ensuring the product not only meets but exceeds user expectations, fostering loyalty and boosting the startup's competitiveness.

This study follows a qualitative approach based on a case study, focusing on the integration of UCD guidelines into the development process of Groovoo under the Scrumban framework. The methodology includes interviews with stakeholders, focus groups, usability testing, and platform metrics analysis. Data were collected and analyzed using thematic coding techniques, aiming to identify the challenges and benefits of adopting UCD within an agile context.

2 THEORETICAL FRAMEWORK

The integration of User-Centered Design (UCD) practices with agile methodologies has been the subject of numerous studies over the years. Works such as Goal-Oriented Analysis (van Lamsweerde, 1999) and Goal-Driven Requirements Analysis (van Lamsweerde, 2004) propose structured approaches for requirements elicitation based on stakeholders' interests. Additionally, methodologies like Lean UX (Gothelf and Seiden, 2013) have been widely adopted to enable rapid iterative cycles without compromising the user experience.

Recent studies on the Scaled Agile Framework (SAFe) (Leffingwell, 2019) explore how Scrum scalability can be adjusted to accommodate large teams and complex projects. However, few approaches propose a hybrid model that combines the flexibility of Scrumban with robust UCD practices. This study contributes to the literature by demonstrating, through a real-world case study, how this integration can be achieved without compromising development speed.

2.1 Agile Methodologies and Scrumban

Agile methodologies emerged in the early 2000s to make software development more flexible and collaborative. The Agile Manifesto, published in 2001, redefined the development mindset by emphasizing four key values: individuals and interactions over processes and tools, working software over comprehensive documentation, customer collaboration over contract negotiation, and responding to change over following a rigid plan (Soares, 2004). Among agile methodologies, Scrum and Kanban stand out as widely applied approaches and serve as a foundation for software development in teams seeking greater adaptability and alignment with customer needs.

Scrum is a methodology structured in development cycles called sprints, which allow for short-term goal planning and incremental product delivery. Each sprint is reviewed with the customer, enabling continuous adjustments to the project and fostering the creation of a product that better aligns with business needs (Schwaber, 1997). Additionally, Scrum emphasizes transparency and stakeholder involvement, facilitating adaptation to scope changes and building a shared vision among the team.

Conversely, Kanban is a methodology based on workflow visualization and limiting work in progress (WIP) to optimize resource usage and prevent team overload. By visualizing all project stages on a task board and defining limits for ongoing work, Kanban enables teams to better manage time and workload, resulting in more consistent and predictable productivity (Mircea, 2019).

The combination of Scrum and Kanban led to the hybrid Scrumban framework, which uses Scrum's iterative and collaborative structure along with Kanban's visual management and flexibility, illustrated on Figure 1. Scrumban was developed to help teams balance the rigidity of Scrum's sprints with Kanban's adaptability, promoting efficient management and a

Figure 1: Scrumban process.

rapid response to changes while maintaining a focus on product quality and collaboration (Sensuse and Ramadhani, 2017)(Alqudah and Razali, 2018). This hybrid approach is particularly useful in dynamic environments where frequent changes are expected, such as startups and consumer-oriented projects.

2.2 User-Centered Design (UCD)

User-Centered Design (UCD) is an approach that places the needs, expectations, and limitations of the end user at the center of the design and development process for products and services. Developed by Don Norman in the 1980s, UCD is based on a deep understanding of users, taking into account their characteristics, tasks, and the context in which they will use the product (Norman and Draper, 1986). The goal of UCD is to create solutions that not only meet technical and business specifications but are also intuitive and easily usable by the target audience (Rubin et al., 1984). Figure 2 shows the steps of UCD process.

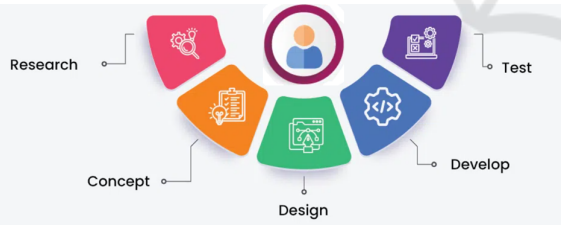

Figure 2: UCD Steps.

The practice of UCD is guided by several fundamental principles, such as the active participation of users in the design process, the creation of design requirements based on user needs, the continuous collection of user feedback throughout the product lifecycle, and constant iteration of the design (International Organization for Standardization, 1999). The UCD process is iterative and includes four main stages: observation (understanding the problem), design (ideation and solution generation), prototyping (creating models or preliminary versions of the product), and testing (evaluation of usability and user experience).

To guide these stages, various techniques are employed, such as user interviews, focus groups, customer journey mapping, persona creation, card sorting, and usability testing (Novoseltseva, 2017). These techniques help teams gain an in-depth understanding of the user, informing design decisions that ensure the final product aligns with user needs and expectations, promoting a satisfying and intuitive user experience.

2.3 Integration of UCD and Agile Methodologies

In recent years, several studies have explored the integration of UCD practices with agile methodologies such as Scrum and Kanban. While agile methodologies prioritize adaptability and iterative development, they do not always provide enough time or structure to deeply consider user needs during each development cycle (Argumanis et al., 2021). Conversely, UCD, with its intensive user research and prototyping approach, can be perceived as a slow and costly process, which may pose a challenge in agile contexts where the pace is accelerated.

Recent studies suggest that hybrid frameworks like Scrumban may offer a solution to this apparent incompatibility, as they combine the structure and iterative capacity of agile methodologies with the flexibility to adapt user-centered design practices. The Scrumban approach allows UCD practices, such as persona creation and usability testing, to be integrated incrementally into agile cycles, ensuring that user feedback is considered throughout the development process without compromising delivery speed (Khan, 2014)(Patterson and Carlson, 2017).

2.4 User Experience (UX)

User Experience (UX) refers to the perception and reactions of a user when interacting with a product or service. UX encompasses all aspects of the interaction, from ease of use to emotional satisfaction, and has become a priority for companies aiming to create differentiated products centered on user needs (Team, 2018). While UCD focuses on applying design tech-

niques to place the user at the center of development, UX deals directly with the elements that influence a user's perception when using a product.

The importance of UX is particularly relevant in digital products like Groovoo, where usability and accessibility can directly impact user satisfaction and loyalty. In agile projects, ensuring good UX requires an approach that allows for constant revisions based on user feedback, which is enabled by UCD practices. To achieve high-quality UX, it is essential to integrate UCD practices into the agile cycle, using techniques that facilitate understanding of the user journey, such as journey mapping and usability testing.

3 METHODOLOGY

This section describes the methodology adopted to develop the case study on the integration of User-Centered Design (UCD) into the Scrumban framework in the development process of the Groovoo platform.

The chosen methodology was designed to provide a seamless integration between UCD and Scrumban, maintaining development agility while ensuring the user remains at the center of design decisions. The planning, data collection, and analysis phases, along with the selected UCD techniques, were crucial in creating a development process more aligned with the needs of Groovoo users. The results obtained serve as a basis for future recommendations on applying UCD in agile methodologies, particularly in startup contexts and consumer-oriented projects.

Below, we detail the research structure, the specific study context, the process stages, and the UCD techniques chosen to meet the study's objectives.

3.1 Research Structure

This study is characterized as applied research, as it seeks practical solutions for integrating UCD guidelines into an agile process, aiming to improve the user experience on the Groovoo platform. The methodological approach is qualitative, as the goal is to deeply understand the perceptions of users and stakeholders involved and to explore the adaptation of Scrumban based on these insights. We adopted the case study method, as it allows for a detailed analysis of the phenomenon in a specific context, enabling a rich and contextualized understanding of the impact of UCD guidelines on the agile development of the platform.

3.2 Object of Study

Groovoo is a platform for selling and issuing event tickets, operated by the startup Atena Solutions. The platform has processed over 10 million reais in transactions and serves a diverse audience in the United States and Brazil. The development of Groovoo involves a team of 17 professionals, including developers, designers, UX specialists, and product managers.

The stakeholders include event organizers, end customers who purchase tickets, and technology partners. The main challenge identified was aligning delivery speed with an optimized user experience, ensuring that user needs were considered from the early stages of development.

Atena Solutions uses the Scrumban framework to manage the development of Groovoo, combining Scrum and Kanban practices to maximize the adaptability and efficiency of the development team. However, the agile methodology, due to its iterative nature and focus on rapid deliveries, does not provide the depth necessary to fully address the user journey. This context motivated the incorporation of UCD guidelines to align product development with the real needs of users.

3.3 Research Stages

The research was organized into four main stages, following an adaptation of the Case Study Protocol by Brereton et al. (2008): planning, data collection, data analysis, and reporting of results.

- **Planning.** In this initial phase, we defined the research context, the research question ("How to introduce Scrumban-UCD framework practices into Groovoo's software development process to better recognize the user journey?"), the general and specific objectives, and the methodological guidelines for conducting the study. A detailed methodological plan was developed, defining the qualitative approach and the case study as the main methods.
- **Data Collection.** Data collection involved document review, literature review, and qualitative interviews with stakeholders, including developers, designers, and user representatives. The goal was to obtain a comprehensive understanding of users' needs and expectations, as well as the current functioning of the development process at the startup. In addition, we conducted focus groups and questionnaires with end users to capture their perceptions of the Groovoo platform experience.

- **Data Analysis.** In the data analysis phase, we used an interpretive approach to identify recurring themes and relevant insights about user needs and the limitations of the current process. The qualitative analysis focused on stakeholders' perceptions of the product's usability and user satisfaction, as well as the development team's evaluation of agile practices and the integration of UCD guidelines.
- **Reporting.** In the final stage, the results were organized into a detailed report summarizing the adaptations made to the Groovoo development process and the perceived impacts of incorporating UCD guidelines. The report also presents reflections on the benefits and limitations of integrating UCD with agile methodologies, suggesting future improvements.

3.4 UCD Techniques Integrated into Scrumban

To ensure that the user experience was a priority in the development of Groovoo, specific UCD techniques were selected to be integrated into the agile cycle of Scrumban without compromising delivery speed. Below, we describe the main UCD techniques used:

- **Customer Journey Mapping (CJM).** CJM was used to visualize the complete user journey when interacting with the platform, identifying touchpoints, needs, and potential difficulties. This technique allowed the development team to understand the platform's usage flow and adapt the design to offer a more seamless and intuitive experience.
- **Card Sorting.** The card sorting technique was employed to structure the navigation and information hierarchy of the platform, considering users' expectations and logic. This method helped the team organize the content more intuitively, facilitating access to information and task completion for users.
- **Participatory Design.** Participatory design involved end users in the creation process, allowing them to share feedback and suggestions during the prototyping phase. This collaborative approach facilitated the identification of necessary adjustments in the design and helped ensure that Groovoo's interface aligned with user preferences.
- **Usability Testing with Thinking Aloud.** During usability testing, participants were encouraged to express their thoughts aloud while using the platform, describing the actions they were taking and the challenges encountered. This technique provided valuable insights into interface aspects that required improvement, enabling quick adjustments to the design.

3.5 Validation of UCD Guidelines in Scrumban

To validate the integration of UCD guidelines into Groovoo's development process, semi-structured interviews were conducted with the development team and questionnaires were administered to end users after the changes were implemented. The validation sought to assess stakeholders' perceptions of the effectiveness of the new practices, their impact on user experience, and the feasibility of maintaining UCD guidelines in the agile development process.

The data analysis revealed that integrating UCD practices into Scrumban resulted in a better understanding of user needs and improved platform usability without compromising delivery speed. Stakeholders reported that UCD guidelines brought tangible benefits to the process, fostering a more intuitive and satisfying user experience.

4 IMPLEMENTATION AND RESULTS

This section presents the results of applying User-Centered Design (UCD) guidelines within the Scrumban framework in the context of Groovoo platform development. We describe the implementation process of UCD practices within the agile Scrumban cycle and discuss the main results, including the perceived impact on user experience and the efficiency of the development process.

4.1 Implementation of UCD Guidelines in Scrumban

The implementation of UCD guidelines in Scrumban followed the steps outlined in the methodology. The process began with the creation of personas and customer journey mapping, which allowed the team to understand the specific needs of Groovoo users. These elements were integrated into the Scrumban backlog, ensuring that user needs were considered throughout the development cycles.

In each sprint, new features and usability improvements were prioritized based on user feedback. Participatory design was essential during

this phase, as it involved end users directly in the prototyping and iteration process. Usability testing with thinking aloud was conducted in every iteration, providing valuable insights into how users interacted with new features and identifying areas for improvement in the platform's interface and navigation.

To ensure continuous integration of UCD practices, the development team adapted the Scrumban Kanban board, adding additional columns for "Usability Testing" and "User Feedback." This allowed tasks related to user experience to remain visible and prioritized alongside other development activities, facilitating progress tracking and real-time adjustments.

4.2 Results of the UCD-Scrumban Integration

The integration of UCD guidelines into Scrumban resulted in a more user-centered development process without compromising agility. The development team experienced greater clarity in priority setting and a reduction in the number of reworks, as user feedback was gathered and incorporated into each iteration cycle. Furthermore, usability testing identified critical interface issues before the launch of new features, significantly reducing the number of issues reported post-implementation.

Figure 3 shows a comparative chart to demonstrate the priority scale among different User-Centered Design (UCD) techniques, categorized into low, medium, and high priority. The results indicate that Customer Journey Mapping is widely considered essential in the user-centered design process, with over 60% of respondents assigning it high priority. This finding suggests that understanding the user journey is a fundamental step in optimizing the experience and identifying friction points in product or service usage. Conversely, this technique had a lower adherence in the medium priority category, while a reasonable percentage classified it as low priority, indicating that in certain contexts, other approaches may be more suitable.

In the case of Card Sorting, there is a balance between the different priority levels, with approximately 45% of respondents assigning it medium priority. This suggests that, although recognized as a valuable technique, its applicability may be more situational, depending on the complexity of the information architecture of the system being analyzed. The relatively homogeneous distribution among priorities indicates that while Card Sorting is useful, it may not be considered indispensable for all projects.

Participatory Design stands out as one of the most valued techniques, with nearly half of the participants assigning it high priority. This finding reinforces the importance of active user participation in the development process, ensuring their needs are effectively met. However, a significant portion indicated medium priority for this approach, suggesting that its application can be more flexible in some contexts, complementing other techniques rather than being a central element in the design process.

Finally, the Thinking Aloud technique exhibits a behavior similar to Card Sorting, with strong emphasis on both medium and high priority. This demonstrates that the technique is widely recognized as useful for capturing direct insights from user interactions, but its priority may vary depending on project needs. The fact that low priority has a small percentage reinforces that this technique is well accepted and considered relevant in most cases.

Overall, the chart's findings indicate that there is no single predominant technique for all contexts, but rather a combination of approaches that can be applied based on the project's nature. While Customer Journey Mapping and Participatory Design are perceived as more strategic and essential techniques, Card Sorting and Thinking Aloud show greater variation in prioritization, being applied more flexibly. These results highlight the need for careful planning when selecting UCD techniques, ensuring that the chosen tools are suitable for the specificities of each development process.

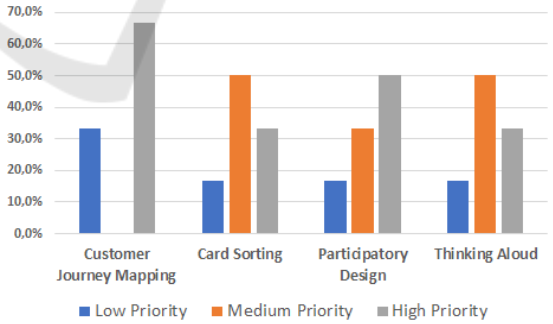

Figure 3: Priority scale among UCD techniques.

4.3 Summary of Results

The implementation of UCD guidelines in Scrumban within the context of Groovoo development demonstrated that it is possible to reconcile user-centered design practices with agile development. Through the integration of UCD techniques such as personas, customer journey mapping, and usability testing, it was

possible to create a more intuitive platform aligned with user expectations. The gains in usability and efficiency reinforce the viability of the UCD-Scrumban approach for projects requiring agile cycles and a focus on user experience.

These results suggest that the combination of UCD and Scrumban can benefit not only startups and consumer-oriented projects but also organizations seeking to enhance the usability of their products without sacrificing delivery speed. The Groovoo experience indicates that implementing UCD-Scrumban can be adapted to different contexts, promoting an improved user experience and better resource allocation for the development team.

5 DISCUSSION

This section discusses the main findings of the study, highlighting the benefits and challenges of integrating User-Centered Design (UCD) guidelines into the Scrumban framework in the development of the Groovoo platform. Additionally, the contributions of this research to the field of agile development and the study's limitations are presented.

5.1 Critical Analysis of Results

The implementation of UCD guidelines in Scrumban resulted in significant improvements in the usability of the Groovoo platform. The creation of personas and customer journey mapping provided a deeper understanding of user needs, enabling a more precise alignment of development with the target audience's expectations. The inclusion of usability testing and participatory design in the Scrumban cycle was effective in identifying and resolving interface issues quickly, minimizing rework and improving the user experience.

However, the integration of UCD into Scrumban also presented some challenges, particularly regarding the time required to perform certain UCD activities, such as usability testing and journey mapping. In development environments with tight deadlines, these activities may be seen as an addition to the agile cycle, requiring adaptations to be conducted incrementally. This challenge underscores the importance of balancing UCD practices with delivery speed in agile methodologies, adapting the process according to the project's complexity and scope.

5.2 Contributions to Agile Development

This study contributes to the field of agile development by demonstrating the feasibility and benefits of a hybrid approach that integrates UCD and Scrumban, especially in the context of startups and consumer-oriented products. By integrating UCD techniques, such as personas, customer journey mapping, and usability testing, into the Scrumban development cycle, this work provides a reference model for teams seeking user-centered agile development. The research shows that it is possible to prioritize the user experience without compromising efficiency and development speed, which is a critical advantage in rapidly evolving environments.

The UCD-Scrumban methodology proposed in this study can be applied in other agile development contexts, offering an adaptable framework for teams aiming to keep user needs at the forefront throughout the product lifecycle. Additionally, the practical experience gained from implementing this model on the Groovoo platform provides valuable insights for the development community, indicating that including UCD practices in Scrumban contributes to the creation of more intuitive and satisfying products for end users.

5.3 Study Limitations

While the results of this study are promising, some limitations must be considered. First, the research was conducted in the specific context of the Groovoo platform, developed by a startup with a particular target audience and requirements. Therefore, generalizing the results to other types of projects and organizations should be approached with caution. The application of UCD-Scrumban in projects with different user profiles or in corporate environments with more extensive structures may require additional adaptations.

Another limitation relates to the qualitative nature of the case study, which, while providing an in-depth understanding of the phenomenon studied, has restrictions in terms of statistical representativeness. Future studies could employ quantitative methods to assess the impact of UCD-Scrumban in a larger number of projects, enhancing the robustness of the results and enabling comparative analysis across different contexts.

5.4 Future Work

To expand on the findings of this study, we suggest that future research explore the application of UCD-

Scrumban in various sectors and types of products, including larger-scale projects and enterprise contexts. Additionally, the creation of specific metrics to evaluate the impact of UCD practices on agile team performance could provide a more quantitative and comparable view of the benefits of this integration.

Another promising area of research is the study of adaptations that enable UCD activities to be performed in even shorter agile cycles, such as those found in continuous development and DevOps. These studies could help establish additional guidelines for the efficient use of UCD practices in agile development, allowing companies of different sizes and industries to reap the benefits of user-centered development.

6 CONCLUSION

This study presented the integration of User-Centered Design (UCD) guidelines into the Scrumban framework in the development of the Groovoo platform, exploring the impact of this approach on user experience and development process efficiency. Through a qualitative case study, it was observed that combining UCD practices with the hybrid Scrumban methodology can offer an effective solution to balance the speed of agile development with the need to focus on user expectations.

The adoption of techniques such as customer journey mapping, card sorting, and thinking aloud enabled the identification of friction points in the user experience and facilitated iterative adjustments to the Groovoo platform. However, the scalability of this approach to other projects still needs to be investigated, as the specificities of each context may require tailored adaptations.

For future work, it is suggested that this approach be applied to projects in different sectors to evaluate its generalization and impact on other software domains. Additionally, conducting longitudinal studies could provide a more detailed view of the continuous adoption of UCD guidelines in agile environments.

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