

An Approach to Running Community Training Application Development Using User Centered Design

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Abstract - This research outlines the User-Centered Design (UCD) framework for developing a training application tailored for the RIOT Indonesia running community. Acknowledging the surge in running interest since the global pandemic and the role of running communities, this study emphasizes understanding user needs as the foundation for design. Utilizing the ISO 9241-210 standard, the methodology includes phases of planning, context determination, and defining user requirements. Initial findings from engagements with the RIOT Bandung Training Team revealed critical needs for a web-based, multi-device accessible application supporting diverse training activities and integrating with platforms like Strava. The defined user requirements, detailed through a context diagram, clearly outline functionalities for Coaches, Trainers/Supervisors, and general Users. While the final UI prototype is pending, this research provides a comprehensive theoretical blueprint, affirming that a UCD approach is essential for creating an application that enhances user interaction, satisfaction, and delivers significant value to the running community.

Keywords: User Centered Design, UI/UX, ISO 9241-210, Running Training

I. INTRODUCTION

Running has become one of the increasingly popular sports since the global pandemic (Ibe et al., 2024). Despite the phenomenon (Schmitt et al., 2021) of increasing public interest in running, running communities serve as platforms to help people run and train together. Rapid technological development has begun to penetrate the sports sector. The application designed monitors the training activities of every RIOT Indonesia running community member during each session, including Tuesday Night Miles, Speed Session (Wednesday), Strength and Conditioning (Thursday), and Weekend Run & Chill or Long Run. This application design employs a User-Centered Design (UCD) approach with the aim of understanding user needs and designing the application accordingly. The UCD approach to application development effectively captures user requirements through direct evaluation between developers and users (Yasmine & Atmojo, 2022). Furthermore, the use of UCD can gather user perspectives on plans for further application development (Mubiarto et al., 2023).

The results of implementing UCD are expected to provide a comprehensive view on the importance of placing users at the center of the design process and are anticipated to enhance the overall quality of user interaction and satisfaction. Based on this approach, the design of

the running community training application is expected to provide benefits and value to all users.

II. LITERATURE REVIEW

User-Centered Design (UCD) is defined as an interactive design approach that focuses on understanding users and their needs. The international standard ISO 9241-210:2019 (formerly ISO 13407) explicitly states that UCD is "a design approach in which the main focus is on understanding users, tasks, and their environment" (International Organization for Standardization, 2019). The core philosophy of UCD is that a product or system should be designed around how users can, want to, or need to use it, rather than forcing users to adapt to the system (Ferris, 2004). This means designers must set aside their own assumptions and actively involve users at every stage of the design process. The basic principles of UCD emphasize the importance of: (1) an initial focus on users and tasks, (2) empirical measurement using user data, and (3) an iterative design process involving repeated testing and refinement (Gulliksen et al., 2003; Simões-Marques & L. Nunes, 2022). This approach ensures that design decisions are based on actual insights from users, not just speculation. The following are some of the main principles of Centered Design:

1. Understanding Users and Usage Context

Understanding users and their context of use forms the fundamental basis of every successful User Centered Design (UCD) project. To craft an appropriate solution, it is crucial to know who the users are, their objectives, and the situations or environments in which the application will be used. User identity goes beyond mere demographics—it includes background, level of technological expertise, motivation, goals, and even personality. Techniques like personas can help illustrate user characteristics, such as “Experienced Marathon Runner” or “Beginner Seeking Health,” each with their own distinct needs. It is also important to identify their main purposes for using the application, whether to track progress, discover new routes, compete, or simply gain motivation. Understanding the user workflow—the steps they take and the challenges they might face—is equally essential. Environmental context, such as whether the app is used indoors or outdoors, during running, at the gym, or at home, also influences design. With a deep understanding of these aspects, the resulting application will not only be functional but also relevant and able to provide an optimal experience for its users.

2. Active User Participation

Active user participation is the core of User-Centered Design (UCD), where users are directly involved in every stage of the design process. This involvement does not occur only at the beginning but continues throughout the development process. It starts with user research, such as interviews, focus groups, or direct observations to understand their behaviors and needs (Travis & Hodgson, 2019). Next, during the ideation or prototyping phase, users are given opportunities to provide feedback on initial concepts, either through paper prototyping or low-fidelity wireframes. The following stage is

usability testing, where users try out prototypes or early versions of the application while their interactions are observed to identify problematic areas and features they like or dislike. In some cases, users may even participate in brainstorming or co-creation sessions to collaboratively generate solutions. This active involvement of users is highly important because it significantly reduces the risk of developing irrelevant features or creating confusing application flows, as well as fostering empathy within the design team to ensure that the final product truly resonates with the people who will use it (Schall, 2024).

3. Design Iteration and Evaluation

The User-Centered Design (UCD) process is cyclical rather than linear, so design development does not stop at just one stage. Through this approach, designers consistently repeat cycles of designing, testing, refining, and iterating. After receiving feedback from users, designers use that input to improve the design—for example, by adjusting the layout, simplifying workflows, adding or removing features, or modifying the terminology used. Each design revision needs to be reevaluated through various methods, such as formal usability testing, A/B testing, user surveys, or analyzing application usage data after launch. This evaluation aims to measure how well the developed design meets user needs and business goals. The iteration and evaluation process continues until the application reaches the desired level of maturity, with minimal usability issues and increased user satisfaction. Even after the application is launched, the UCD approach continues through updates based on user feedback. This iterative approach is crucial, as initial designs are rarely perfect; through repeated cycles, designers can learn from mistakes, refine solutions, and progressively enhance user experience, while also adapting to changing needs and technological advancements (Afrianto & Guntara, 2019).

4. Focus on User Experience (UX)

The final principle emphasizes that UCD goes beyond merely creating an attractive user interface (UI); it encompasses the entire journey and experience of the user as they interact with the product. In this context, aspects such as usability—or how easy and efficient it is for users to achieve their goals, how intuitive the interface is, and how often errors occur—become essential. Utility, or how relevant and beneficial the application is to users' needs and whether it truly solves their real problems, is equally important (Kalankesh et al., 2020). Accessibility is a primary concern, meaning the application must be usable by people with a range of abilities, including those with disabilities, for example by supporting screen readers and providing adequate color contrast settings. Desirability is also considered; this includes visual appeal, the enjoyment of use, and the positive emotional impact delivered—often related to aesthetics and branding. Findability, or how easy it is for users to locate features and information as well as the logical structure of app navigation, must not be overlooked. Ultimately, the value or benefit that users receive is the key benchmark: does the application truly offer real advantages, help users become more productive, or make their lives easier and more enjoyable? All these aspects must be considered, because a

visually appealing app alone does not guarantee a good user experience if it is difficult to use or fails to address core problems. That is why a holistic focus on every aspect of interaction is essential, from the moment users first encounter the app to their daily usage.

III. METHODS

The primary method used in this research is User-Centered Design, focusing on application requirements based on user needs analysis. In practice, the User-Centered Design model can vary. In this study, it will refer to the ISO 9241-210 standard (International Organization for Standardization, 2019) with general stages consisting of: (1) Planning, (2) Understanding and Determining the Context of Use, (3) Determining User Requirements, (4) Producing Design Solutions, (5) Evaluating the Design Against Requirements.

1. Planning

At this stage, a meeting is held between the researcher and the users to define the project objectives, identify the users involved, and plan the activities for user-centered design, including defining the project's scope and limitations. The result of this stage is an initial overview and agreement that aligns with user expectations. The participants on the user side are the Training team from the running community.

2. Context Determination

At this stage, research is conducted on users, the types of tasks they want to accomplish, and the development environment or the intended output of the application. This phase is typically carried out through meetings such as oral interviews, direct observation, or surveys to gather data on user requirements. For efficiency, this stage is planned to be combined with the previous phase.

3. Defining User Requirements

At this stage, the results from the previous steps—such as understanding the context, user needs, desires, and goals—are clearly described. The outcomes can be presented as a narrative of user requirements, use case diagrams, context diagrams, or as both functional and non-functional requirements focused on user needs.

4. Creating Design Solution

After user requirements are defined, the next step is the creation of initial designs or wireframes for the application, progressing to low-fidelity mockups. The goal of this stage is to confirm that the proposed interface solutions adequately meet user needs. Principles such as design consistency, layout organization, and accessibility are all addressed at this point.

5. Design Evaluation

The prototype or wireframe designs created will go through a phase of user testing to identify usability issues or gaps in meeting user needs. The basic evaluation methods used

range from usability testing to cognitive walkthroughs. Feedback provided by users will be collected and used to refine the UI/UX.

IV. RESULTS AND DISCUSSION

Based on the implementation of the methods described in the previous section, the initial meeting between the developers and users (RIOT Bandung Training Team), held on January 13, 2025, at Fuels Coffee, resulted in several key points that were then translated into the stages of User Centered Design.

1. Planning and Determining Context

Users require an application that can be accessed from various devices, both mobile and desktop, and across multiple operating systems. Most of the data entered by users consists of text, along with several links. For this reason, the developers have chosen to use a web-based application. Users will be asked to provide personal information such as full name, phone number, email, gender, date of birth, height, and weight, and they can also connect their Strava account through the "Connect to Strava" feature. Additionally, the application will automatically process data such as Vo2Max results from the VCR Test and classify based on the outcomes of the Rush Test, VCR, and Core assessments. Users can also record various activities, including Long Run, Easy Run, Interval, Fartlek, Tempo Run, Strength Training, as well as Rush Test and VCR Test, in different durations (15, 30, or 45 minutes). The system is designed to be flexible, allowing users to combine several activities as a single claim, for example, a Rush Test that consists of multiple exercises. At the start, each user will also enter a list of races they plan to participate in, so the training team can tailor programs according to the needs and number of participants. In this way, the application aims to provide an intuitive and personalized experience, empowering users in their training journey in a structured, efficient, and purposeful manner.

2. Defining User Requirements

Based on the context outlined in the previous section, the developers created a context diagram (DFD Level 0) (Miles & Hamilton, 2006) with three levels of authorization: Coach, Trainer/Supervisor, and User. The Coach can create training programs, classify each training achievement, and manage the training calendar. The second level, Trainer/Supervisor, allows for validation of submitted data, manual entry of participant data (overrides), and supervision of each participant's activities. However, only the Trainer can summarize and classify participants' abilities. Lastly, users—whether they are RIOT members or guests—have access to registration, participation in training activities, race data entry, and more. The context diagram shown on Figure 1.

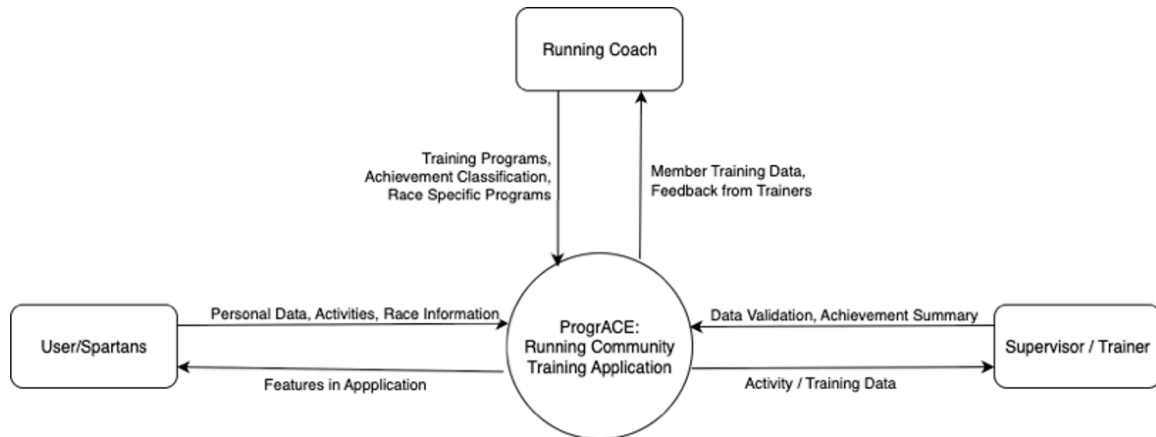


Figure 1. Application Context Diagram

3. Creating Design Solution and Evaluation Plan

At this stage, a UI design was created based on the previously developed UX. Due to internal technical issues, a final UI design that aligns with the running community's image and specific needs could not yet be agreed upon. The solution development will adopt a prototyping approach, where the UI and UX designs are regularly evaluated by users to produce an interface that fits their requirements. The actual UI Prototype will be present in future paper.

V. CONCLUSION

This research successfully established a strong theoretical and foundational framework for a User-Centered Design (UCD)-driven training application for the RIOT Indonesia running community. Following the ISO 9241-210 standard, we moved from initial planning to detailed user requirements, underscoring the vital importance of user-centricity in design. The Planning phase initiated crucial collaboration with the RIOT Bandung Training Team, setting clear objectives. Context Determination revealed the need for a web-based application accessible across devices, handling diverse data types, and integrating with platforms like Strava for a personalized experience. This phase identified automatic data processing and flexible activity recording as key functionalities for structured and purposeful training. The Defining User Requirements phase translated these insights into a context diagram (DFD Level 0), clearly outlining three user authorization levels: Coach, Trainer/Supervisor, and User. This detailed structure ensures each role has necessary functionalities, fostering a cohesive training ecosystem. Finally, the Creating Design Solution and Evaluation Plan committed to an iterative prototyping approach. Despite current UI design finalization pending, this commitment ensures continuous user evaluation, guaranteeing a highly functional and user-aligned interface. In essence, this research provides a comprehensive blueprint, validating UCD's power in uncovering and addressing complex user needs for an application that will genuinely enhance the running community's experience and satisfaction.

For future research, it should focus on developing and implementing the UI Prototype, followed by rigorous usability testing with diverse RIOT Indonesia members. Longitudinal studies are needed to assess long-term user engagement. Further investigation into integration

with wearables and other running platforms could enhance user convenience. Finally, a comparative UCD analysis with existing running applications would offer valuable insights and identify unique differentiators.

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