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Fagner Alfredo Ardisson Cirino Campos *, Carla Aparecida Arena Ventura, José Carlos Sánchez García *

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The Framework for Developing Mental Health Apps: Contributions (or Not) of the "Psychosocial Rehab App"

Fagner Alfredo Ardisson Cirino Campos [1,*], Carla Aparecida Arena Ventura [2] and José Carlos Sánchez García [1,*]

[1] Faculty of Psychology, University of Salamanca (USAL)

[2] University of São Paulo at Ribeirão Preto College of Nursing, PAHO/WHO Collaborating Centre for Nursing Research Development-Brazil

* Correspondence: fagneralfredo@usal.es (F.A.A.C.C.); jsanchez@usal.es (J.C.S.G.)

Abstract

Developing mental health apps is a complex task that requires co-design, creativity, and reconciliation between clinical and technological priorities, while facing barriers related to ethics, privacy, costs, and team limitations. This work proposes a structured framework derived from the authors' experience in developing the webapp "Psychosocial Rehab App", created and validated by specialists, with high usability, and led by mental health professionals. This is a critical-reflective experience report based on SQUIRE, referring to a doctoral project initiated in 2023, with partial completion in 2025 and final implementation expected in 2027. The accumulated know-how enabled the construction of the Framework for the Development of the webapp "Psychosocial Rehab App": Actions and Recommendations, composed of: Planning, Requirements Gathering, Prototyping, Prototype, Development with Alpha Validation, Beta Validation, Implementation, and Gold Validation. Thus, this work consolidates a methodological and practical trajectory that can guide professionals and researchers in creating robust, safe, and effective clinical technologies, contributing to the advancement of digital mental health.

Keywords: mental health; mobile applications; software design; psychosocial rehabilitation; user-centered design

Introduction

Developing applications (apps) in the field of mental health is not a simple task for either software developers or mental health professionals (Ardisson Cirino Campos et al., 2025; Bezerra et al., 2023; Chow, 2020). It is a demanding process that requires co-design or participatory design, with active involvement of users and a high degree of creativity (Giovanelli et al., 2023; Vial et al., 2023). Within this context, tensions arise from interests that do not always converge: mental health professionals typically prioritize theoretical foundations, evidence-based models, and features that support clinical practice and guide therapeutic decision-making (Hanssen et al., 2020; Miralles & Granell, 2019; Neary & Schueller, 2018). Conversely, technology professionals tend to focus on ensuring the technical functioning of the tool (Cirino Campos, Sánches García, et al., 2025; Williams & Pykett, 2022).

Ethical, security, and privacy considerations - although essential - often receive limited attention from both groups, either due to insufficient knowledge or because these themes are more broadly explored by philosophers and specialized scholars (Martinez-Martin et al., 2021; Queiroz, 2022; J. B. Torous et al., 2018; J. Torous & Roberts, 2017).

Moreover, when mental health professionals lead application (app) development projects (Hwang et al., 2021; Nordgreen et al., 2021), they face challenges related to planning, meeting

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deadlines, and securing physical, mental, and especially financial resources (Ardisson Cirino Campos et al., 2025; Chow, 2020; Rosenfeld et al., 2022). Estimates indicate that developing an app may cost between 70,000 and 150,000 USD (González-Pérez et al., 2023a).

Despite these barriers, a substantial number of mental health apps exist. The literature reports more than 20,000 mental health apps (Eis et al., 2022; King et al., 2023; Taylor et al., 2024), a small number when compared to the 300,000-325,000 apps available in general health (Eis et al., 2022). Nevertheless, when narrowing the focus to specialized areas, such as psychosocial rehabilitation, there are virtually no apps available - except for the webapp "Psychosocial Rehab App" (Cirino Campos, Sánches García, et al., 2025). Distinct from conventional apps, webapps operate through a link, making them more flexible and adaptable across technological platforms (Martorella et al., 2017; Pokhrel et al., 2021; Sturm et al., 2017).

The "Psychosocial Rehab App" was developed based on the psychosocial rehabilitation project, conceptualized as a systematic method of care management in mental health services, grounded in Psychosocial Rehabilitation and Case Management, and organized according to the stages of the Singular Therapeutic Project: assessment, goal-setting, intervention planning, and continuous re-evaluation (Ardisson Cirino Campos et al., 2025). According to Guimarães & Saeki (2001), the psychosocial rehabilitation project acts as a "fissure" that integrates thinking and doing, representing a perspective of "being at the window," envisioning an instituting rather than instituted future (Guimarães & Saeki, 2001).

The app was developed through successive stages, beginning with a literature review (Ardisson Cirino Campos et al., 2025; Campos, Feitosa, et al., 2025) and focus groups with specialists in psychosocial rehabilitation (Cirino Campos, García, et al., 2025) to identify functional requirements and guide prototyping (Ardisson Cirino Campos et al., 2025; Campos, Feitosa, et al., 2025; Cirino Campos, García, et al., 2025). The initial prototype was refined with the participation of mental health professionals, achieving Content Validity Index (CVI) scores above 0.9 for objectives, appearance, structure, organization, content, and relevance (Campos, García, et al., 2025). Its development involved iterative collaboration between the lead researcher and three technology professionals through virtual co-design meetings characterized by mutual collaboration, empathy, active listening, and clear communication (Cirino Campos, Sánches García, et al., 2025).

The app's usability was evaluated by technology professionals (U = 0.674; SD = 1.181; CI: –0.507 to 1.855) (Campos, 2025) and by mental health professionals (U = 76.2). It is currently undergoing implementation among mental health professionals and services, with implementation outcomes assessed according to Proctor et al., 2011 (E. Proctor et al., 2011).

Given that app development is a complex and multifaceted process - particularly for mental health professionals (Bezerra et al., 2023), this work aims to propose a structured framework informed by the authors' experience in developing the "Psychosocial Rehab App". The goal is to offer contributions and practical recommendations that may guide researchers, regardless of prior expertise, in the development of mental health apps, especially those designed to support clinical decision-making (Schlieter et al., 2022).

Conceptual frameworks are valuable tools for organizing concepts, models, and research reports in health and mental health (E. Proctor et al., 2011; E. K. Proctor et al., 2023). Additionally, there are taxonomies and frameworks that guide intervention research (Damschroder et al., 2022; D'Lima et al., 2022; Glasgow et al., 2019), as well as guidelines for reporting implementation research aimed at improving health care (Ogrinc et al., 2015; Pinnock et al., 2017). Notably, the DEFINED framework evaluates evidence supporting health apps to facilitate their adoption in clinical practice (Silberman et al., 2023), aligned with the hierarchical evaluation model for app safety developed by the American Psychiatric Association (Lagan et al., 2021). Moreover, the AwarNS framework provides a structured approach for the development of mobile applications in health and mental health, with a focus on the technologic support (González-Pérez et al., 2023b).

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Method

This study is characterized as an experience report with a critical-reflective approach (Mussi et al., 2021), grounded in the Standards for Quality Improvement Reporting Excellence (SQUIRE) guidelines, which orient the preparation of publications aimed at improving health and mental health care with a focus on quality. These guidelines provide a systematic structure for reporting new knowledge on how to enhance healthcare delivery (Ogrinc et al., 2015).

The development of the webapp "Psychosocial Rehab App" is part of a doctoral umbrella project in Psychiatric Nursing, conducted at the School of Nursing of Ribeirão Preto at the University of São Paulo (EERP-USP) and at the Faculty of Psychology of the University of Salamanca (USAL), entitled "The development and validation of a virtual application for the design, monitoring, and evaluation of psychosocial rehabilitation projects in mental health." The project began in 2023, and by the end of 2025, the usability validation and the initial phase of implementation among Brazilian mental health professionals had been partially completed, with full completion expected in 2027. The study was approved by the Research Ethics Committee of EERP-USP, under Opinion No. 6.605.152, dated January 3, 2024 (CAAE: 75372623.5.0000.5393).

The development of the webapp "Psychosocial Rehab App" involved: a narrative literature review addressing the theoretical synthesis of Psychosocial Rehabilitation, Psychosocial Rehabilitation Projects, and the bioethics of mental health applications; identification of prototyping requirements; prototyping; development with alpha testing; beta validation; and implementation. All stages were conducted based on an adaptation of Novak's method (Castro, 2021).

This process contributed to the construction of applied know-how capable of guiding the development of apps in the field of mental health, particularly for early-career professionals, since app development may be especially challenging for mental health practitioners (Bezerra et al., 2023). Studies also highlight practical experiences as a basis for structuring recommendations and frameworks (Silberman et al., 2023). Developing an application is a reality-based process guided by practical rationality and shaped by sociological elements that foster the construction of critical and collaborative dialogue (Berg et al., 2003). Learning from another's experience becomes possible only when it is revisited, systematized, and appropriated by the researcher (Mussi et al., 2021).

To ensure the objectivity and reliability of this study, reflexivity was conducted continuously and systematically throughout all stages, supported by verification and confirmability of the findings produced, built and structured by the first author together with the co-authors - his academic supervisors - in order to minimize subjectivity in both the construction and writing of the study (Malterud, 2001).

Results

The following table presents the structure of the development of the "Psychosocial Rehab App", detailing the stages carried out, the concrete actions performed in each phase, and practical recommendations for future mental health app developments.

Discussion

Experience and innovation are essential in the development of applications, particularly in the formulation of recommendations (E. Proctor et al., 2011; E. K. Proctor et al., 2023; Silberman et al., 2023). Mental health applications enable precise monitoring of symptoms and behaviors, optimize traditional care processes, and support mental health professionals (Connolly et al., 2021; Merchant et al., 2020; Miralles & Granell, 2019). However, developing an app is not a simple task, as it is costly, time-consuming, and challenging (González-Pérez et al., 2023a).

The planning of mental health app development is a crucial stage, in which researchers and specialists can assume leadership roles, ensuring that the application is effective, functional, and aligned with clinical objectives (Hwang et al., 2021). It is necessary to plan resources, timelines, and schedules, promoting collaborative and interdisciplinary work, which facilitates development

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(Nordgreen et al., 2021). Tools such as the SWOT matrix help prepare the team to face uncertainties and challenges (Campos & Halax Orfão, 2022). Methodologies such as Design Thinking, co-design, human-centered design, and participatory design are also fundamental in this process (Lemon et al., 2020; Vial et al., 2023).

The requirements gathering for prototyping involves identifying virtual elements, functionalities, texts, and other components that guide the app's development (Cunha et al., 2023). This stage integrates convergent and divergent perspectives from mental health professionals, ensuring that the application meets the needs of users and patients (Cirino Campos, Sánches García, et al., 2025). Systematic and narrative literature reviews are often used to collect initial requirements (Bezerra et al., 2023; Campos, Feitosa, et al., 2025; Chow, 2020; Costa, 2023). Requirements can be categorized into data privacy and policy, design (aesthetic, visual, and textual), and programming (Campos, Feitosa, et al., 2025). Focus groups with specialists and creative techniques for user feedback collection are also recommended (Birrell et al., 2022; Cirino Campos, García, et al., 2025; Lemon et al., 2020).

Requirements gathering is fundamental to ensure that the app is relevant and functional, and it is essential to reflect on its feasibility before prototyping (Campos, Feitosa, et al., 2025; Cirino Campos, García, et al., 2025). Interactive features, such as reminders, notifications, and gamification, make the app more dynamic and engaging, whereas geolocation or monitoring features require attention to security and privacy (Campos, Feitosa, et al., 2025; Cirino Campos, García, et al., 2025; Lipschitz et al., 2022; Lopes et al., 2021; Nicolaidou et al., 2022).

Prototyping aims to create a presentable, functional design aligned with clinical needs, and it is important to involve the team and participants in this process (Biagianti et al., 2017; Vial et al., 2023). This is when the creativity of the mental health professional emerges, contributing to a viable and attractive prototype ready for validation (Campos, García, et al., 2025; Viana et al., 2023). Involvement of design professionals facilitates this stage, ensuring usability, aesthetics, and functional adequacy (Giovanelli et al., 2023; Vial et al., 2023). Content and appearance validation is essential to identify problems and barriers before final development, and all improvements should be based on scientific evidence and theoretical foundations (Bezerra et al., 2023; Birrell et al., 2022; Lin et al., 2023; Neary & Schueller, 2018).

The development of the application and the alpha/beta validation require continuous collaboration between mental health professionals and the technology team, ensuring delivery of a safe and minimally viable product (Burchert et al., 2019; Cirino Campos, Sánches García, et al., 2025; Nordgreen et al., 2021). Alpha validation consists of initial tests conducted by mental health professionals, evaluating content, usability, and clinical adequacy. Beta validation involves joint technical and clinical assessment by technology and mental health professionals, allowing identification and correction of usability, functionality, and clinical alignment issues before final implementation (Castro, 2021; Castro Rocha et al., 2014; Liew et al., 2019; Viana et al., 2023).

After these stages, the app is reassessed by the mental health team for final adjustments in content, aesthetics, and functionalities, ensuring continuous improvements and evidence-based updates (Biagianti et al., 2017; Birrell et al., 2022; Lemon et al., 2020). To support the implementation of the app within the Brazilian psychosocial care network, the Implementation Outcomes Framework (IOF) is adopted, which defines eight key outcomes: acceptability, adoption, appropriateness, feasibility, fidelity, cost, penetration, and sustainability (E. Proctor et al., 2011). The gold-standard validation represents the final stage, in which the technology demonstrates efficacy and effectiveness in randomized trials (Silberman et al., 2023).

Finally, user experience is critical, as apps with low acceptance tend to be quickly abandoned, compromising their potential (Lemon et al., 2020). Although many teams hire specialized companies for development (Burn et al., 2022), direct involvement of the mental health team increases flexibility, engagement, and collective construction, focusing on improving clinical practice rather than solely financial outcomes (Cirino Campos, Sánches García, et al., 2025).

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Conclusions

The development of mental health applications requires a strategic combination of clinical expertise, innovation, structured planning, and interdisciplinary collaboration. The experience report presented demonstrates that the active involvement of mental health professionals at all stages - from planning, requirements gathering, prototyping, development, and alpha/beta validation, to implementation and gold-standard validation - is essential to ensure that the application is functional, safe, accepted by users, and aligned with evidence-based clinical practices. Continuous validation with mental health professionals and the technology team, combined with attention to the user experience, is critical for successful implementation and user adherence.

Thus, the framework proposed (Table 1) based on the experience with the "Psychosocial Rehab App" provides a structured model that can guide future developments of mental health applications, promoting more efficient, safe, and user-centered clinical practices. The approach underscores the importance of clinical leadership, interdisciplinarity, and ongoing evaluation, establishing a consistent pathway for creating mental health technologies with real potential for clinical and social impact.

Table 1. Framework applied to the development of the webapp "Psychosocial Rehab App": actions and recommendations.

Structure	What We Did in the "Psychosocial Rehab App"	Recommendations
Planning	-We developed the research project and submitted it to the Ethics Committee, focusing on the methodological planning of the study.	-Consider the time required for each stage, available financial resources, human resources, and research field/participant availability. -Use a SWOT matrix to identify strengths, weaknesses, opportunities, and threats (Campos & Halax Orfão, 2022). -Leave at least three months of buffer time for unforeseen events. -Partner with technology professionals, ensuring alignment of interests and engagement with the project.
Requirements Gathering for Prototyping	-Narrative review on psychosocial rehabilitation, psychosocial rehabilitation projects, and bioethics of mental health apps (Ardisson Cirino Campos et al., 2025). -Integrative review for prototyping requirements (Campos, Feitosa, et al., 2025). -Focus groups with mental health professionals, including multidisciplinary teams (Cirino Campos, García, et al., 2025).	- Narrative or exploratory reviews are sufficient; exhaustive literature review is not necessary (Ardisson Cirino Campos et al., 2025). - Use flexible methodologies in focus groups (roundtable, brainstorming, chats, video calls, etc.). - Prioritize experienced professionals and specialists with theoretical and practical knowledge. - Requirements should include features, elements, and resources that solve

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		clinical problems or optimize mental health processes or health practice.
Prototyping	-Initial prototype developed in Marvel conducted by mental health professional based in requirements of prototyping (Campos, García, et al., 2025).	-Start with manual sketches, flowcharts, or simple drawings. -Mental health professionals should lead the process, using tools like Marvel, InVision, or Figma, etc. -Value clinical experience, creativity, and participatory design methods. -Maintain a flexible, artistic, and collaborative process, ready for adjustments based on evidence (Campos, García, et al., 2025; Lemon et al., 2020; J. Torous & Vaidyam, 2020; Vial et al., 2023).
Prototype	-Content validation of the prototype with mental health professionals (Campos, García, et al., 2025). -Subsequent reconfiguration/adaptation in Figma by a UX designer, with active participation of mental health professional (Cirino Campos, Sánches García, et al., 2025).	-Always validate with the target audience and, if possible, with a designer to improve aesthetics and functionality. -Base all modifications on professional contributions. -Prioritize simplicity, functionality, and clarity(Biagianti et al., 2017; J. Torous & Vaidyam, 2020).
Development with Alpha Testing	-The technology team developed the "Psychosocial Rehab App" using Flutter and Dart, with data stored in Firebase Cloud (Cirino Campos, Sánches García, et al., 2025). -Initial alpha testing conducted by mental health professional, identifying technical failures, interface defects, broken screens, navigation errors, and textual inconsistencies. -Creation of tutorial videos and user terms.	- Carefully select the platform (web, Android, iOS, or multiplatform). -Preserve source code in secure repositories. -Prioritize essential features while maintaining usability and smooth performance. -Mental health professionals should actively participate, aligning development with clinical practice, leadership, and collaborative teamwork.
Beta Validation	-Technical evaluation of the app by technology professionals and mental health professionals to identify technical, usability, and clinical alignment issues (Campos, 2025). -Resubmission for content and appearance validation with mental health/technology professionals.	-Conduct content, appearance, and overall quality validations using consolidated methodologies (MARS, usability taxonomies). -Test with end-users, including mental health professionals, patients, and technology staff.

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		-Be ready to implement feedback and iterate the prototype (Viana et al., 2023).
Implementation	-Implementation in the Brazilian psychosocial care network using the Implementation Outcomes Framework (IOF), considering acceptability, adoption, appropriateness, feasibility, fidelity, cost, penetration, and sustainability (E. Proctor et al., 2011; E. K. Proctor et al., 2023). -Assessment in real-world mental health environments with NoMAD, uMARS, and psychosocial rehabilitation indicators (Gal et al., 2022; Gelkopf et al., 2015; Measuring Psychosocial Rehabilitation Outcomes The Research Committee of the International Association of Psychosocial Rehabilitation Services, n.d.).	-Involve more than 100 mental health professionals to strengthen evidence of implementation (Silberman et al., 2023).
Gold Validation	-Conduct at least two randomized controlled trials to evaluate efficacy and effectiveness (Silberman et al., 2023). -Use the DEFINED evidence scale (0–4), with trials representing the highest level of evidence (Silberman et al., 2023).	-Structure evidence according to international standards, ensuring scientific robustness and clinical applicability.

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