REVISTA INVECOM
ISSN en línea: 2739-0063

Mobile application for gynecological health and fertility: a UX approach to prototyping

Aplicación móvil para salud ginecológica y fertilidad: un enfoque de UX hacia el prototipo

Received: 27/05/2025 - **Accepted:** 25/08/2025

Joann Morquencho Guerra
https://orcid.org/0009-0001-0899-1625
joann.morquencho@usil.pe
Universidad San Ignacio de Loyola. Lima, Peru

Carmen Chieng Cueva
https://orcid.org/0000-0003-1226-6482
carmen.chieng@usil.pe
Universidad San Ignacio de Loyola. Lima, Peru

Abstract

Digitization in gynecological health has become increasingly important through the use of mobile applications, which have improved access, coverage, and quality of care. Several studies show that these tools contribute to increased adherence to preventive checkups, promote self-care, and increase user satisfaction. However, significant challenges remain, such as limited personal data protection, usability issues, and deficiencies in the incorporation of user-centered design, especially in Latin American contexts. This study proposes the development of a mobile application prototype focused on the experience of users interested in gynecology, intimate aesthetics, and fertility, using the Design Thinking methodology. The main objective is to identify specific needs, apply relevant user experience (UX) principles, and validate a functional prototype that integrates trust, accessibility, and personalization, thus offering a technological tool that effectively responds to the expectations and requirements of the female audience.

Keywords: digitization, gynecological health, mobile applications.

Resumen

La digitalización en la salud ginecológica ha adquirido creciente relevancia mediante el uso de aplicaciones móviles, lo que ha permitido mejorar el acceso, la cobertura y la calidad de la atención. Diversos estudios muestran que estas herramientas contribuyen a incrementar la adherencia a los controles preventivos, favorecen el autocuidado y elevan la satisfacción de las usuarias. Sin embargo, persisten desafíos significativos, como la limitada protección de datos personales, problemas de usabilidad y deficiencias en la incorporación de un diseño centrado en el usuario, especialmente en contextos latinoamericanos. El presente estudio propone el desarrollo de un prototipo de aplicación móvil orientado a la experiencia de usuarias interesadas en ginecología, estética íntima y fertilidad, empleando la metodología Design Thinking. El objetivo principal es identificar necesidades específicas, aplicar principios de experiencia de usuario (UX) pertinentes y validar un prototipo funcional que integre confianza, accesibilidad y personalización, ofreciendo así una herramienta tecnológica que responda de manera efectiva a las expectativas y requerimientos del público femenino.

Palabras clave: digitalización, salud ginecológica, aplicaciones móviles.

Introduction

This article addresses the development of a mobile application prototype focused on gynecological health and fertility, founded on a user-centric (UX) design with criteria for privacy, scientific backing, and cultural relevance. In recent years, mobile technologies have solidified their role as key tools in monitoring menstrual cycles, controlling fertility, and supporting assisted reproductive treatments (Lyzwinski et al., 2024; Shkodzik, 2024). The digitalization in this field has been driven by the need to improve access to and quality of gynecological care, particularly in regions with structural barriers such as Latin America (Alonso et al., 2022; Alvarado et al., 2024).

The issue prompting this research lies in the low quality and reliability of many applications available on the market. Various studies have shown that a significant number of these apps lack scientific validation, exhibit

SciELO Venezuela latindex LatinREV CC BY

deficiencies in user-centric design, and demonstrate security vulnerabilities, such as the use of unnecessary permissions, third-party tracking, and unclear privacy policies (Deverashetti et al., 2022; Hohmann-Marriott, 2023; Li et al., 2022; Riley et al., 2025). Furthermore, reported usability problems are related to overloaded or poorly designed interfaces, contributing to user abandonment of these applications (Weichbroth, 2025).

The significance of this work lies in its potential to contribute to women's public health through a safe, validated technological tool designed based on the actual needs of users. Recent studies indicate that gynecological health applications can increase adherence to preventive controls by 30% and improve user satisfaction (Alfawzan et al., 2022). Similarly, their daily use facilitates access to real-time medical information, promotes self-care, and fosters autonomy over reproductive health (Lyzwinski et al., 2024).

The proposal is theoretically grounded in the Design Thinking approach, a user-centered methodology that enables the resolution of complex problems through an iterative process that includes the phases of empathizing, defining, ideating, and prototyping (Bender-Salazar, 2023; Dell'Era, 2025; Tsai et al., 2023). This perspective is crucial to ensure that the design directly addresses the expectations, barriers, and priorities of users.

Previous studies have shown both advancements and limitations in this field. For instance, Iribarren et al. (2021) and Capras and Cordos (2022) noted that while numerous applications feature visually appealing interfaces, they lack clinical accuracy or published evidence of their effectiveness. In contrast, the French application WiStim, used by women undergoing fertility treatments, achieved high levels of satisfaction and usability (Plouvier et al., 2024). Additionally, a recent systematic review by Ying et al. (2023) revealed that reproductive health applications can improve knowledge about infertility, quality of life, mental state, and even clinical pregnancy rates.

Despite these advancements, a gap remains in the development of gynecological applications specifically designed for Latin American women, integrating their cultural, social, and technological needs (Giebel et al., 2024). This research is situated in a context where many women face difficulties accessing specialists, and the use of applications represents an opportunity to democratize medical information. However, if critical aspects such as usability, privacy, and clinical evidence are not addressed, these tools may prove counterproductive and breed distrust.

In light of this situation, this work aims to develop a user-experience-focused mobile application prototype that integrates functions related to intimate aesthetics, fertility, and general gynecological health. To achieve this, three specific objectives are proposed: (1) to identify the needs and preferences of users through qualitative research, (2) to evaluate relevant UX principles, and (3) to implement and validate a functional prototype. The research questions guiding the study are: What design elements are prioritized by users? and How does a user-centered approach influence adherence to gynecological controls?

Methodology

The research was conducted using a qualitative exploratory approach aimed at gaining an in-depth understanding of the needs, frustrations, and expectations of Peruvian women of reproductive age regarding the use of mobile applications related to gynecological health, intimate aesthetics, and fertility. This approach is relevant as it addresses an emerging phenomenon that demands a situated understanding from the users' own experiences, as proposed by Taylor and Bogdan (1998) and Flick (2007), highlighting the importance of context and the subject's perspective in qualitative studies. Accordingly, the Design Thinking methodology was employed, recognized for its ability to promote innovation through a human-centered iterative process encompassing the phases of empathizing, defining, ideating, and prototyping (Bender-Salazar, 2023; Dell'Era, 2025; Tsai et al., 2023).

The sample was selected non-probabilistically for convenience and consisted of eleven women residing in Peru, aged between 18 and 45 years, with experience using health mobile applications. Participants were chosen based on their willingness to share significant experiences and their access to virtual platforms. This type of sampling is common in qualitative studies, as it prioritizes the richness of discourse over statistical representativeness (Patton, 2015).

Data collection was conducted through in-depth interviews via the Zoom platform, structured according to two methodological tools: the Customer Journey Map and the Value Proposition Canvas. These tools allowed for the identification of patterns in users' actions, emotions, and touchpoints with health applications, as well as mapping their "pain points" and expectations (Micheaux & Bosio, 2019). The interviews were recorded and transcribed with prior informed consent and subsequently analyzed using Atlas.ti software through thematic analysis techniques, facilitating the coding and detection of key patterns in qualitative data (Braun & Clarke, 2006; Gibbs, 2016).

The study adhered to ethical principles established in the Declaration of Helsinki (WMA, 2013), ensuring anonymity, confidentiality of information, and voluntary participation. Inclusion criteria considered women within the defined age range, with access to a mobile device and experience using health applications; those who did not meet these basic conditions were excluded.

While the research provided valuable insights into user-centered design, certain limitations were acknowledged, such as the small and localized sample size and the inability to assess the long-term impact of the prototype on adherence to treatments or objective health indicators. Nevertheless, the findings obtained constitute a solid foundation for future iterations and technological developments aimed at the digital empowerment of women's health.

Results and discussion

During the data collection and analysis phase, eleven in-depth interviews were conducted with Peruvian women aged 18 to 45, who are current or potential users of mobile applications related to gynecological health, fertility, and intimate aesthetics. The interviews, transcribed and coded using Atlas.ti software, allowed for the identification of recurring patterns in their experiences, needs, and frustrations, thereby facilitating the response to the first research question: What design elements are prioritized by users?

Initial findings revealed a strong concern regarding data privacy, complexity in the design of certain interfaces, the lack of reliable professional support, and the absence of content personalization.

Networks of codes were constructed from the transcripts, illustrated in Figures 1 to 6, highlighting terms such as "trust," "security," "information," "support," and "anxiety." This visualization allowed for a clearer understanding of the most sensitive conceptual dimensions for users and reinforced qualitative findings from a semantic perspective.

Figure 1.

Creation of the value proposition based on keywords from interviewees in Atlas.ti.

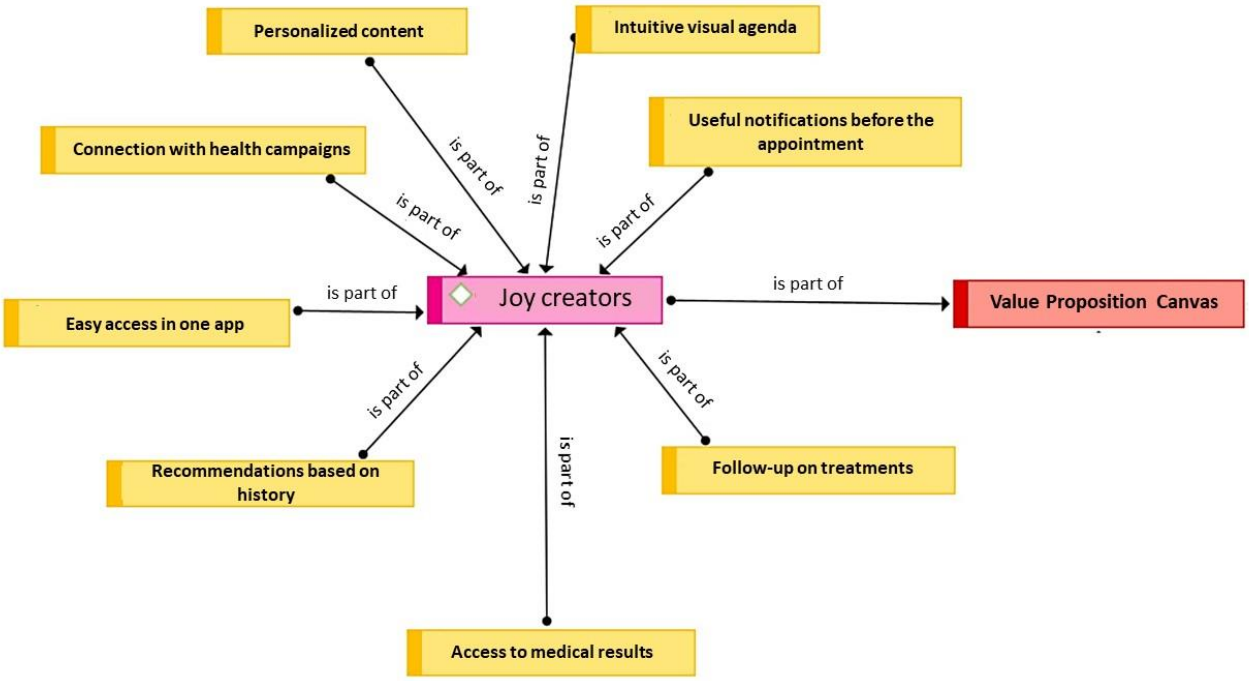
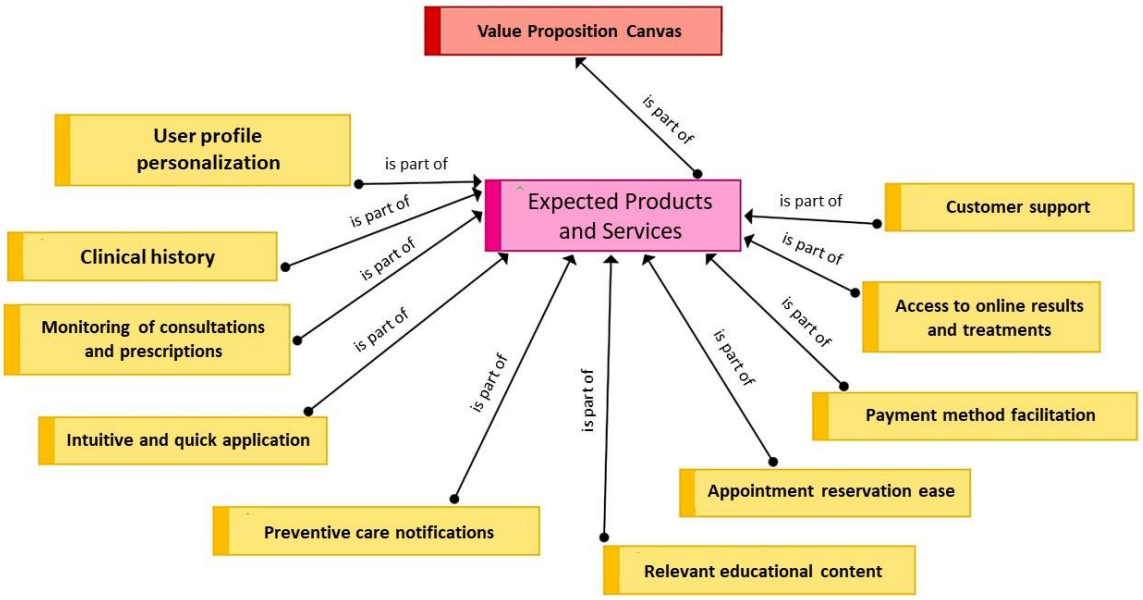
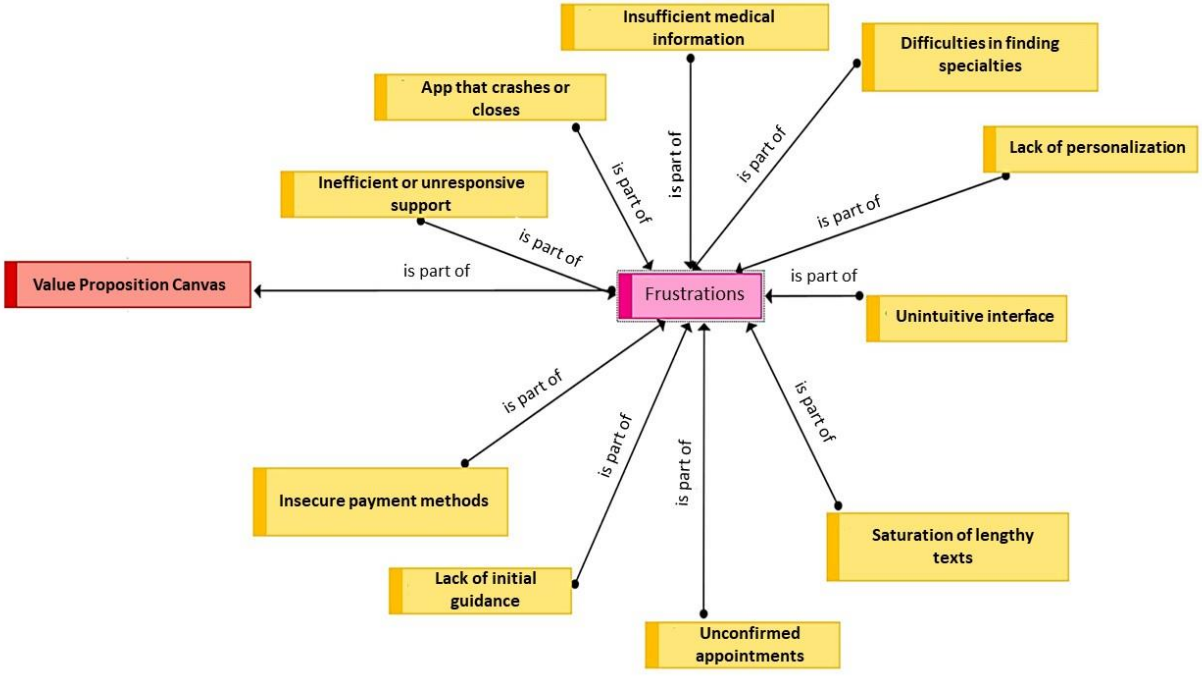


Figure 2.
Creation of the value proposition based on keywords from interviewees in Atlas.ti.



Note: Authors' own elaboration.

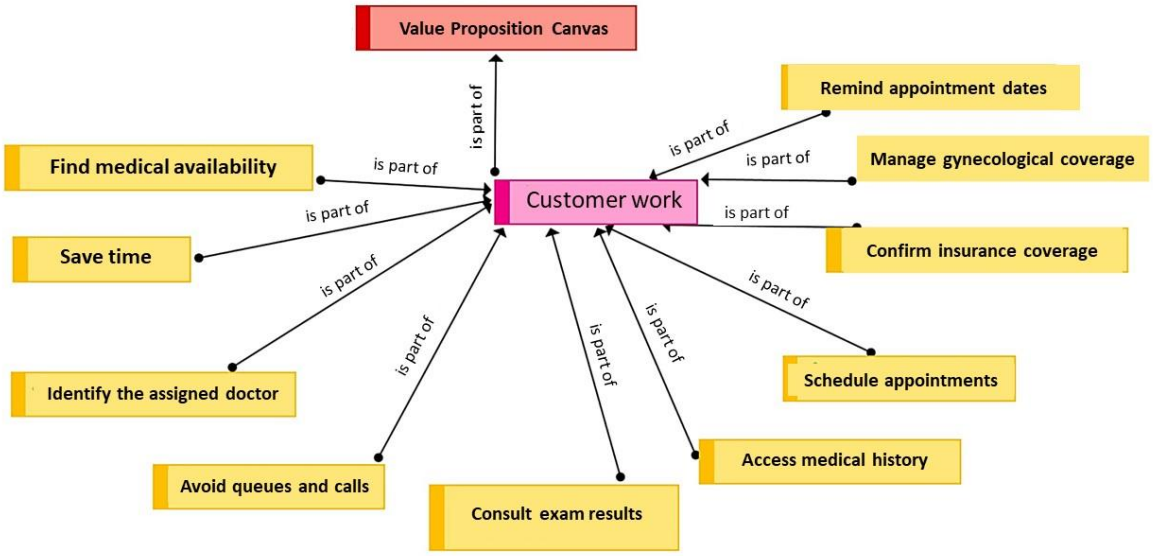
Figure 3
Creation of the customer profile based on keywords from interviewees in Atlas.ti.



Note: Authors' own elaboration.

Figure 4

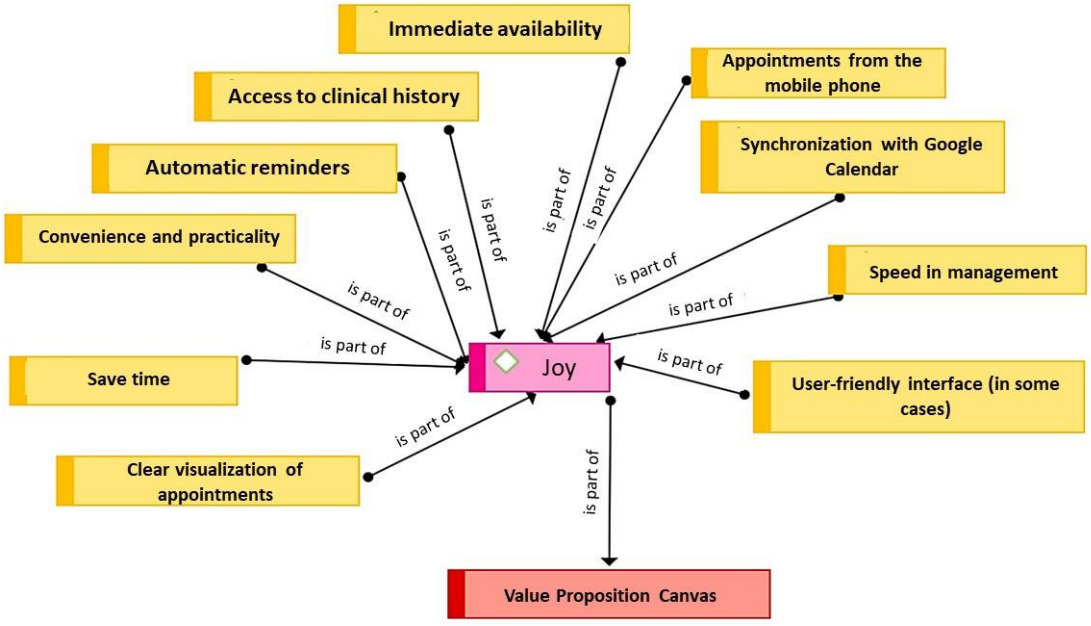
Creation of the customer profile based on keywords from interviewees in Atlas.ti



Note: Authors' own elaboration.

Figure 5.

Creation of the customer profile based on keywords from interviewees in Atlas.ti.



Note: Authors' own elaboration.

As part of the ideation phase, the SCAMPER technique was applied to generate innovative and personalized functions. This application led to proposals such as intelligent reminders linked to the cycle, validated educational content by health professionals, access to secure community forums, self-assessment tests, and the ability to record and track emotional and physical symptoms (Hassan, 2023). These solutions were materialized in an interactive prototype that included sections such as "My Cycle," "My Symptoms," "Medical Appointments," "Intimate Education," "Safe Forum," and "Contact Your Specialist," as shown in Table 1.

Table 1
SCAMPER Method.

Category	Concept
Substitute	Replace generic reminders with personalized reminders based on the menstrual cycle, treatments, or scheduled appointments.
Combine	Combine with multimedia educational content (videos, podcasts, infographics) on intimate health and fertility. Combine with private communities or forums within the app where users can share experiences moderated by experts.
Adapt	Adapt the app for adolescents with friendly content and language for early education on menstrual and sexual health. Adapt AI algorithms used in other medical fields for pre-diagnosis of common gynecological symptoms.
Expand/Modify	Expand the calendar functionality to include alerts about fertile windows, medical appointments, medications, and exams. Modify the UX/UI design to make it even more inclusive, intuitive, and emotionally friendly. Expand service offerings to include teleconsultations with various specialists.
Use	Use the app as an emotional diary to record mood states during the menstrual cycle or hormonal treatments. Use it in health centers as a pre-diagnostic tool to reduce consultation time. Use it as a channel for clinical research on menstrual behavior or fertility.
Eliminate	Eliminate unnecessary steps in scheduling appointments, simplifying the process to 2 clicks. Eliminate poorly personalized information, ensuring that displayed content is based on the user's profile and life stage. Eliminate the need for multiple apps by integrating tracking, education, and medical contact functions into a single platform.
Reorganize/Reverse	Reorganize the main menu according to user objectives (e.g., fertility, prevention, treatments, consultations). Reverse the current navigation flow to start with health objectives rather than medical categories. Reorganize the onboarding experience so that at the start the app can better understand the user and offer guided support from the first use.

Note: *Authors' own elaboration.*

The prototype development was carried out in two phases. First, black-and-white wireframes were designed to define the architecture and navigation flow (Figures 7 to 14). Subsequently, a high-fidelity color version was developed (Figure 15), utilizing Google AI Studio, with architecture simulated in the cloud. This prototype incorporated the criteria of the 7C's model, which ensures a comprehensive experience:

Context. The application context must guarantee a smooth, functional experience consistent with the identity of a gynecological health app. Technically, it is essential to have reliable hosting that ensures constant

availability, optimal loading times, and secure storage of sensitive data in the cloud. The design template should be modern, adaptable, and easy to customize, allowing for clear navigation in sections such as medical appointments, history, news, and calendar. The database must be structured to manage medical information securely, ensuring access to histories, test results, schedules, and user preferences, always adhering to privacy and confidentiality criteria. Additionally, including a secure payment gateway is crucial for users to acquire medical services directly through the application, using local methods such as debit cards, Yape, or Plin. Finally, the aesthetic should reflect empathy, health, and trust, recommending a palette of soft and feminine colors (such as pinks, lavender, or aqua green), clear and appropriately sized typography, as well as illustrative graphics, friendly icons, and images that convey well-being, closeness, and professionalism.

Content. The content must be educational, accessible, and reliable, written in approachable language by specialists in gynecology, fertility, and intimate health. The application should organize its sections clearly so that each user can easily find what they are looking for. On the initial screen, upon first entry, practical guides with step-by-step information about the main functions will be presented. The news section will include visual explanations of medical procedures, interviews with specialists, and educational capsules that reduce anxiety during treatments. The medical appointments section will allow users to manage past and pending appointments, as well as access notes left by treating physicians. Additionally, a support module will provide personalized assistance to resolve questions or request help within the application. The content will be updated continuously and will include multimedia resources that favor different learning styles, facilitating the understanding of complex topics.

Community. The application should foster an enthusiastic community of women interested in caring for their intimate, hormonal, and reproductive health. To achieve this, thematic forums and groups based on interests or life stages should be enabled. It could also organize awareness and prevention campaigns, such as the fight against breast cancer in October or cervical cancer in March, including educational content, healthy challenges, testimonials, and access to preventive medical evaluations. These initiatives transform the app into a platform for collective action, empowerment, and social transformation.

Conversion. Conversion is strengthened through personalization and adaptation. The first depends on configurations made by the user, who can choose alerts for medical appointments, notifications for articles, or save favorite treatments. The second corresponds to the automatic adaptation of the system based on usage history, with recommendations for relevant services and content. This dual approach increases engagement and facilitates decision-making related to health.

Communication. Communication between the app and users is essential. This includes push notifications about medical appointments or results, personalized support chat, and channels for submitting questions, suggestions, or reporting issues. Communication should be fluid, warm, and empathetic, reinforcing professional and human support.

Connection. The application should integrate with other digital spaces, such as social networks, to share educational content and positive experiences.

Commerce. The commercial component should facilitate the booking of medical appointments through secure payment gateways and local payment methods. The process includes selecting a specialty, choosing a professional, scheduling a date, and online payment, after which the user receives immediate confirmation.

Figure 7
Login/session start.



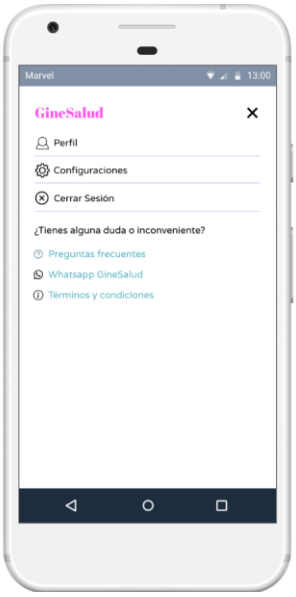
Note: *Authors' own elaboration.*

Figure 8
Home page.



Note: *Authors' own elaboration.*

Figure 9
Side menu.



Note: *Authors' own elaboration.*

Figure 10
News menu.



Note: *Authors' own elaboration.*

Figure 11
Schedule an appointment.



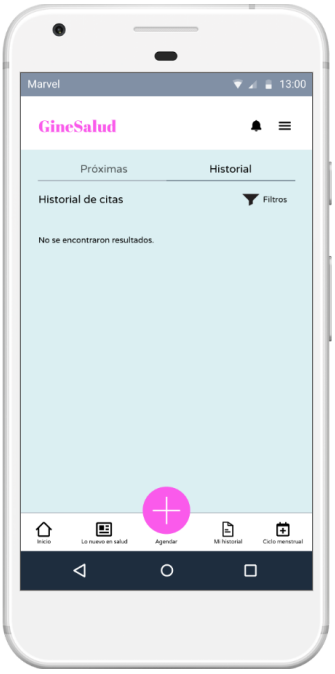
Note: *Authors' own elaboration.*

Figure 12
Upcoming appointments.



Note: *Authors' own elaboration.*

Figure 13
Appointment history.



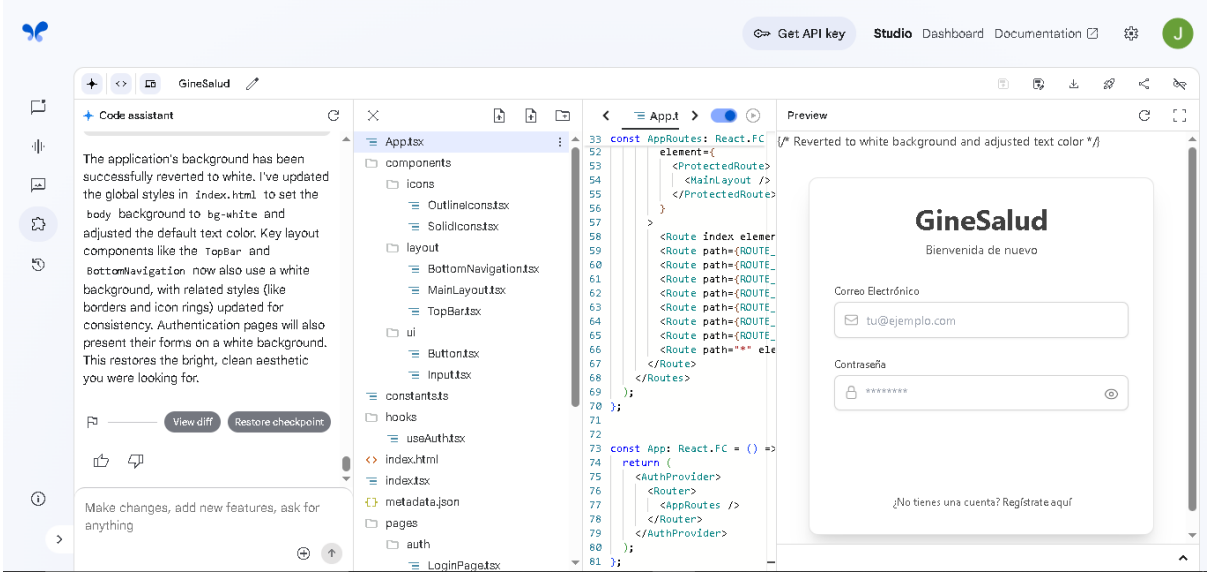
Note: *Authors' own elaboration.*

Figure 14
Period tracking – menstrual cycle log.



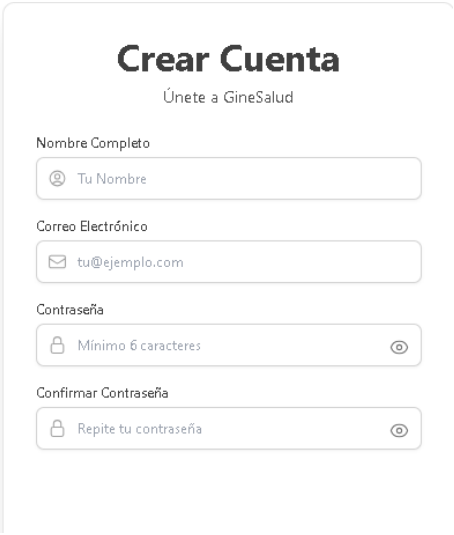
Note: *Authors' own elaboration.*

Figure 15
Mobile application prototype.



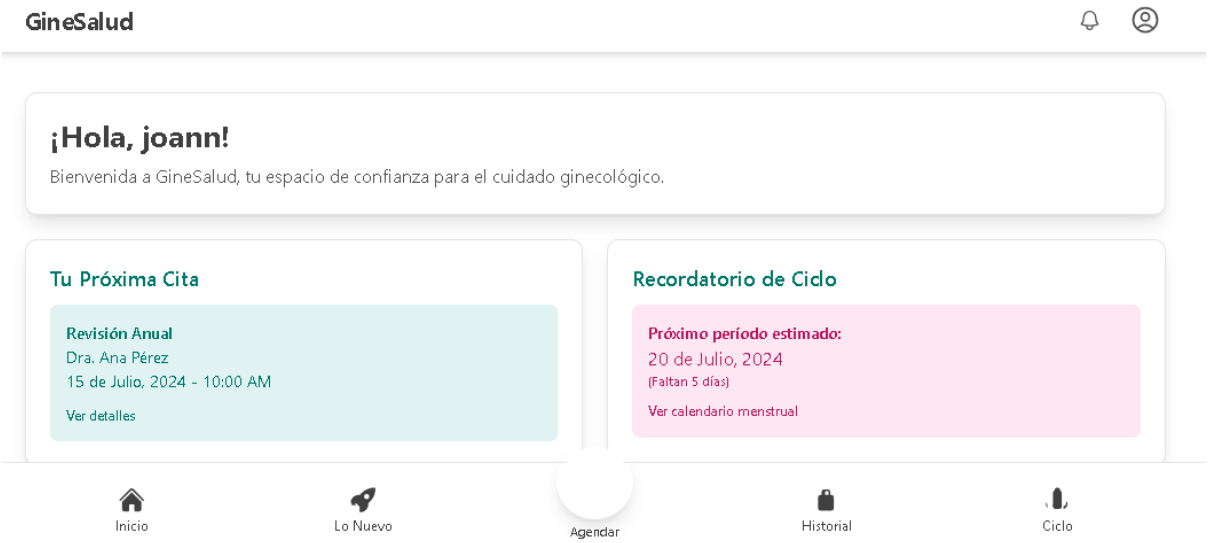
Note: *Authors' own elaboration.*

Figure 16
Mobile application prototype.



Note: *Authors' own elaboration.*

Figure 17
Mobile application prototype.



Note: *Authors' own elaboration.*

These results also allow us to answer the second research question: How does a user-centered approach influence adherence to gynecological controls? Qualitative evidence suggests that an empathetic, clear, and functional design fosters greater trust, active participation, and willingness to follow medical recommendations. Aligning with the findings of Alfawzan et al. (2022), when an application is built from a deep understanding of the user, adherence to self-care practices and preventive controls is significantly increased.

In summary, the study demonstrates how a user-centered methodology not only diagnoses critical points of the digital experience in intimate health but also builds solutions aligned with the real needs of women. The developed prototype constitutes a first functional approach validated by lived experience, laying the groundwork for future iterations, validations, and expansions.

Ultimately, this study represents a scientific novelty in the field of technology design for women's health by coherently integrating the Design Thinking methodology with a deep qualitative focus centered on Peruvian users, a segment that has been scantily explored in the literature. The controversy of this work lies in questioning the usual technocratic approach to medical applications, proposing instead an empathetic, emotionally meaningful, and culturally contextualized design that places the lived experience of women at its center. From a theoretical perspective, the study contributes to the understanding of how user experience (UX) principles can be articulated with digital health models and women's empowerment, opening new lines of analysis on technology and gender. Practically, the prototype not only translates qualitative findings into a functional solution but can also serve as a replicable model for other areas of intimate or reproductive health. Moreover, the relevance of this work aligns fully with research in digital health, innovation, and user behavior, contributing to the advancement of applied knowledge and providing a solid foundation for the development of new inclusive, sensitive, and sustainable technological solutions.

Conclusions

The results obtained in this study affirm that the design of mobile applications for gynecological health will only be effective if it is based on a situated understanding of the female experience, where trust, privacy, autonomy, and accessibility are not mere technical complements but structural conditions for adherence and sustained use. From this perspective, user-centered design should not be conceived solely as an innovation methodology but as an epistemic approach that recognizes the value of experiential knowledge and the emotions linked to intimate care.

The analyzed findings show that the interviewed women do not reject technology itself; rather, they do so when they perceive that it ignores their contexts, real needs, or their right to decide about their personal

information. Consequently, the technological proposal presented—based on principles of clarity, empathy, professional backing, and emotional design—directly and coherently responds to the expectations expressed in the narratives. This grants the work both methodological and ethical solidity by prioritizing the voice of users in constructing solutions that directly engage them.

From a theoretical standpoint, the research illustrates that traditional functional design models are insufficient for applications aimed at intimate well-being, where emotions, health trajectories, and cultural imaginaries play a central role. The study reinforces the need for technological development to incorporate hybrid models that articulate usability, digital health, and design justice, especially when working with historically underrepresented populations in technological innovation processes.

However, this work does not aim to exhaust the discussion. Questions remain that invite future research: How does the perception of trust evolve over time with sustained use of an application designed with a user-centered approach? What impact do these digital solutions have in rural contexts or areas with less access to connectivity? How do these designs adapt to other stages of the reproductive cycle, such as menopause or early motherhood? These questions open the pathway for a collaborative and transdisciplinary research agenda that not only validates but also expands and diversifies the results obtained here, contributing to the consolidation of a more just, sensitive, and effective digital health ecosystem.

References

Alonso, R. G., Thoene, U., & Benavides, D. D. (2022). Digital health and artificial intelligence: Advancing healthcare provision in Latin America. *IT Professional, 24*(2), 62–68. https://doi.org/10.1109/MITP.2022.3143530

Alvarado, A., Ramos-Echevarría, P., Cotto-Vázquez, A. C., Núñez-González, S., Nieves-Vázquez, C. I., Sierra, C. R., ... & Flores, I. (2024). Acceptability of gynecologic e-health modalities by Hispanic/Latina women of reproductive age. *Health Policy and Technology, 13*(2), 100841. https://doi.org/10.1016/j.hlpt.2024.100841

Alfawzan, N., Christen, M., Spitale, G., & Biller-Andorno, N. (2022). Privacy, data sharing, and data security policies of women's mHealth apps: Scoping review and content analysis. *JMIR mHealth and uHealth, 10*(5), e33735. https://doi.org/10.2196/33735

Bender-Salazar, R. (2023). Design thinking as an effective method for problem-setting and needfinding for entrepreneurial teams addressing wicked problems. *Journal of Innovation and Entrepreneurship, 12*(1), 24. https://doi.org/10.1186/s13731-023-00291-2

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Capraş, R. D., & Cordoş, A. A. (2022). Evaluation of gynecology patient-oriented free mobile Android medical apps. *Applied Medical Informatics, 44*(4), 124–138. https://ami.info.umfcluj.ro/index.php/AMI/article/view/910

Dell'Era, C., Magistretti, S., Candi, M., Bianchi, M., Calabretta, G., Stigliani, I., & Verganti, R. (2025). Design thinking in action: A quantitative study of design thinking practices in innovation projects. *Journal of Knowledge Management, 29*(11), 32–58. https://doi.org/10.1108/jkm-04-2024-0424

Deverashetti, M., Ranjitha, K., & Pradeepthi, K. V. (2022). Security analysis of menstruation cycle tracking applications using static, dynamic and machine learning techniques. *Journal of Information Security and Applications, 67,* 103171. https://doi.org/10.1016/j.jisa.2022.103171

Flick, U. (2007). *Introducción a la investigación cualitativa* (2.ª ed.). Morata.

Gibbs, G. (2016). Media review: Atlas.ti software to assist with the qualitative analysis of data. *Journal of Mixed Methods Research, 1*(1), 103–104. https://doi.org/10.1177/2345678906291490

Giebel, G. D., Abels, C., Plescher, F., Speckemeier, C., Schrader, N. F., Börchers, K., Wasem, J., Neusser, S., & Blase, N. (2024). Problems and barriers related to the use of mHealth apps from the perspective of patients: Focus group and interview study. *Journal of Medical Internet Research, 26,* e49982. https://doi.org/10.2196/49982

Hassan, Sh. M. (2023). SCAMPER as a creative idea generation method: Case study on graphic design students. *Information Sciences Letters, 12*(4). https://digitalcommons.aaru.edu.jo/isl/vol12/iss4/53

Hohmann-Marriott, B. (2023). Periods as powerful data: User understandings of menstrual app data and information. *New Media & Society, 25*(11), 3028–3046. https://doi.org/10.1177/14614448211040245

Iribarren, S. J., Akande, T. O., Kamp, K. J., Barry, D., Kader, Y. G., & Suelzer, E. (2021). Effectiveness of mobile apps to promote health and manage disease: Systematic review and meta-analysis of randomized controlled trials. *JMIR mHealth and uHealth, 9*(1), e21563. https://doi.org/10.2196/21563

Li, K., Urteaga, I., Shea, A., Vitzthum, V. J., Wiggins, C. H., & Elhadad, N. (2022). A predictive model for next cycle start date that accounts for adherence in menstrual self-tracking. *Journal of the American Medical Informatics Association, 29*(1), 3–11. https://doi.org/10.1093/jamia/ocab182

Lyzwinski, L., Elgendi, M., & Menon, C. (2024). Innovative approaches to menstruation and fertility tracking using wearable reproductive health technology: Systematic review. *Journal of Medical Internet Research, 26,* e45139. https://doi.org/10.2196/45139

Micheaux, A., & Bosio, B. (2019). Customer journey mapping as a new way to teach data-driven marketing as a service. *Journal of Marketing Education, 41*(2), 127–140. https://doi.org/10.1177/027347531881255

Patton, M. Q. (2015). *Qualitative research & evaluation methods: Integrating theory and practice* (4th ed.). SAGE Publications.

Plouvier, P., Marcilly, R., Robin, G., Benamar, C., Robin, C., Simon, V., Piau, A. S., Cambay, I., Schiro, J., & Decanter, C. (2024). Evaluation of satisfaction with a secure, connected mobile application for women in assisted reproductive technology programmes: A prospective, observational study of patients and medical team members. *JMIR Human Factors, 12,* e63570. https://doi.org/10.2196/63570

Riley, S., Healy-Cullen, S., Rice, C., Tiidenberg, K., Hawkey, A., Evans, A., Stephens, C., Tappin, J., Ensslin, A., & Morison, T. (2025). Problematising menstrual tracking apps: Presenting a novel critical scoping review methodology for mapping and interpreting research literature. *Psychology & Health,* 1–25. https://doi.org/10.1080/08870446.2024.2445518

Shkodzik, K. (2024, junio). Innovative approaches to digital health in ovulation detection: A review of current methods and emerging technologies. *Seminars in Reproductive Medicine, 42*(2), 81–89. https://doi.org/10.1055/s-0044-1793829

Taylor, S. J., & Bogdan, R. (1998). *Introducción a los métodos cualitativos de investigación: La búsqueda de significados.* Paidós.

Tsai, C. A., Song, M. Y. W., Lo, Y. F., & Lo, C. C. (2023). Design thinking with constructivist learning increases the learning motivation and wicked problem-solving capability—An empirical research in Taiwan. *Thinking Skills and Creativity, 50,* 101385. https://doi.org/10.1016/j.tsc.2023.101385

Weichbroth, P. (2025). Usability issues with mobile applications: Insights from practitioners and future research directions. *IEEE Access, 13,* 91301–91311. https://doi.org/10.1109/ACCESS.2025.3573503

World Medical Association. (2013). World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. *JAMA, 310*(20), 2191–2194. https://doi.org/10.1001/jama.2013.281053

Ying Li, Shen, W.-J., Wu, X.-L., & Jin, X.-W. (2023). The potential of mobile health applications to improve couples' fertility: A systematic review and meta-analysis of randomized controlled trials. *Journal of Men's Health.* https://doi.org/10.22514/jomh.2023.026

Yu, M. (2023). The rise of super apps: Insights and opportunities from a UX perspective. *2023 IEEE International Professional Communication Conference (ProComm),* 128–133. https://doi.org/10.1109/ProComm57838.2023.00044