

Eldera: Intelligent Elderly Care and Assistant App

Chris Jericho M. Picoc¹, Andrew B. Malubag², Camela Kim C. Arcalas³, John Philip J. Pajela⁴, Leo Gabriel V. Villanueva⁵

^{1,2,3,4,5}Pangasinan State University - Urdaneta City Campus
Urdaneta City, Pangasinan, Philippines

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Abstract - The rapid growth of the elderly population presents significant challenges in healthcare access, emergency response, medication adherence, and social participation, particularly in local communities in the Philippines. Many elderly individuals experience difficulty managing daily health needs, responding to emergencies, and staying informed about government benefits and barangay services. This study aimed to design, develop, and evaluate ELDERA: Intelligent Elderly Care and Assistant App, a mobile-based application that enhances elderly care through health monitoring, emergency response, and community engagement. The study utilized the Agile Scrum software development methodology to guide the iterative planning, development, testing, and evaluation of the system. The application combines features such as emergency alert notifications, medication scheduling, health monitoring support, community announcements, digital application templates, an AI-powered assistant, and GeoFence-based location tracking. Usability and effectiveness of the system were assessed using the System Usability Scale (SUS). Findings revealed that the system achieved an overall SUS score of 80.75, which is descriptively rated as "Good" and interpreted as "Usable." The study concluded that Eldera is an intuitive, accessible, and practical digital solution that strengthens elderly care, encourages community involvement, and enhances the overall well-being and safety of elderly individuals within the community.

Keywords - Elderly Care, Mobile Application, Emergency Assistance, Health Support, Agile Scrum, System Usability Scale, User-Centered Design

INTRODUCTION

The aging population grows rapidly worldwide, with the Philippines being no exception (Frontiers in Public Health, 2024; United Nations, 2022). Longer life expectancy is sought by many, but aging often brings challenges such as financial insecurity, limited access to healthcare, and social isolation (Takagi et al., 2022). It is estimated that by 2050, people aged 65 and above will surpass children under 5 years old worldwide for the first time in history (United Nations, 2022). Global data highlights the urgency of addressing elderly care needs, yet systemic challenges—including insufficient geriatric care services and unmet health needs—persist, especially in rural areas where government support and medical services face limitations.

Furthermore, rapid technological advances do

not always benefit older adults, many of whom remain digitally excluded due to a lack of skills, resources, or guidance (Chen & Wang, 2025; Ma et al., 2020). This digital divide restricts their access to online government services and social connection platforms, further compounding their isolation. Studies reveal that many seniors remain unaware of their senior benefits from government initiatives, such as Republic Act 9994 (the Expanded Senior Citizens Act of 2010), highlighting a critical gap in information accessibility (Dupa & Cagas, 2021). Elders also face memory decline and physical limitations, which impact their ability to manage daily health routines and seek timely help during emergencies (Oliver-Hamilton et al., 2025).



To address these challenges, web-based portals and mobile platforms have become valuable tools for improving organizational management, care delivery, and communication. Centralized digital systems enhance collaboration, information accessibility, and operational efficiency while reducing administrative workloads. Therefore, this study proposes the design, development, and evaluation of Eldera: Intelligent Elderly Care and Assistant App. The app serves as a centralized community-based platform designed to enhance coordination between family members, barangay health staff, and the local community to safeguard senior citizens and maximize their access to public welfare services.

MATERIALS AND METHOD

This study utilized a Descriptive and Developmental Research Design to establish the foundations and complete the technical realization of the Eldera application (Dewi et al., 2024; Qualtrics, 2024). The descriptive design was employed to systematically identify, analyze, and map the existing difficulties encountered by senior citizens, caregivers, and local administrative workers regarding emergency responsiveness, information gaps, and health monitoring. Concurrently, the developmental research methodology governed the engineering, iterative iteration, and empirical verification of the mobile-based solution against user satisfaction metrics.

Data gathering was systematically executed across selected barangays in Urdaneta City, Pangasinan, involving a sample population of 48 respondents. This included 8 Barangay Staff members, 10 Family Members, and 30 Elderly residents. Information was captured via structured questionnaires, open-ended consultations, and targeted interviews. For Objective 1 (identifying challenges) and Objective 2 (determining user requirements), data from the entire cohort was collected, with family members rendering text-entry assistance to seniors facing physical or literacy constraints. For Objective 4 (usability testing), participants interacted directly with the compiled

software builds before completing the standardized questionnaire.

The software construction process adhered strictly to the Scrum Software Development Methodology, an Agile framework promoting continuous deployment cycles, stakeholder feedback integration, and flexible adjustment mechanisms (Simplilearn, 2022). The project was executed over a span of 183 man-days using the following structured phases:

1. **Initiate:** Formation of the dedicated Scrum Team (Scrum Master, Product Owner, and Developers), creation of the core project vision, and formulation of the initial Product Backlog listing required functional features based on user requirements.
2. **Plan and Estimate:** Translation of user feedback into concise User Stories, computation of developmental effort, optimization of task priorities, and creation of the Sprint Backlog to establish roadmap increments lasting two and a half weeks per cycle.
3. **Implement:** Active software engineering utilizing the Flutter framework with Dart as the primary programming language for cross-platform interface layouts, combined with Firebase Integration to ensure secure user authentication and real-time database storage.
4. **Review and Retrospect:** Iterative construction of functional software prototypes, verification of sprint objectives, validation of data flow consistency, and proactive adjustment of user workflows based on internal evaluation cycles.
5. **Release:** Final package assembly, deployment of mobile builds to the target population for field evaluation, collection of psychometric data, and documentation of system architectural logs.

RESULTS AND DISCUSSION

The development of the Eldera application successfully mitigated key structural vulnerabilities regarding community eldercare delivery, emergency dispatching, and medical documentation. The visual interfaces and statistical results extracted from user surveys are presented below:

A. System Interface

The application architecture delivers distinct, customized dashboards depending on the authenticated user role selected during the initial enrollment screen:



Figure 1. User Role Selection

Figure 1 shows the User Role Selection screen. The first step is the Eldera app, where users choose to be an Elderly, Family Member, or Barangay Staff. This selection determines the interface and features based on their role, before proceeding to registration.



Figure 2. Sign-Up Pages & Login Page | Eldera App

Figure 2 shows the Eldera application's registration and login interfaces, which secure and manage system access. The Sign-Up pages capture specific details from Elderly users, Family members, and Barangay Staff to ensure accurate documentation, while the Login Page verifies these registered credentials to protect data privacy and grant secure access to personalized dashboards.



Figure 3. Homepage | Elderly

Figure 3 shows the Elderly Homepage, featuring the Health Monitoring Dashboard. To record data (steps, heart rate, calories, distance, sleep), users must connect to a wearable device. A notification button is in the upper-right corner for announcements and alerts, a hamburger menu is in the upper-left for all Eldera features, and an SOS button is at the bottom-right for emergency assistance.



Figure 4. Homepage | Family Members

Figure 4 shows the Family Member’s Homepage. A notification button is in the upper-right corner for announcements and alerts, and a three-horizontal-line menu is in the upper-left for all Eldera features. At the center, a button allows linking to the elderly's account to track and monitor their location by entering their full name and email address to send a request.



Figure 5. Homepage | Barangay Staff

Figure 5 shows the Barangay Staff Homepage, displaying the total number of registered users and active emergency alerts with the user's name, location, and a direct Google Maps link for faster response. This enables staff to efficiently monitor and respond to emergencies, ensuring resident safety. The page also includes recent barangay announcements and updates.



Figure 6. SOS Emergency | Elderly

Figure 6 shows the SOS Emergency Screen, which displays a map of the elderly's current location. Pressing the Send SOS button triggers a 10-second countdown, after which an emergency alert is automatically sent to both designated emergency contacts and local authorities.



Figure 7. Medicine Reminder | Elderly

Figure 7 shows the Medicine Reminder screen, allowing elderly users to manage and monitor their daily medication schedule by tracking overdue, missed, taken, and skipped doses. It features an Add Medicine button to log new prescriptions, helping users stay consistent with their medical routines and improve health management within the Eldera application.



Figure 8. Application Form Template | Elderly

Figure 8 shows the Application Form Template screen, offering various downloadable forms for elderly users. Tapping the Download button triggers a confirmation message, while a live search bar helps locate specific templates. A nearby button directs users to their downloaded forms, which can be opened as printable PDFs or managed using the delete selection button.



Figure 9. Community Group / Elderly - Family Members

Figure 9 shows the Community Group screen, a centralized communication platform within the Eldera application. It disseminates barangay announcements to all registered users for effective information sharing and community engagement. The screen includes interactive reaction, comment, and view comments options to facilitate feedback and community discussions.

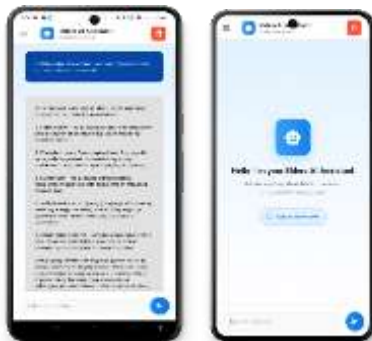


Figure 10. Eldera AI Chatbot | Elderly

Figure 10 shows the Chatbot screen, where users interact with the Eldera AI Assistant to ask questions, seek guidance, and receive automated responses. This feature provides convenient access to information and support, enhancing user experience and promoting efficient communication within the application.



Figure 11. Health Monitoring Screen | Elderly

Figure 11 shows the Health Monitoring screen, which integrates data from wearable devices to track physical activity and wellness metrics. It displays steps, calories burned, heart rate, distance, sleep duration, and workout activities, enabling users to easily monitor their daily health status and promote early awareness of health concerns.



Figure 12. Elder's Health Data – Link Elders | Family Member

Figure 12 shows the Health Monitoring screen, displaying a list of linked elders via individual cards that open to their detailed health data. It integrates wearable device metrics—including steps, calories, heart rate, distance, sleep, and workouts—allowing family members to conveniently monitor daily health status and ensure early awareness of potential concerns.



Figure 13. Elder’s Medicine Data – Link Elders | Family Member

Figure 13 shows the Medicine Reminder screen, displaying a list of linked elders via individual cards that open to their detailed medication schedules. It tracks medicines, dosage, frequency, and upcoming reminders, allowing family members to conveniently monitor adherence and ensure linked elders take their medications on time to prevent missed doses.



Figure 14. Manage Community Dashboard | Barangay Staff

Figure 14 shows the Community Dashboard, where Barangay Staff manage community activities. Each post displays the event name, location, description, date, and time. Staff can view reactions and comments, toggle posts to view-only mode, and use the edit button to update details. A floating action button allows adding new posts to keep residents informed.

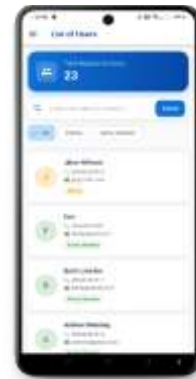


Figure 15. List of Users | Barangay Staff

Figure 15 shows the List of Users screen, allowing Barangay Staff to view all registered users in Eldera. It displays the total number of users, provides a search bar for quick lookup, and includes filters for Elderly or Family Member categories. Each user card contains the name, phone number, email, and user type for efficient information management.



Figure 16. Emergency Dashboard | Barangay Staff

Figure 16 shows the Emergency Dashboard, where Barangay Staff view incoming SOS notifications. Each alert card displays the sender, urgent message, detected location, coordinates, accuracy details, and a timestamp. Staff can open the location in Google Maps for quick response, helping them monitor and act on emergency reports efficiently.



Figure 17. My Profile Screen | Eldera App

Figure 17 shows the Profile Management screen, where users can view and edit their personal information, update their account password, and upload a profile picture. This enables users to maintain accurate and personalized account details, ensuring data consistency and enhancing the overall user experience within the Eldera application.

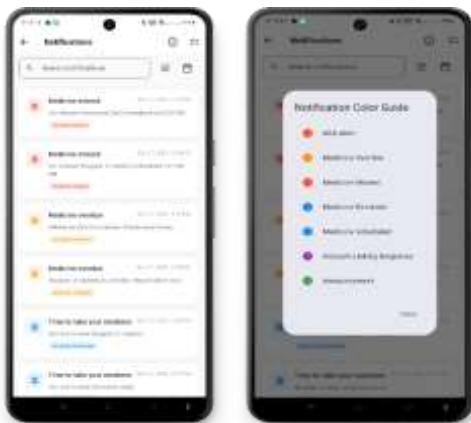


Figure 18. Notification Screen | Eldera App

Figure 18 shows the Notification Screen, where users view system alerts regarding account and health activities. It displays medicine reminders, scheduled medications, missed doses, and overdue medicines using color-coded labels for easy identification. The screen also includes a notification color guide to help users quickly understand each alert type, improving awareness and response time.



Figure 19. Login Page | Web Application – Admin

Figure 19 shows the Admin Login Page, where admins securely access the Eldera web application. It features input fields for the admin's email and password, ensuring only authorized personnel can enter the system. This interface serves as the gateway to all administrative functions, maintaining system security and protecting sensitive data.

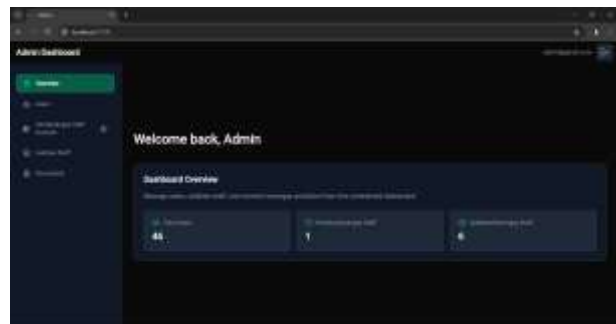


Figure 20. Admin Dashboard | Web Application – Admin

Figure 20 shows the Admin Dashboard, allowing admins to manage users, validate barangay staff accounts, and monitor system activities. The interface displays key metrics—including total users, pending validations, and validated staff—while a sidebar navigation menu provides access to user management, staff account creation, validation, and document handling.

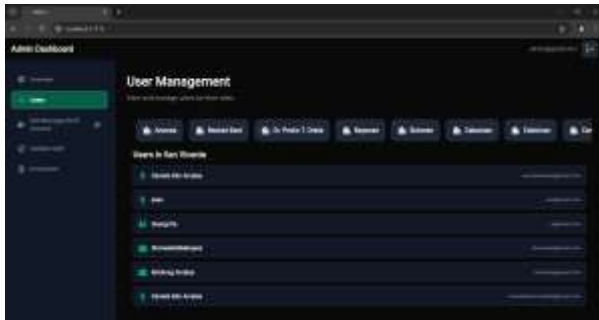


Figure 21. Manage Registered Users | Web Application – Admin

Figure 21 shows the User Management screen, where admins view and manage registered users by their assigned barangay. The screen features a barangay filter at the top to sort users based on location, displaying a list of names and email addresses below it. This enables administrators to efficiently monitor records and maintain organized user data across the Eldera platform.

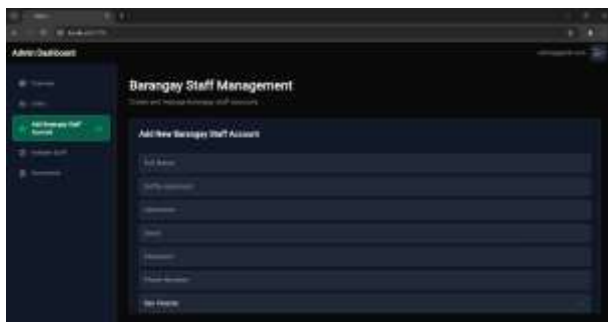


Figure 22. Manage Barangay Staff Account | Web Application – Admin

Figure 22 shows the Add Barangay Staff Account screen, where admins can create a new profile by entering personal info, contact details, and assigned barangay. It features options to edit information for updates and delete account function, ensuring each account is properly registered and organized within the Eldera system.

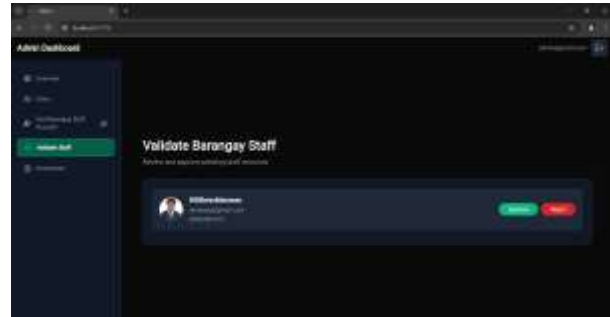


Figure 23. Validate Barangay Staff Account | Web Application – Admin

Figure 23 shows the Validate Barangay Staff screen, where the admin reviews pending accounts needing approval. It displays each staff member's name, email, and contact number, along with action buttons to approve or reject the registration request. This ensures only verified and authorized personnel are activated in the Eldera system.

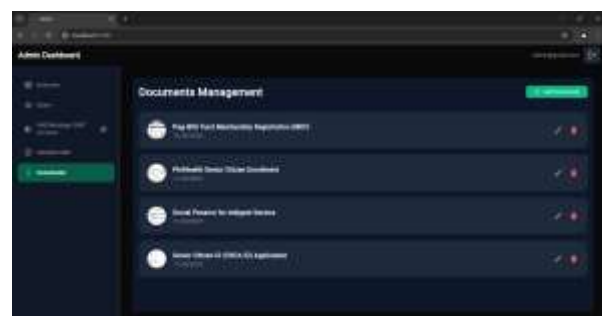


Figure 24. Documents Management | Web Application – Admin

Figure 24 shows the Documents Management screen, where the admin views and manages the system's available documents. Each entry displays the title and date. The admin can use the Add Document button to upload new files or use the action icons to edit or delete existing ones, keeping forms and resources organized and up to date.

B. Usability Evaluation Results

To analyze the technical viability and user satisfaction of the system, data from the 10-item System Usability Scale (SUS) survey were compiled from the target user groups:

SUS Item Index	Evaluated Usability Statement	Computed Mean Score
1	I think that I would like to use this system frequently.	3.40
2	I found the system unnecessarily complex.	3.12
3	I thought the system was easy to use.	3.50
4	I think that I would need the support of a technical person to be able to use this system.	3.10
5	I found the various functions in this system were well integrated.	3.30
6	I thought there was too much inconsistency in this system.	3.12
7	I imagine that most people would learn to use this system very quickly.	3.46

8	I found the system very cumbersome to use.	3.05
9	I felt very confident using the system.	3.16
10	I needed to learn a lot of things before I could get going with this system.	3.09
Overall Total	Calculated Overall SUS Score	80.75 (Descriptive Equivalent: Good / Usable)

The overall score of 80.75 places Eldera well above the standard benchmarking average of 68. Top-tier performance marks were achieved in item 3 (3.50 score) and item 7 (3.46 score), demonstrating that users found the application interface intuitive and highly coherent. These metrics confirm that the user experience is well-suited for non-technical users, including senior citizens and local health workers.

CONCLUSION

The study concluded that Eldera: Intelligent Elderly Care and Assistant App is an effective solution for addressing the critical challenges faced by elderly individuals, such as medication non-adherence, delayed emergency response, social isolation, and information barriers. The system successfully centralized essential processes, enabling real-time emergency alert tracking, automated medication schedules, and streamlined communication channels among elders, family members, and barangay health workers.

The utilization of the Scrum methodology provided a structured yet adaptive framework that ensured development directly aligned with identified user requirements. Grounding the application's features in the practical needs of the community enabled the successful implementation of safety,



health monitoring, and coordination tools. The overall System Usability Scale score of 80.75 confirms that Eldera is intuitive, accessible, and highly usable for its target audience, providing a practical digital solution to enhance the safety, coordination, and overall well-being of elderly individuals within a technologically enabled community environment.

RECOMMENDATION

Based on the empirical findings and operational conclusions derived throughout this study, the following technical and institutional recommendations are proposed:

1. **Institutional Adoption:** It is highly recommended that the Senior Citizens Center of Urdaneta City officially adopt and implement the Eldera platform across all its constituent local chapters to enhance public welfare tracking and emergency dispatch response.
2. **Hardware Optimization:** Future development teams should integrate dedicated microcontroller components, such as Neo-6M GPS architectures and SIM800L GSM modules, to provide robust offline tracking backups and SMS alert fallback systems independent of cellular data connectivity.
3. **Cross-Platform Deployment:** Researchers should expand software compilation to ensure wider operating system compatibility across a broader range of low-cost mobile devices.
4. **Methodological Continuity:** The utilization of the Agile Scrum methodology should be maintained in follow-up study iterations to preserve development flexibility and encourage regular community feedback loops.
5. **Community Engagement:** Local administrative units should conduct structured training seminars and user orientation programs for senior citizens and family caregivers to maximize feature utilization and system familiarity.

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Authors

Please Include Contact Information:

NAME: Chris Jericho M. Picoc

Contact No: +639684389177

Email Address: jerichopicoc@gmail.com

NAME: Andrew B. Malubag

Contact No: +639467176983

Email Address: drewmalubag9@gmail.com

NAME: Camela Kim C. Arcalas

Contact No: +639064872805

Email Address: camelaarcaldas@gmail.com

NAME: Rodel John Philip J. Pajela

Contact No: +639762099778

Email Address: jppajela321@gmail.com

NAME: Leo Gabriel V. Villanueva

Contact No: +639338117950

Email Address: lvillanueva@psu.edu.ph