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Research on Intelligent Design from the Perspective of Age-Friendly Design: Taking "Remembering" as an Example

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Abstract: This study focuses on the elderly memo app "Remembering," addressing memory decline and operational difficulties. It introduces a progressive interaction system with three core modules: Dynamic font adjustment, intelligent voice reminders, and family warning systems. Health monitoring and remote care functions are also integrated, creating a simple operation process. The research highlights four design dimensions for elderly-friendly products: Usability, security, emotionalization, and personalization. This innovation reduces the digital barrier and provides a model for smart elderly-friendly product development.

Keywords: Elderly people; Memorandum; Voice interaction; Intelligent reminder; Age-friendly design

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1. Introduction

As of 2023, 10% of the global population is aged 65 and above, projected to rise to 16% by 2050. China's aging is rapid, with the proportion of those aged 65 and above increasing from 7% in 2000 to 14.9% in 2022, and is expected to reach nearly 30% by 2050. Aging poses significant challenges to economies, social services, and family structures, making improvements to elderly care systems and adaptive renovations urgent.

2. Limitations of existing memorandum-type apps

In today's digital age, memo apps are key efficiency tools, but they have notable shortcomings in user experience and functional design across four core dimensions.

2.1. There is a generation gap in interaction design

Mainstream applications use a multi-layer menu structure with functions hidden 3–4 levels deep, requiring new users to take 12–15 steps to create a memo. The interface has high element density (7–9 buttons per screen) and lacks visual guidance. Elderly users need up to 2 weeks to learn, with a 63% abandonment rate, highlighting the urgent need for simplification.

2.2. Visual presentation violates the principle of accessibility

The default font size is smaller than the WHO recommendation, and the color contrast does not meet WCAG standards, leading to a 42% higher reading error rate for users over 60. The absence of dynamic layout adaptation leads to overlapping text on horizontal and vertical screens and button misalignment, and the satisfaction rate of visually impaired individuals is less than 35% [1].

2.3. The intelligence level of the reminder system is insufficient

87% of users need to manually set repeated reminders, and only 15% of applications support location-triggered or behavior-predicted reminders [2]. The coverage of reminder intensity grading is only 28%, and in medical contexts, just 9% of apps link health data, showing weak personalization and context awareness.

2.4. Social security attributes are seriously lacking

The family sharing function is limited to simple forwarding with low collaborative scenario implementation (<40%), lacking real-time features and permission management. Emergency contact functionality is absent, unable to trigger location sharing or alerts. Cross-platform synchronization is supported by only 13% of apps, and data encryption falls short of financial-grade standards, posing significant privacy risks [3].

3. Design practice of elderly memo app

3.1. Product creativity overview

3.1.1. Adaptation to the elderly

The app uses a minimalist design with large fonts, enlarged icons, and text enlarged by 1.5 times to prevent visual fatigue. Voice functionality is integrated throughout, enabling quick voice input for notes and automatic voice reminders, lowering the text operation threshold for users with tremors or vision issues.

3.1.2. Core function integration

The app provides intelligent reminders based on user behaviors, family sharing with real-time data sync and privacy protection, one-click SOS for emergency contact with location tracking, and integrated health management features including medication records, check-up countdowns, and personalized health suggestions [4].

3.1.3. Online and offline linkage

The program involves operation training and Q&A with communities, providing graphic manuals [5]. Health lectures and activities embed usage scenarios, while grid officers follow up regularly to optimize the experience, forming an offline-to-online feedback loop to enhance user retention.

3.2. Development process

The development of the elderly memo app focuses on users, ensuring the product meets elderly needs through demand research, testing, and iteration. Below is the detailed process.

3.2.1. Demand research

The process includes designing a questionnaire for elderly users on functional needs, conducting one-on-one interviews to understand specific memo requirements, and analyzing existing apps to avoid repetitive design and learn from successes [6].

3.2.2. UI/UX design

The design uses a card layout for functional modules, circular icons without sharp corners for friendliness, high-contrast colors for clarity, large fonts for readability, and customizable font size and contrast for individual needs.

3.2.3. Technical implementation

The team ensured the App's stability, security, and scalability using advanced technology. An intelligent algorithm was developed to optimize reminders based on user behavior data, such as medication records and schedules. A family sharing function was created for remote viewing and adding memo contents. One-click call and location sharing were implemented for emergency assistance. A health management module was also developed for recording medication and check-up data.

3.2.4. Testing and iteration

The app underwent accessibility compatibility tests for screen readers and assistive tools, focusing on font size, contrast, and voice announcements to support users with vision or hearing impairments. Comprehensive performance testing ensured stable operation under high concurrency, while security tests safeguarded user data like health records and family sharing info. Based on test results and feedback, the team optimized interaction logic and functionality, such as adding a volume adjustment feature for voice announcements.

3.2.5. Launch and promotion

The app was released in major app stores for easy access, promoted through community cooperation with on-site guidance. Post-launch, user feedback was collected for regular updates and optimizations, while 24-hour support services were provided.

3.3. Function module design

The function module design of the elderly memo app is centered on user needs, ensuring that each module provides practical and convenient services [7]. The detailed design of each function module is as follows:

3.3.1. Main page

The main page is simple and intuitive, featuring the "Today's Tasks" list sorted by time and displaying date and weather information.

3.3.2. Intelligent reminder module

The intelligent reminder module is a core function to help the elderly avoid missing important tasks. Users can set

repeat cycles (daily, weekly, monthly) and severity levels for reminders, with high-urgency items marked in red and featuring vibration and voice alerts.

3.3.3. Family sharing module

The family sharing module allows children or guardians to synchronize and edit the elderly's memo contents via the App, providing comprehensive support. Real-time synchronization ensures both the elderly's and children's Apps are updated simultaneously.

3.3.4. Health management module

The health management module helps the elderly manage their health with medication and check-up reminders. Users can input medication details via voice or text, set exam times with countdowns, and record health data like blood pressure for visual charts.

3.3.5. Emergency contact module

The emergency contact module allows users to set contacts on the main page and quickly call them in emergencies. It also shares real-time location with contacts and operates in the background for continuous security.

3.3.6. Settings and personalization module

Users can adjust the font size and interface theme color according to their own needs to ensure a clear and easy-to-read interface. It supports users to customize the volume, speed, and language of the voice broadcast.

3.4. Visual design

The visual design of the elderly memo app is centered on the principles of "simplicity, clarity, and friendliness," fully considering the visual characteristics and operation habits of the elderly to ensure that the interface is easy to understand and operate.

3.4.1. Interface style

The design of the interface style aims to provide a comfortable and intuitive visual experience for the elderly, reducing the cognitive burden during use [8]. Use light background colors and high-contrast icons/text to reduce visual fatigue and ensure clarity for the elderly. Increase blank space to avoid clutter, use large fonts for readability, and support user-defined font sizes.

3.4.2. Dynamic interaction

The dynamic interaction design enhances user experience with immediate notifications and voice assistance. Notifications are provided via voice and pop-ups after operations, and voice assistance confirms actions at key nodes.

3.4.3. Icon and button design

The design of icons and buttons is intuitive, using circular shapes for friendliness and clear meanings, such as a pill pattern for medication reminders. Buttons are large and use high-contrast colors for easy clicking.

3.4.4. Accessibility design

To ensure usability for the elderly with vision or hearing impairments, the App integrates accessibility design, supports screen readers and voice notifications, and enables voice operation for all functions.

3.5. Design case presentation

As shown in **Figure 1**, the "Recall" App adopts a minimalist interface and large font design. The icons and text are enlarged to 1.5 times the normal size to avoid visual fatigue.

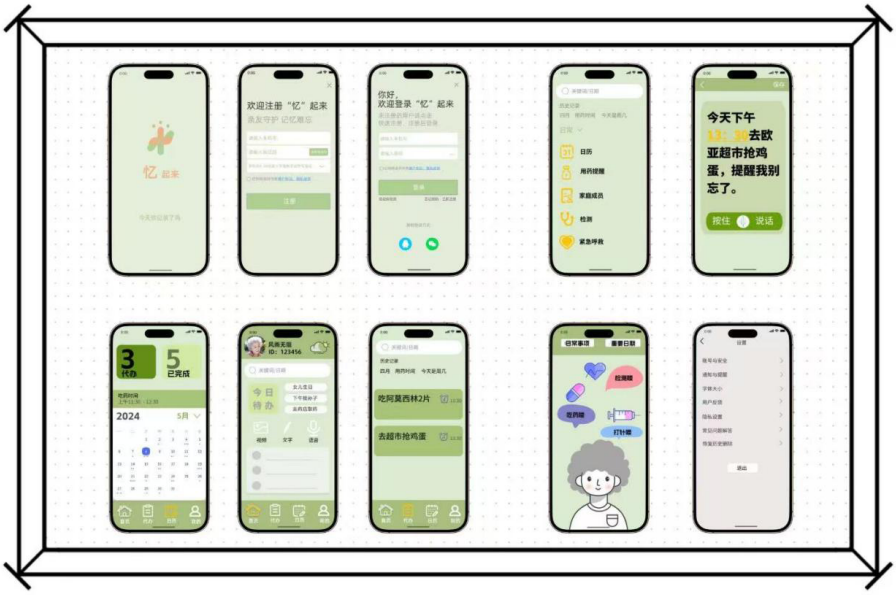

Figure 1. The design of the "Recall" app

4. Product operation and promotion strategies

4.1. Introduction period

The main goal of this stage is to quickly reach the target users, establish a seed user group, and enhance the popularity of "Remembering."

(1) Precise positioning of target users. The target users of the "Remembering" APP are elderly people aged 60 and above and their children (auxiliary users).

(2) Expansion of online and offline channels:

(a) Offline channels: Cooperate with community elderly care centers, senior universities, and hospitals to conduct "Intelligent Elderly Care" training, demonstrate App functions on-site; set up publicity points in places where elderly people gather such as parks and vegetable markets, and distribute operation manuals and promotional leaflets [9].

(b) Online channels: Place advertisements on platforms commonly used by children, such as WeChat and Douyin, emphasizing the "Customized for Parents" function; collaborate with KOLs in elderly communities to produce short video tutorials.

(3) User incentives and viral mechanisms: Give away "Health Gift Packages" for the first registration; Elderly users who invite friends to register will receive points, and the points can be exchanged for daily necessities [10].

(4) Technical support and user education: Provide a 7 × 24-hour customer service hotline; arrange volunteers in cooperation with communities to answer questions regularly.

4.2. Growth period

The main goal of this stage is to expand the user scale and enhance the activity level and user stickiness.

(1) Function optimization: Optimize interface interaction through user behavior analysis, simplify operation procedures; operate active users and low-frequency users separately, and push personalized reminders [11].

(2) Points operation: Set up a check-in point system, record matters to accumulate points, and the points can be exchanged for daily necessities.

(3) Cross-border cooperation and resource integration: Access community hospital data to push personalized health reminders; provide free health lectures or physical examination services.

4.3. Mature period

The main objective of this stage is to maintain user activity and extend the life cycle.

(1) Ecological expansion and data value mining: Cooperating with smart hardware manufacturers to synchronize data and generate health weekly reports; access pharmacy/hospital systems to support medication reminders; anonymize user data for research institutions (with authorization required) [12].

(2) User retention and emotional maintenance: Generating annual matters summaries to strengthen users' sense of achievement [13].

(3) Backfilling the community and promoting the brand: Establishing the "Silver-haired Digital Mentor" program to train active users to become community volunteers.

4.4. Decline period

During this stage, user activity and usage rate gradually decline. Therefore, the goal is to stimulate user return, extend the product life cycle, and explore new growth points [14].

(1) User recall: Send "Exclusive Benefits for Old Users" via SMS or email.

(2) Advertising placement: Place targeted advertisements on platforms such as WeChat and Douyin, emphasizing core functions; collaborate with charity organizations to launch "Intelligent Elderly Care" themed advertisements to enhance brand image [15].

(3) Strategic transformation to explore the B-end market and seek new growth points: Develop a customized version for nursing homes, integrate health management, medication reminder functions, and provide data analysis report functions to help nursing homes understand the health status and daily needs of the elderly.

5. Summary

The "Remembering" App focuses on adaptive design, with intelligent and family-linked functions, to help the elderly achieve convenient daily management. In the future, it can be expanded to a data connection with medical institutions to further deepen health services and provide practical solutions for an aging society.

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Disclosure statement

The authors declare no conflict of interest.

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