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Special Needs of Older Adults in the Use of Fitness Apps: Mismatches and Development Suggestions

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Abstract: Against the backdrop of the overlapping national strategies of Active Aging and Digital China, fitness apps have become a core digital carrier for promoting health management among the elderly. However, the adoption and continuous usage rates of such products among this group remain persistently low. Most existing research on technology acceptance and health behaviors is rooted in the Western individualistic cultural context, analyzing user behavior from an individual-centric perspective, and largely neglects the profound impact of intergenerational family relations in China on the elderly's technology usage behaviors. Based on the local Chinese context, this paper focuses on the specific needs of older adults in using fitness apps, clarifies the explanatory boundaries and application limitations of existing mainstream theories, identifies the core mismatches between the real needs of elderly users and the logical underpinnings of existing theories and product design, and finally proposes targeted optimization paths. This study aims to provide localized references for the age-friendly design and operation of fitness apps.

Keywords: Older adults; Fitness apps; Intergenerational family relations; Digital feedback; Technology acceptance; Age-friendly design

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1. Research background

By the end of 2025, the population aged 60 and above in China had exceeded 323 million (23.0% of the total), marking the entry into a moderately aging society. As digital health tools, fitness apps can help older adults manage their health and prevent chronic diseases. However, their actual usage rate among the elderly remains very low. Most older adults face significant technological anxiety and operational difficulties when using complex fitness apps, and existing app designs are primarily centered on young users, failing to accommodate the characteristics of the elderly. This paper, grounded in the Chinese family cultural context, analyzes the specific needs of older adults in using fitness apps, the explanatory limitations of existing

theories, the mismatches between real needs and current logic, and proposes optimization suggestions.

2. Specific needs of older adults in using fitness apps

2.1. Family-responsibility-oriented expression of health needs

Unlike young users who use fitness apps mostly out of endogenous individual demands such as weight loss, body shaping, and independent health management, the health needs of the elderly are deeply intertwined with family responsibilities, and their exercise demands are often activated through their family roles [1]. For most older adults, the core goal of using fitness apps to maintain health is not merely individual health improvement, but more about "staying healthy to avoid troubling their children" or maintaining a good physical condition to undertake responsibilities such as caring for grandchildren and managing household affairs. Consequently, in the perception of the elderly, fitness apps are no longer simply personal health management tools, but are endowed with the in-depth attribute of "auxiliary tools for fulfilling family responsibilities" [2].

2.2. Relationship-dependence in technology learning

Ordinary young users generally have strong independent exploration abilities when facing a new app, with technology learning mainly relying on individual self-exploration. However, when the elderly encounter digital products with complex functions, their primary source of help is almost always their children. Their technology learning process is highl y dependent on intergenerational support, representing a typical form of "relational learning" [3]. In many cases, the learning barriers for the elderly do not stem from the technical operations themselves, but from the psychological burden of fearing to trouble their children frequently, as well as the technological anxiety of "daring not to press buttons for fear of making mistakes" in the absence of family support. Even if the product interface is designed to be sufficiently simple, the elderly are prone to abandoning the attempt due to anxiety without the guidance and encouragement of family members [4].

2.3. Relationship-driven motivation for continuous use

The continuous usage intention of ordinary users is mainly determined by the functional value and user experience of the product itself. However, the long-term use of fitness apps by the elderly largely depends on the sustainability of family support [5]. Family feedback, such as children's daily inquiries, likes, and encouragement for exercise records, and intergenerational exercise interactions, constitutes the core motivation for the elderly to persist in using the apps. Once family support is interrupted, the elderly's motivation to use the apps will decline rapidly. For elderly users, continuous usage behavior is never a simple result of the accumulation of product functional value; the emotional feedback and relational value brought by family interactions exert a decisive influence on their persistence in use.

3. Theoretical review and research questions

3.1 Technology acceptance model and its explanatory boundaries

The Technology Acceptance Model (TAM) is a core framework in the research field of user acceptance of digital products, with perceived usefulness and perceived ease of use as its core variables. It clearly reveals the formation mechanism of users' technology usage intention and is widely applied in the acceptance test

of health-related digital products [6]. However, the analysis unit of this model is always the "individual", which can only explain the cognitive formation process at the individual level. It cannot account for how intergenerational family interactions shape the elderly's perception of products in the Chinese context, and is thus difficult to adapt to the non-individual-dominated usage behavior logic of the elderly.

3.2. Age-friendly interactive design theory and its limitations

Age-friendly interactive design theory focuses on the physiological decline and cognitive characteristics of the elderly, proposing core design principles such as font enlargement, simplified operation hierarchies, and increased fault-tolerant mechanisms. It effectively addresses the physical adaptation problem between the elderly and product interfaces and promotes the popularization of barrier-free design [7]. Nevertheless, this theory limits the usage dilemmas of the elderly to the binary matching problem of "elderly individual—product interface", only solving barriers at the physical operation level. It fails to respond to the social usage dilemmas of the elderly, such as "no one to teach, daring not to try, and fearing mistakes", and is even less able to resolve the technological anxiety caused by the lack of intergenerational support.

3.3. Behavioral intervention theory and its limitations

Centered on the Health Belief Model and the Theory of Planned Behavior, behavioral intervention theory advocates promoting the formation and consolidation of individual health behaviors through means such as goal setting, progress feedback, and incentive mechanisms, providing important theoretical support for the design of behavior guidance functions of fitness apps [8]. However, the core implicit premise of this theory is that exercise behavior is a "personal independent choice", and the entire analysis logic always revolves around individual decision-making. It cannot explain the family attribute of the exercise behaviors of Chinese elderly groups, nor the core driving effect of family factors on health behaviors.

3.4. Hierarchy of needs theory and its limitations

From a humanistic perspective, Maslow's Hierarchy of Needs Theory decomposes user needs into a hierarchical structure from physiological and safety needs to self-actualization needs. It breaks the limitation of pure technical analysis in digital product research and restores the elderly to "complete individuals with diverse needs" [9]. However, this theory always takes "individual needs" as the core analysis unit, failing to capture the relational characteristics of the needs of the elderly in the Chinese context and the profound shaping of demand expression by family structures, making it difficult to fully adapt to the demand logic of Chinese elderly groups.

3.5. Research gaps and research questions

Existing studies have extensively explored the user usage behaviors of fitness apps from the perspectives of technology acceptance, interface design, behavioral incentives, and demand hierarchy, forming a relatively mature research paradigm. However, most of these studies are based on the Western individualistic cultural context, conducting analysis from an individual-centric perspective, and pay insufficient attention to the family-oriented and relational characteristics of the demand expression, learning methods, and continuous usage motivation of Chinese elderly users. As a result, they have always been unable to fully explain the realistic dilemmas of low adoption and low continuous use among the elderly. Based on this, the core

research questions of this paper are: What are the core mismatches between the specific needs of Chinese elderly groups in using fitness apps and the logical underpinnings of existing theories and product design? How to resolve the usage dilemmas of the elderly through product and operational optimization?

4. Demand mismatches: An analysis of the discrepancies between the elderly's needs and existing logic

4.1. Mismatch in demand identification

Current mainstream theoretical research and product design always follow an individual-centric logic in demand identification, assuming that user needs are endogenous and independent of social relations. Consequently, the needs of elderly users are simplified to individual-level health demand [10]. However, the needs of Chinese elderly for fitness apps are essentially activated through their family roles, and behind individual health needs lie in-depth family responsibilities and intergenerational connection demands. The existing logic always regards elderly users as independent individual decision-making units, failing to capture the family significance behind their needs. This ultimately leads to a fundamental mismatch between the product's value proposition and the real needs of elderly users.

4.2. Mismatch in learning mechanisms

Age-friendly design theory and product practice hold a core assumption: the elderly can achieve independent learning and use as long as the age-friendly optimization of interface functions is completed. However, the core dilemma of the elderly in using fitness apps is often not "complex interfaces and difficult operations", but technological anxiety and fear of use caused by the lack of intergenerational support [11]. Even if a product achieves an extreme age-friendly interface design, the elderly may still abandon its use due to fear of trying without the guidance and encouragement of their children. The existing logic has never responded to the relational learning needs of elderly users, and thus, naturally, cannot resolve their social usage dilemmas.

4.3. Mismatch in usage motivation

Both the Technology Acceptance Model and behavioral intervention theory hold that the core motivation for users' continuous use is the individual's judgment of the product's functional value [12]. The operation logic of the vast majority of fitness apps on the market also always revolves around individual functional value. However, the core motivation for the elderly to continuously use fitness apps often comes from the relational value brought by family interactions, rather than the pure tool value of health management. The existing logic focuses entirely on the tool attribute of products, seriously underestimating the decisive role of relational value in the usage behaviors of elderly users, and thus cannot activate their endogenous motivation for continuous use. This is also the core reason for the generally low retention rate of elderly users.

5. Problem-solving: Development suggestions and research limitations

5.1. Suggestions for optimizing demand identification

The demand identification of fitness apps needs to break away from the traditional logic centered on individual health demands. Based on the essential characteristic that the needs of Chinese elderly groups are deeply embedded in family structures and intergenerational relations, family role responsibilities

and intergenerational emotional connection should be incorporated into the core dimensions of demand identification and product value construction, fundamentally resolving the mismatch between demand identification and the real demands of users.

5.2. Suggestions for optimizing learning support

The age-friendly optimization of fitness apps should break through the traditional approach of single interface function adaptation and embed the whole process of intergenerational learning support into the product design system. Its core principle is to take intergenerational family interaction as the core support, and resolve the technological anxiety and use hesitation of the elderly caused by the lack of intergenerational support through enabling intergenerational teaching support and normalized family linkage mechanisms. This will fundamentally address their social usage dilemmas of "daring not to use and failing to learn", and improve the technological learning efficiency and usage intention of elderly users.

5.3. Suggestions for optimizing continuous operation

The operation of fitness apps needs to break away from the traditional logic centered on individual tool value and build a family-oriented operation system with the activation of family relational value as the core. Intergenerational interaction and family support should be integrated throughout the entire user life cycle. By exploring the intergenerational connection attribute of products, individual exercise behavior is transformed into family interactive behavior, which fundamentally activates the endogenous motivation of the elderly for continuous use and resolves the core problem of insufficient retention motivation for elderly users.

5.4. Research limitations

The analysis of this study is mainly based on theoretical deduction and combing of existing literature, and has not completed a systematic empirical test through first-hand qualitative interviews and quantitative survey data, so the generalizability of the conclusions remains to be further verified. Secondly, for the core concepts such as the family-oriented needs and relational learning of elderly users, this study has not clearly defined their structural dimensions and standardized measurement indicators, which, to a certain extent, limits the transformation of the research into quantitative analysis. Finally, this study does not fully consider group heterogeneity and has not clarified the impacts of factors such as urban-rural differences, family structure differences, and intergenerational relationship quality differences, so the situational application boundaries of the research conclusions remain to be further defined.

6. Future research directions

Future research can be advanced in three directions: first, conducting in-depth interviews to explore the need structures of older adults with different family structures, intergenerational relationship quality, and usage stages; second, developing measurement scales and using large-sample questionnaire surveys to examine the pathways among intergenerational support, family interaction, and usage intention; third, adopting experimental designs to compare the causal effects of different intergenerational support approaches on older adults' learning outcomes, self-efficacy, and usage intention.

Disclosure statement

The authors declare no conflict of interest.

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