Closing the Digital Gap: Empowering Elderly Communities in the Age of Smart Healthcare

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Abstract. The digital divide is an increasingly pressing issue that affects older adults, as they are less likely to have the opportunity and ability to use digital technology due to individual and institutional factors. This research aims to explore the factors that lead to the digital gap and analyzed the individual factors of financial ability, physical ability, and traditional thinking, as well as the institutional factors of electric product design, medical environment, social relationships, and hospital services. To solve this problem, this research proposed two solutions: smartphone design enhancement and using AI technology. Smartphone design should be intuitive, with clear instructions that do not require a complex operation, and voice recognition technology should be incorporated to eliminate the need for complex operations. Additionally, AI technology can transform healthcare services into conversational features that are easy for older adults to use and understand. These solutions could improve digital literacy, health literacy, and enable older adults to access healthcare and better manage their health.

Keywords: Digital Gap, the Elderly, Smart Healthcare.

1 Introduction

When smart technology and media development merge, bringing a new communication pattern, the effect is not always beneficial when it comes to the actual application of technology, but causes the widening of the digital divide to a degree. From the perspective of technology inventors, on the one hand, due to the complexity of the operating mechanism and application logic of smart technologies, smartphones set the "threshold" for users at the beginning of their creation, requiring certain operational skills and constantly adapting to the differences brought about by device updates. On another hand, the profit-seeking nature of capital makes technology masters give priority to the needs of the "majority", mainly young and middle-aged people, when designing products, while ignoring the habits of the elderly, children, people with disabilities and other socially disadvantaged groups. As a result, the elderly often encounters problems such as small font size and complicated operation when using some smartphone applications.

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The problem we are trying to explore and solve in this study is to analyze whether smart medical care is really convenient from the perspective of the elderly and how to improve it to be truly age friendly.

The elderly population is a growing percentage of the world's population, and as the mainstay of society, they have contributed greatly to the development of society, but have become "digital outcasts" in the context of digitalization when they are ready to spend their later years. Our society today is based on the contributions of the elderly, but the development of digital technology has not yet benefited their lives equitably. This paper explores how to make healthcare services more "age-appropriate" and how to mobilize the whole society to help the elderly cross the digital divide from the perspective of the elderly, which is important for enhancing the well-being of the elderly, improving the level of care of the whole society and even further developing the digital economy.

2 Literature Review

The digital divide has become increasingly pronounced over the past 30 years. One of the key manifestations of the digital divide is the generational difference, i.e. the huge gap between the older and younger groups in terms of IT acceptance, frequency of use and knowledge acquisition. Modern technology is a double-edged sword that fosters social growth while also putting the elderly at a disadvantage, making them typical representatives of the "information underclass" or "digital disadvantaged."

According to Fozard, older adults are more prone than those of other ages to experience cognitive and physical impairments that hinder their interest in and capacity for assimilation of new information [1]. Niehaves & Plattfaut found that older adults are a qualitatively different group themselves, and that there are significant moderating effects on this group as they age, with older adults' network adaptability being influenced by friends or family, which is an important path to explore [2]. The digital divide among the elderly is more severe than it is for other groups of people who lack access to information, according to a study by Korean scholar Woochun Jun [3]. He proposed three components of the divide among the elderly: digital access, digital capability, and digital utilization. The lack of digital competence among the elderly is the main factor contributing to the digital divide, followed by lack of digital access and use.

Zhao Na found that with the popularity of new media payments, when older adults encounter difficulties in online shopping, online registration, and grocery shopping WeChat payments, they often choose to seek help from their children to achieve educational feedbacks [4]. Wu Xiaoli analyzed the media needs of contemporary older adults and the challenges faced by older adults' media use [5].

These findings show that the digital divide among older adults has become a global problem that requires the combined efforts of governments, businesses and society to address. Older people need more convenient and intelligent digital healthcare service devices and software to facilitate their use and improve their digital skills. In the process of solving the digital divide among the older people, it is necessary to do a good job of data protection, information security and privacy protection of digital healthcare

services for the older people to increase their trust in digital healthcare services and protect the rights of users, pay much more attention to the needs and experiences of the older people, provide easy-to-use digital products and services, and strengthen digital education and literacy for the older people.

3 Wisdom Gap

The digital divide is a growing problem for older adults, making it increasingly difficult to keep up with the digital world. The digital divide refers to the gap between those with the opportunity and ability to use digital technology and those without. This research team will analyze why older adults face this digital divide in terms of individual and institutional factors (see Fig.1).

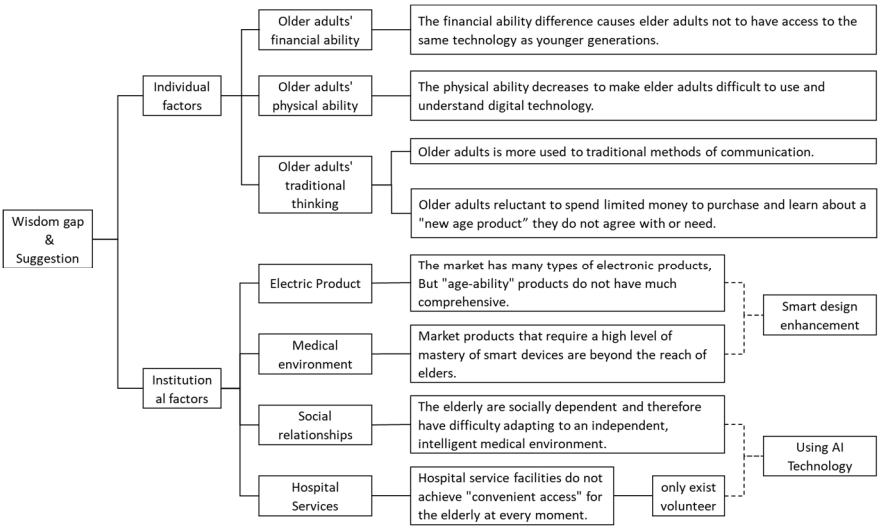

Fig. 1. Closing the wisdom gap

3.1 Individual Factors

From the perspective of the individual older adult, the digital divide is caused by three main factors: financial ability, physical ability, and traditional thinking.

Older Adults' Financial Ability. As technology becomes more expensive and complex, older adults may struggle to purchase the latest gadgets and keep up with the latest trends. That does not mean that the elderly is catching up with fashion, but rather that the elderly should use the latest one to get the best user experience. Further, older adults may not have access to the same financial resources as younger generations, who are more likely to have higher incomes and access to more credit. According to the 2017 China Household Finance Report, the average annual income of the elderly in urban

China is 38,2272.92 yuan, and the average annual income of the elderly in rural China is 9,607.80 yuan [6]. However, most electronic products are priced according to the spending power of mainstream users. Thus, the financial ability gap can result in older adults not having access to the same technology as younger generations and being unable to take full advantage of the digital world.

Older Adults' Biological Ability. As people age, their physical ability can decrease, making it difficult for older adults to use technology. It is well documented that sensitivity in sensory systems decreases with advancing age for hearing, taste, smell, vision, and touch due in part to diminished numbers of specialized peripheral receptors combined with a deterioration of supporting tissues, which will cause older adults may have difficulty hearing the instructions and information on a computer or smartphone or may have difficulty using the buttons and touchscreens of such devices [7]. When a person's physical ability is insufficient to support their use of a new product, they will give up using it. At this time, what is needed for aging electronics is not to simplify the use of the page but to design devices that meet the habits of the elderly based on their physiological capabilities.

Older Adults' Traditional Thinking. Older adults may come from a generation that is more used to traditional methods of communication, such as face-to-face interaction or writing letters. This means that older adults may not be as open to technology as younger generations and may not understand how or why they should use it. For financial and physical reasons, older adults are reluctant to spend limited money to purchase and learn about a "new age product" they do not agree with or need.

3.2 Institutional Factors

The reason is not solely determined by the factors of the elderly themselves but by the combined action of the formal levels of social support. Formal support subjects include government, communities, and businesses [8].

Electric Product. There are many kinds of electronic products in the market with complicated functions. Still, most elderly groups do not have high requirements for the functionality of cell phones, and the overly complicated functions will cause the elderly to encounter obstacles in the process of using them [9]. If the screen size is set to a standard size, they will not be able to see what is written on the screen; too large a size will result in less information being displayed on the screen at one time, which makes the reading perception poor. In response to this phenomenon, few "age-appropriate" smartphones and systems are on the market.

Medical Environment. With the development of "smart medicine," Internet hospitals must respond to higher patient-free device requirements. At the same time, some elderly machines do not have intelligent functions. The use of their own devices is limited, for

the elderly who have smart machines, "smart medicine" requires them to be able to for the elderly who have smartphones, "smart medical" requires them to be able to use the relevant app to complete the "appointment registration" on their own [10]. When the elderly goes to the hospital, they must go to the all-in-one machine to get the on-site or appointment registration forms. They also need to go to the all-in-one machine to pay the bill after completing the consultation, and some of the consultation items require laboratory tests and films. The result reports need to be taken from the all-in-one machine. Behind the seemingly convenient but raised the elderly on the intelligent equipment mastery requirements. If the elderly does not know how to use these devices, they need to queue up in the manual channel. If too many of them do not know how to use intelligent devices, this will lead to a long queue and reduce the elderly's medical experience.

Social Relationships. The lack of family feedback, mutual support from family and friends, and social support in terms of information technology makes it difficult for older adults to integrate into the information society [11]. For the elderly group, the popularity of intelligent technology devices is relatively backward, and they need "digital feedback" from their children, in other words, their children teach the elderly how to use smartphones [12]. The current level of information in the elderly population is low, and most of them have difficulty adapting to an intelligent medical environment. Fully intelligent medical care brings great challenges to the elderly.

Hospital Services. The development of "smart medicine" does, to a certain extent, make the consultation process more efficient and convenient, but hospitals ignore "smart medicine" from the perspective of the elderly. For them, "smart" is not the same as "convenient," and a more interactive approach to medical care may be more suitable for the elderly, but "smart medical care" has increased the difficulties of the elderly groups to seek medical care. The hospital should establish a long-term mechanism of humanistic services from the perspective of the elderly to truly realize "convenient medical treatment" for the elderly.

4 Suggestion

The digitization of healthcare can improve the quality and accessibility of healthcare services, but it also poses challenges for older adults who are not as tech-savvy as younger generations. Therefore, countermeasures must be taken to alleviate the digital deficit of older adults and to digitize healthcare services. The research group will propose ideas to solve this problem: to develop the aim of not forcing the elderly to accept high technology but to let high technology serve them; And to transform the form of services such as page operation registration into face-to-face conversation processing using humanoid AI technology.

4.1 Smartphone Design Enhancement

Although all major cell phone manufacturers have other means, such as "elderly mode" cell phone settings, the problem of digital uncertainty among the elderly has not been significantly improved. Zhang and Sun propose a framework and design guidelines to improve the digital literacy of older adults. They suggest the design should be intuitive, with clear instructions that do not require a complex operation. Technology should also provide feedback so that seniors can easily understand what they are doing and adjust accordingly [13]. Also, some idea to make technology more friendly to seniors is incorporating voice recognition technology. This can eliminate the need for complex operations and allow seniors to interact with technology more naturally. Turner suggests that healthcare professionals should be trained to use digital technology and educate patients, especially seniors, on how to use technology to manage their health [14]. This could improve health literacy and enable older adults to use digital technology to access healthcare and better manage their health.

4.2 Using AI Technology

The second idea is to continue the previous hospital registration model - talking face-to-face with a healthcare professional - using humanoid AI technology based on voice recognition technology. Lian evaluated online health information for older adults and found that older adults prefer conversational communication [15]. They also prefer information that is easy to understand and without excessive medical jargon. Using portrait AI technology, healthcare services can be transformed into conversational features that are easy for older adults to use and understand.

5 Conclusion

In parallel with intelligence, the problem of aging is becoming increasingly serious. While facing the convenience brought by the advancement of media technology, the elderly is inevitably confronted with the hidden worries it brings. In terms of intelligent medical care, smart media often lack age-appropriate design, and the elderly are increasingly overwhelmed by the new technology and find it increasingly difficult to adapt to the trend of smart technology development. With the rapid development of digital technology, social lifestyles are changing at an unpredictable rate, and the elderly are overwhelmed by the advanced intelligent consultation devices when seeking medical treatment.

In this paper, we first analyze the causes of the wisdom divide in elderly people's access to medical care, and roughly divide them into two aspects, namely, individual factors & instructional factors, and then refine the individual factors into Older adults' financial ability, Older adults' biological ability, and Older adults' traditional thinking, and the instructional factors were subdivided into Electric Product, Medical We also analyze the digital dilemmas faced by the elderly in the medical field, and from the perspective of the elderly group, we put forward the following suggestions for improvement from the perspective of the elderly group, taking into account the development

status of intelligent medical care in hospitals and the degree of use of intelligent media by the elderly group at this stage. We will continue to make new suggestions based on the summary of previous studies. Through theoretical combing we found that although the digital divide theory has been around for a long time, it is not an old theory, but with the development of intelligent technology, it will have new performance in the digital era.

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