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Research on the Construction of Age-appropriate Information Accessibility under the Era of Artificial Intelligence

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Abstract: Accelerating the construction of information accessibility is an effective measure to promote the steady advancement of ageing-friendly work in the age of artificial intelligence. In order to understand the motivation for building an age-appropriate information accessibility environment, data from the seventh population census of Hebei Province was chosen as the basis for research and analysis. The results show that:(1) Environmental construction is closely related to older subjects and the objective environment. (2) Older persons face the problem of lagging behind and the intelligence gap, while at the same time hindering the improvement of the level of information accessibility. Based on the results, the following recommendations are made: (1) Build a social system for information accessibility. (2) Set up a guarantee system for sustained education supply. (3) Improve community service support. (4) Enhanced information technology safeguards. (5) Toward a Re-employment Channel for the Elderly.(6) Innovate informatization technology

1. Introduction

In recent years, China has witnessed a notably intensified phenomenon of population aging. Data from the 2020 Seventh National Population Census revealed that the population aged 60 and above and those aged 65 and above reached 264 million and 190 million, respectively, accounting for 18.7% and 13.5% of the nation's total population. By international standards (where a society is classified as aging when individuals aged 60 and above constitute 10% of the total population, or those aged 65 and above reach 7%), China has transitioned into an aging society. Under the accelerating trend of population aging, the increasing number of empty-nest elderly and those with limited self-care capabilities has posed formidable challenges to China's economic and social development. The societal consensus now widely acknowledges the importance of proactively addressing aging issues and fostering harmonious socio-economic development. Particularly against the backdrop of rapid advancements in artificial intelligence (AI) technologies, older adults face barriers such as limited digital literacy and declining learning capacities, hindering their access to the conveniences offered

by intelligent services. Consequently, bridging the "digital divide" for the elderly through multifaceted measures has emerged as a critical societal imperative. Information accessibility is a new idea that mainly uses information technology to make up for differences in people's physical abilities and the conditions of their surroundings. This way, everyone, young or old, able-bodied or disabled, can easily access and use information[1-2]. Originally derived from United Nations resolutions, this concept plays a critical role in mitigating the "digital divide" among elderly populations. Against this backdrop, the development of AI-supported age-friendly information accessibility environments has emerged as a critical priority for China's socio-economic advancement in the new era.

2. Analysis of driving factors for the construction of elderly-adapted information accessibility environments in the artificial intelligence era

2.1 Serving the practical activities of the elderly in the economic and social context while aligning with the developmental needs of the intelligent era

Technological innovation and progress provide effective solutions for addressing population aging. Particularly in the era of artificial intelligence, information accessibility can be applied across various social domains, aligning with the needs of aging-friendly development and enhancing the operational quality of an aging society[4]. Because the government has been putting in place relevant guidelines and policies on information accessibility, it has become more effective at dealing with the aging population. First, it contributes to responding to emergencies and enhancing the quality of services for the elderly. In the era of artificial intelligence, significant progress has been made in information accessibility, playing a crucial role in emergency response and ensuring the effective operation of elderly services. When dealing with emergencies like natural disasters and public health crises, an easily accessible information environment backed by AI technology can offer services like "one-click emergency calls" and moving people who have been affected by disasters, which can help the elderly with many of the problems they face. Second, it promotes the widespread application of intelligent products and services, laying the foundation for the construction of an accessible information environment. In response to the functional decline of elderly individuals, the government has issued a catalog for the promotion of smart healthcare and elderly care products and services while also launching special initiatives to improve internet websites and mobile applications. In this process, efforts have been focused on adapting applications closely related to the daily lives of the elderly[3].

2.2 Expanding the development opportunities for the elderly and enabling them to realize their inherent value

As society gets older, older people not only have a strong need for an easily accessible information environment because of things like getting older, living alone, and losing physical abilities, but they also have a strong demand in terms of their level of education and awareness of social participation [5]. This plays a positive role in enabling the elderly to realize their societal value. In the era of artificial intelligence, the development of an accessible information environment is increasingly aligning with the needs of an aging society. First, it meets the educational and learning demands of the elderly. Due to factors such as empty-nest living and advanced age, older adults have a heightened need for information[6]. In this context, regardless of whether they have received higher education, they exhibit a strong desire for information acquisition, particularly in learning about new developments and mastering new skills. Second, it stimulates the willingness of the elderly to re-engage in social and economic activities. On November 18, 2021, *the Opinions on*

Strengthening Aging Work in the New Era proposed promoting social participation among the elderly and encouraging them to continue contributing to society[7].

3. Survey Results and Analysis

3.1 Current Status of Respondents and Information Acquisition among the Elderly

3.1.1 Basic Status of the Respondents

According the survey results, the penetration rate of smart home devices is relatively high, accounting for 69.81%. Regarding the age distribution, elderly individuals aged 60-69 and 70-79 together account for 71.7%. In terms of education level, 51.70% of the elderly respondents have an education level of elementary school or below, 32.45% have a middle school education, 11.32% have a high school education or higher, and only 4.53% have a college or university education or higher. This indicates that the education level of the elderly respondents is generally low. In terms of health status, 75.48% report being in good or basic health, 19.34% are unhealthy but can take care of themselves, and only 4.26% are unhealthy and unable to care for themselves, indicating that the overall health condition of the elderly is relatively good. In terms of employment status, 62.11% of the elderly respondents are farmers. Considering the educational background of the respondents, the majority are farmers with generally low education levels.

3.1.2 Basic Status of Information Acquisition among the Elderly

The analysis reveals that (Figure 1), aside from a relatively low interest in knowledge and skills (4%), elderly individuals show higher levels of interest in areas such as daily necessities (26%), healthcare (30%), and social activities with family and friends (20%).

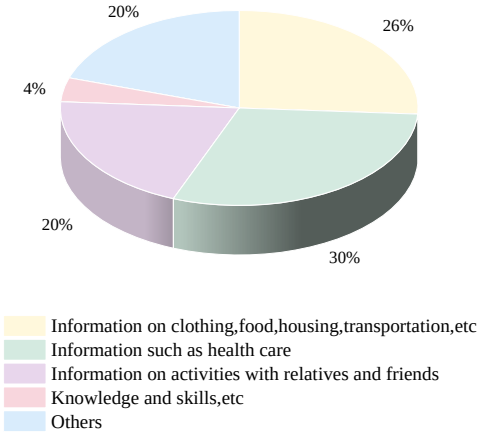

Figure 1: Information Categories of Interest to Respondents

In terms of the content of information of interest (Figure 2), elderly individuals primarily access news and information, mobile payment, and shopping through smartphones. This indicates a strong demand for cultural and entertainment content, as well as communication with family and friends.

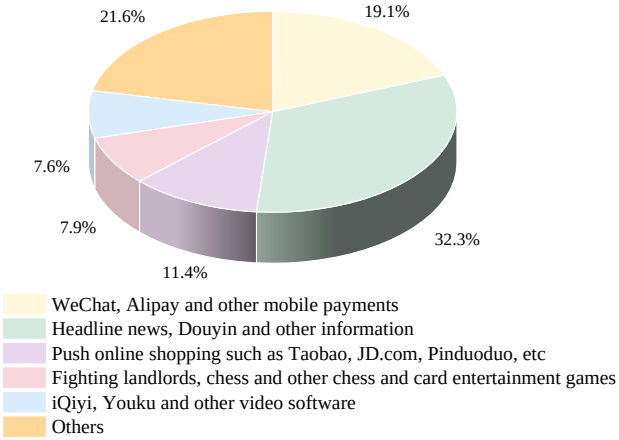

Figure 2: Proportion of Content Accessed by Respondents

In terms of the application of information technology (Figure 3), elderly individuals face various factors that contribute to their unfamiliarity with the internet. Psychologically, there is a general tendency toward conservatism and a reluctance to try new things, resulting in significant resistance to adopting new technologies. In terms of the application of information, product designs are not sufficiently age-friendly, and the design of apps is often inconvenient for elderly users[8]. In terms of physical condition, barriers or the decline of bodily functions are factors that influence the use of information technology.

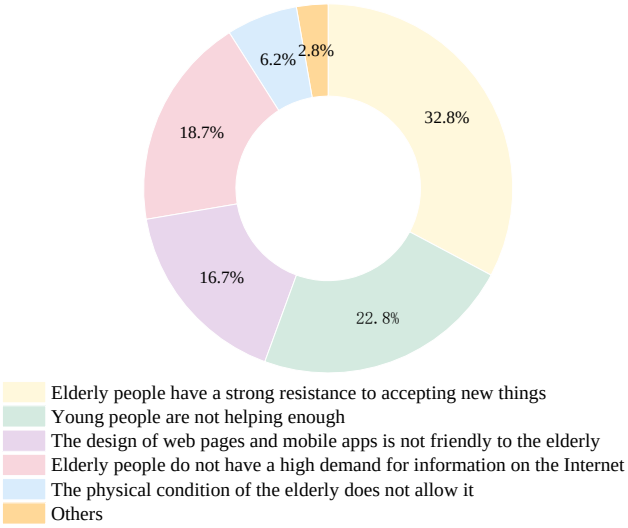

Figure 3:Specific Reasons for Elderly Individuals' Unfamiliarity with Artificial Intelligence and the Internet

3.2 Experience of Information Accessibility Environment.

Through the survey on the usage of commonly used apps among the elderly (Figure 4), it was found that social apps account for 59.25%, followed by short videos and news apps, with proportions of 51.7% and 42.26%, respectively. This indicates that elderly individuals frequently use apps for socializing, watching short videos, and staying updated on current affairs. It also emphasizes the necessity of age-friendly design in mobile apps, which plays a crucial role in enhancing the elderly's experience of information accessibility environments.

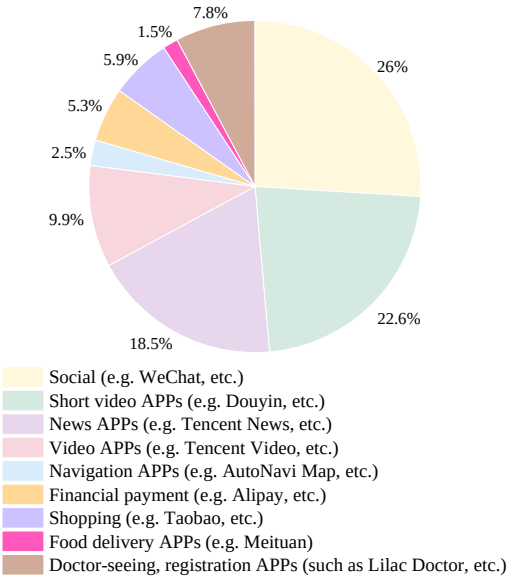

Figure 4:Usage of Commonly Used Apps by the Elderly

According to the survey data on the proportion of elderly individuals who have not mastered or are unfamiliar with certain mobile phone functions (Figure 5), many elderly people are not familiar with the usage methods of certain apps, resulting in relatively low usage frequencies for these apps.

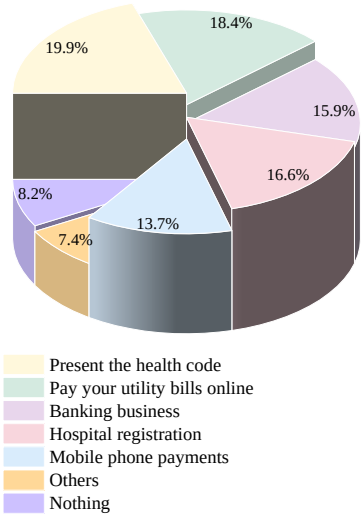

Figure 5: Impact of Elderly Individuals' Inability to Use Apps on Daily Life

In response to the difficulties that elderly individuals may encounter while using apps, the research focuses on aspects such as age-friendly app development, login methods, screen display features, information interaction, transportation, and medical appointment registration. The analysis reveals that in terms of age-friendly app development, excessive pop-up ads have a significant impact (46.79%). Regarding login methods, there is a high demand for one-click login using the device's phone number (54.34%).

3.3 Analysis of Influencing Factors.

We looked at how gerontological factors (like level of education, physical health, and work history) can be used to predict how much information older people need about technology in the age

of AI using advanced cross-tabulation analysis in SPSS on survey datasets. We also looked for barriers to accessibility within digital ecosystems.

① Impact of Educational Attainment. The real-world data show that seniors with less education have the highest information needs intensity (M=5.66%, SD=0.23) in AI-enabled environments. On the other hand, seniors with a college degree or higher have lower demand metrics (M=4.91%, SD=0.18).

② The impact of physical health is significant. Survey data shows that elderly individuals in good health exhibit the highest level of information demand (6.79%), while those in poor health and unable to care for themselves have a lower level of information demand (1.13%). This indicates that the physical health of the elderly significantly influences their use of smart devices and their level of demand for information.

③ The study examines the impact of pre-retirement occupations. According to the survey data, in the era of artificial intelligence, the information demand decreases in the following order: farmers, workers, and professionals in fields such as science, education, culture, and healthcare.

④ Living conditions have a significant impact. Elderly individuals living with their spouses or children exhibit higher information demand, with proportions of 3.4% and 3.77%, respectively.

⑤ The impact of age on the use of smart devices by the elderly is a significant issue. Analysis of the survey data shows that elderly individuals aged 70-79 are able to use common functions of smart devices proficiently but have the lowest acceptance of new technologies.

4. Research Findings

4.1 Issues in the construction of an age-friendly, accessible information environment in Hebei Province in the Era of Artificial Intelligence.

Through analyzing the data, it is found that the construction of age-appropriate information accessibility environment in the era of artificial intelligence faces the following dilemmas.

4.1.1 Subjective factors: physical deterioration leading to outliers

First, the education level is generally low. According to the research results, it is known that compared with the middle-aged and young people, the education level of the elderly in Hebei Province is low, which leads to the key factor of the low acceptance of the elderly for artificial intelligence equipment and technology, and hinders the construction of ageing-friendly information accessibility in Hebei Province. Second, there is resistance to new things.

4.1.2 Objective Factors: Intelligence Divide Impedes Information Accessibility

First, the popularization of information accessibility technology is narrow. The awareness of information accessibility among the elderly in Hebei Province is relatively weak, government investment and support policies are imperfect, and the information accessibility development industry in the context of aging has yet to be formed. Second, information accessibility laws and standards are not sound enough. Relevant laws and regulations in Hebei Province are not sound enough, and most measures have not fundamentally promoted the construction of information accessibility services for the aging environment. Third, the support from family and society is insufficient. When elderly people in Hebei Province encounter difficulties in applying information technology, 75% of them seek help from their families, and their children lack sufficient time and patience to guide them in their operations.

4.2 Recommendations for Solutions.

① Build a social system for information accessibility.

Building a social support system for information accessibility based on the principle of "policy guidance, financial support and widespread promotion"[9]. By promoting the introduction of encouraging policies and increasing income, the development of information technology application accessibility for the elderly has been promoted, with a focus on strengthening the construction of information infrastructure in the rural areas of Hebei Province, in particular by incorporating information services for the elderly into the basic public services provided free of charge, so as to enhance the accessibility of digital information technology for the elderly.

② Set up a guarantee system for sustained education supply.

The government departments can attempt to create a knowledge education security system that includes "knowledge education, lifelong education, and social experience." First, it is strengthening education on information technology knowledge and skills for the elderly. In response to the needs of the elderly for information technology applications, an all-media curriculum system has been developed to guide the elderly to actively integrate into society.

③ Improve community service support.

Integration of the community support component of "family support and voluntary service". Through social publicity, education and popularization, it mobilizes the strength of society and families to enhance the ability of older persons to make use of information technology tools[10].

④ Enhanced information technology safeguards.

A cycle of "digital inclusion, security and safety, and technical services" has been formed. First, it will promote services closely related to the daily lives of older persons in such areas as health care, finance and transportation. Secondly, the relevant departments should provide legal protection measures to ensure the security of elderly individuals' personal information. Thirdly, information technology infrastructure and information technology public services should be provided as free public goods to bridge the digital divide and reduce digital inequality.

⑤ Toward a Re-employment Channel for the Elderly.

Relying on information technology to create a re-employment mechanism with social participation by the elderly. Older persons who wish to work are provided with job placement, vocational skills training and guidance services for innovation and entrepreneurship. Flexible employment models suitable for older persons are being explored in schools, hospitals and other organizations, as well as in such industries as community housekeeping and the management of services in public places[11].

⑥ Innovate informatization technology services.

Constructing a technological application framework of "innovative design - innovative development - innovative application". It will strengthen the innovative design of age-friendly media, so as to make the content of the pages more in line with the visual characteristics of the elderly[12].

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