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Research on the Current Situation of ICT Using and Learning among the Elderly in Urban China

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중국 도시 노인의 ICT 이용 및 학습실태에 관한 연구

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Abstract Population aging is an inevitable problem in our society nowadays, and the current aging trend in Asia is prominent and the number of elderly people is huge, among which the World Health Organization predicts that by 2050, 35% of China's population will be over 60 years old, making it the most serious aging country in the world. According to actual reports and surveys, there is a clear digital divide between a large proportion of the elderly and ICT technology, which has had a negative impact on the quality of life and mentality of the elderly living in cities due to the rapid development of technology and the dramatic changes that have occurred in urban life in recent years. The author chose Chinese urban elderly as the main research topic, the research method through the collation of existing literature and information combined with the actual data research, narrative collation of the current situation of ICT use among the Chinese urban elderly and the causes of the difficulties, summarize the ability of the Chinese urban elderly as the representative of the elderly users to master and learn ICT. The study concluded that the needs of the elderly for ICT are multi-layered and there is a gradation in the ability of the elderly users to master various ICT services, so that the elderly can better use and enjoy ICT services and provide teaching and services in a hierarchical and targeted manner can be the next research direction.

Key Words : Elderly people, Digital divide, ICT, ICT learning, User research, Convergence

요 약 인구 고령화는 요즘 우리 사회에서 피할 수 없는 문제인데, 현재 아시아의 고령화 추세가 두드러지고 고령인구도 어마어마한데, 이 가운데 2050년이 되면 중국 인구의 35%가 60세 이상이 돼 세계에서 가장 심각한 고령화 국가가 될 것으로 세계보건기구(WHO)는 내다보고 있다. 실제 보도와 조사에 따르면 최근 도시 생활에 급격한 기술 발달과 극적인 변화로 도시 거주 노인의 삶의 질과 정신에 부정적인 영향을 끼친 고령자와 ICT기술의 비중이 큰 디지털 격차가 뚜렷하다. 저자는 중국 도시노인을 주요 연구 대상으로 삼았으며, 기존 문헌과 정보의 수집과 실제 데이터 연구를 통한 연구 방법, 중국 도시노인의 ICT 이용 실태에 대한 서술적 수집 및 어려움의 원인을 정리하였다.ICT를 마스터하고 학습하기 위한 노인 사용자 대표로서 도시 노인이라는 것을 알 수 있다. 이번 연구는 고령자의 ICT 수요는 다층화돼 있고 다양한 ICT 서비스를 숙달할 수 있는 노인 이용자의 능력도 세분화돼 있어 고령자가 ICT 서비스를 보다 잘 이용하고 즐길 수 있고 계층적이고 목표적인 방식으로 교사와 서비스를 제공할 수 있는 것이 다음 연구 방향이 될 수 있다고 결론지었다.

주제어 : 노인, 정보격차, ICT, ICT 학습, 사용자 연구, 융합

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1. Introduction

1.1 Research Background

With the rapid development of technologies such as the Internet, big data, artificial intelligence, etc., ICT technologies are widely used as an important part of production and life and have changed the way people live. People have access to more opportunities such as information retrieval, social interaction and consumer spending through ICT, and with the development and spread of technology, the Internet is also considered an important tool to improve the services provided by public sector organizations.

At the same time, most countries in the world have already entered or are entering an aging society, compared with which, China's population aging situation is severe, representative of the aging development in Asia and the world, and facing many more complex problems. Among them, the development of ICT has brought great progress to the society under the trend and trend of large-scale application of digital technology, especially the big data technology now. Especially in 2020 in the prevention and control of the new crown pneumonia epidemic, the application of digital technology, also in a very strong and useful way, has greatly contributed to the well-being of society and the implementation of preventive and control measures, while the rapidly developing technology is rapidly changing urban life compared to rural areas, and it also relies on the Internet for many actions in people's daily lives, and more and more urban living services are dependent on ICT technology for their implementation.

And according to data released by China's National Bureau of Statistics, by the end of 2019, the proportion of the population aged 60 and over will be about 18.1% of the total population. By March 2020, the size of China's Internet user base reaches 904 million, with 6.7% of users aged 60 and older[1]. The comparison of these two figures reflects a huge user gap, which indicates that there is a large number of older people who have not mastered ICT in the age of intelligence, and older users of ICT often express the problems they face, among which is the existence of a digital divide.

1.2 Necessity and Purpose

First of all, the inability of the elderly to use Internet devices well has led to a series of problems, and the rapid development of the Internet has affected all aspects of people's lives. Now many senior citizens are struggling to adapt to a rapidly transforming society——The problem has come into sharp focus during COVID-19, because many daily services, including the health codes needed to enter many buildings have all gone digital. The 43rd statistical report on China's Internet development reflects that there are 243 million elderly people over 60 years of age in China, and only 55.71 million of them use the Internet, accounting for 23.2%[2].

In general, the elderly face a lot of difficulties in using the Internet. There are difficulties in using Internet devices for the elderly, and the proportion of elderly people who can skillfully apply Internet devices is low. The inability to use Internet devices affects the quality of life of the elderly.

Through the investigation and analysis of the current situation of the use and learning of ICT for the elderly in the city, sorted out ideas and put forward suggestions on how to provide more suitable ICT education for the elderly.

2. Research on the Current Situation

2.1 ICT Use among Older Adults in Urban China

ICT includes all communication devices or

applications: such as radio, TV, cell phones, computers, network hardware and software, satellite systems, etc.; and the various services and applications associated with them, such as video conferencing and distance learning. Whereas nowadays, the older age group over 60 years old, who mainly focus on radio and TV in their life experience, miss the learning time of the rapid development of Internet and smart devices, and are more accustomed to the physical concept of how to operate.

In general, older people have difficulties in using ICT and the percentage of older people who are skilled in ICT is very low, and they do not have the foundation of contextual understanding in the digital age to integrate and spontaneously learn new technologies. Currently, the main activities that older adults use ICT and smart devices for are: daily transportation, healthcare, consumption, cultural and sports activities, and public services. For example, due to control period of COVID-19, urban seniors need to use QR codes on their cell phones to pay for public transportation, and cash payment methods are gradually being banned[3].

The study was conducted using a questionnaire based on the theme of "ICT use among the elderly". The study was conducted in three cities in China to understand the current situation of ICT usage among the elderly aged 60 and above, and to analyze the problems and barriers of ICT usage among the elderly.

79.2% of the respondents indicated that they have smart devices. The results of two of the main questions are shown in Tables 1 and 2. As shown in Table 1, the most common way for older people to learn ICT is to receive help from their children, followed by help and guidance from relatives and friends, and a smaller number of them choose to learn in the community and in senior universities. The survey results in Table 2 reflect that the main concerns of elderly users are both psychological and physiological, psychological distrust of Internet information and physiological unfamiliarity with ICT-related operations.

Table 1. Learn ICT use related knowledge through which way? (Multi select)

Options	Total
Children	72.2%
Relatives and friends	44.4%
Communities	18.0%
Elderly universities	9.7%

Table 2. The main difficulties encountered while usng ICT? (MultiSelect)

Options	Total
Concerns about the security of information and property	54.4%
Operation or gestures are complex	50.9%
Poor vision or dexterity with fingers	38.2%
Do not understand instructions or related terms	30.9%

2.2 Digital Divide and Grey Digital Divide

"The perceived gap between those who have access to the latest information technologies and those who do not" is called digital divide[4]. The concept graphically reveals differences in ICT connectivity, use and literacy, drawing attention to the information asymmetries and unequal development opportunities that result from the digital divide.

In this regard, Older adults are experiencing marginalization when it comes to the digital divide. This inequality has been referred to as the grey digital divide[5]. Older people in particular are slower to adapt to rapid changes in the population, and in order to help older people overcome the intergenerational digital divide and to truly integrate them into the rapidly evolving digital society, ICT implementation should take into account their lives and become a useful tool for them to interact and connect with the outside world[6], thus helping older people to promote active aging and achieve a higher quality of life[7].

2.2.1 Digital divide cause analysis

Digital divide are articulated into the following three aspects, as shown in Fig. 1: the access to information devices or database (information accessibility); the ability to utilize information resources (information mobilization); and the ability to differentiate the The ability to differentiate the quality of information (information consciousness)[8].

Correspondingly, older adults face difficulties in digital devices, digital literacy, and digital thinking in the digital divide. According to existing research on the understanding of the digital divide, the digital divide is no longer limited to the traditional economic disparities in access, but more research suggests that the digital divide is not necessarily due to economic or technological factors, including the fact that there is now a complex hybrid society associated with ICT, which includes more factors such as human psychology and competencies[9]. Most of the urban elderly have access to the Internet, mainly smart phones, smart tablets and other devices, either given to them by their children or used on their behalf. Regarding digital literacy and information utilization, due to the age of the elderly group, there are major problems in the use of devices and information processing due to the decline of physiological functions such as vision, finger dexterity and cognitive ability. Finally about digital thinking, older users who are digital immigrants have some difficulty in receiving and processing rapidly changing ICT and network contexts because they do not have access to the atmosphere of digital contexts, which is a higher level reason for the formation of digital divide[10].

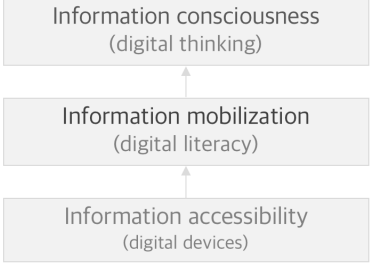

Fig. 1. Three levels of digital divide

2.3 Digital Back-feeding

"Cultural feedback" (literally "cultural reverse feeding"), a new mode of transmission - the extensive absorption of emerging cultural elements by the older generation In order to help the older generation digitally engage and reduce the digital divide within families, the younger generation plays an important role in educating the older generation about digital access, skills and literacy. Since most of the current elderly are digital immigrants, i.e., people who were not born in the digital age, and their children, the digital natives who grew up with digital devices and digital technologies, these two generations have entered the information age, resulting in a change in the direction of knowledge flow and cultural conflicts, and the phenomenon of cultural feedbacks in which the younger generation channels digital capital to the older generation has formed a new social phenomenon[11].

“Digital back-feeding” is a home-based classroom model, with home and vacation being the most common forms of feedback. It has narrowed the digital divide to some extent, but it still cannot bridge the divide.

Visiting surveys have found that in Chinese urban families, one-on-one guidance between children and the elderly, children making handwritten smartphone usage guides for the elderly, and similar approaches are widely used, digital feedbacks are indeed widespread and gradually realized by all as a problem of digital divide that needs to be addressed urgently.

2.3.1 Existing ICT Learning Approaches for the Urban Elderly

According to the questionnaire and research

mentioned earlier, the existing ICT learning pathways for urban elderly can be divided into the following three categories according to the scenarios. (i) Family, when elderly people have questions about the use of ICT, they may choose to ask their family members for help first. In a family, other members may or may not be more patient with the elderly, depending on the atmosphere of the family. The elderly can always ask questions and other family members will help them in different ways, his most common form of expression is writing on paper. (ii) Community, the most common social unit for the elderly in China is the community. The community is an important place for the elderly to live and an important institution for their socialization. Community education is a new mode of education in modern society[12]. In recent years, a number of community activities have been reported throughout China to educate older people about smartphone skills. Teachers can be community workers, student volunteers and enthusiastic, skilled seniors. (iii) Senior universities, universities specifically for older adults, which have special courses for teaching smartphones. Courses are divided according to skill difficulty. Smaller classes focus on basic functions, such as how to use WeChat, mobile payments, etc. Advanced classes are more comprehensive and include video, games, news, shopping and other forms of entertainment.

Among them, family is the most extensive form of learning. The advantage is the high trust of the elderly and the fact that most of the smart devices of the elderly in the city are now given by their children.

In the concept of intergenerational learning, by analogy with ICT education, the intergenerational division is no longer limited to the family. Instead, it is generalized to interactive and cooperative learning between generations of different ages. Digital immigrants pass on their life experiences, life knowledge, and traditional culture to digital natives, while digital natives feed back to digital immigrants the use of the Internet, social media, and smart devices, as well as new social views and perspectives[13].

3. User Analysis of Older ICT Users

3.1 Older ICT Users

ICT as a technology is involved in people's lives in the form of services combined with digital devices. As a group of users of such services, need to understand the needs and difficulties of the elderly, and further analyze and study this group of users as a target focus.

In terms of ICT usage, the elderly mainly face the following problems: declining cognitive ability, slow reaction, backward knowledge structure, poor ability to accept new things, children's busy careers, lack of communication and help, lack of lectures and guidance, etc. These combined factors, coupled with the general lack of digital participation and knowledge due to the age difference, have led to the elderly not being able to keep up with the development of intelligent information technology. The pace of the development of intelligent information technology. In the context of COVID-19, as maintaining social distance isolation becomes the norm, social distance increases and face-to-face interactions are greatly reduced, accentuating the isolation of older adults, which is increasingly detrimental to their mental state[14]. Although everyone uses ICT for online social interactions, older adults often do not have access to these technologies or the skills and experience necessary to use them effectively.

3.1.1 Demand Analysis of Older ICT Users

Based on Maslow's Hierarchy of Needs theory, the ICT needs of the elderly are summarized into the three levels in Fig. 2, based on their use of

Fig. 2. Needs of older ICT users

ICT scenarios and behavioral psychology. The first level, existence needs, is that ICT has influenced all aspects of urban life, such as travel, registration, smartphone login and online payment, and the urban elderly must learn basic operation skills to carry out their daily lives. The second layer is Interpersonal relationships needs. Urban seniors need to actively socialize with friends and relatives to meet their spiritual needs, and ICT-assisted socialization can help urban seniors to actively age. In some prior studies on the demographics and behavior of older adults, it has been shown that promoting more social engagement on the Internet among older adults can help with active aging and help meet the emotional needs of older adults[15]. The third level is Achievement needs, where urban seniors need to learn and integrate into the digital society through ICT, continue to explore areas of interest, acquire knowledge and exchange information, and gain feedback to build self-esteem, self-actualization and a sense of accomplishment.

3.2 Classification of Older ICT Users

As mentioned before, since most of the elderly people are not the original citizens of the digital society, there is a part of the elderly users who hold negative attitudes, who believe that ICT is not necessary and that ICT technology can be replaced by traditional media and other means in their lives, or they maintain a negative attitude toward ICT technology due to physical level difficulties or psychological rejection. a rejection mentality towards ICT technology. In an interview survey conducted by Tencent Research Institute, the "fears" of the elderly towards digital products can be divided into the following categories: property risks, weakened social relationships, harmful to health, harm to personality, and invasion of privacy[16]. With the increase of positive attitudes towards ICT, three different identities can be used for the participation of older people in the use of ICT: passive recipient, active recipient and creator[17].

Using the attitude, participation status and common ability of elderly users as reference

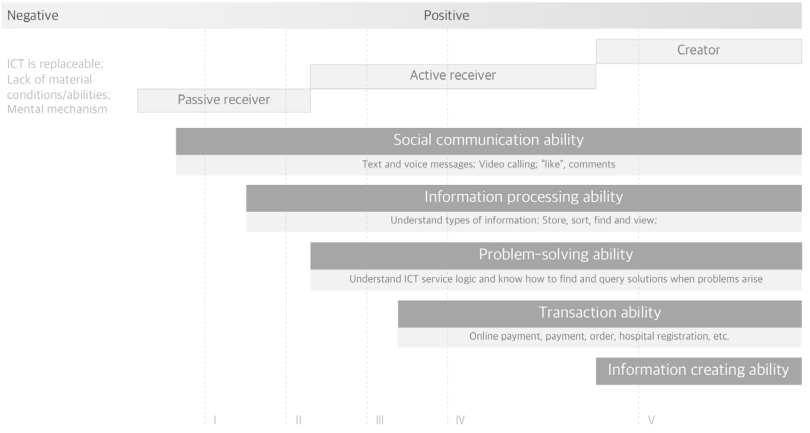

Fig. 3. Classification of older ICT users

indicators, elderly ICT users are divided into five levels, as shown in the Fig. 3 The first level of elderly users are initial ICT users, passive recipients who have to start learning ICT due to the inconvenience of living or wanting to participate socially. They generally only have the ability to communicate socially and process information, and can simply use social software and access browsing to understand information. The older users in the second level have a more positive attitude and no longer consider ICT as a hard-to-reach burden; they have information processing skills, compared to the users in the first level. The third level of older users have increased their ability to understand the logic of ICT services and have mastered the ability to transact online, so they can complete a series of tasks such as online payment, shopping, hospital registration, etc. They can successfully participate in the convenient life of the digital society. The third and fourth level of older users are mature and active recipients and participants, and can see ICT as a tool to help them solve problems. The fifth and highest level of users are information creators, who have the ability to create original information in the Internet and are mature users of ICT. At present, the first and second levels are the main part of the urban elderly in China, and the number decreases with each level. Therefore, ICT education for the elderly is needed in order to help them improve their ICT capabilities and actively participate in the digital society.

4. Evaluation and Analysis

4.1 Analysis and evaluation of research results

Based on the previous analysis of the characteristics of elderly ICT users, including the causes of difficulties and the needs of the elderly and the ability to master the grading, the resulting grading results represent the level diversity of the elderly in the city nowadays. According to the incremental attitudes, part of the elderly are motivated to learn to meet basic needs in order to keep up with the existing fast urban life, while with the incremental levels summarized in the previous section, and the needs of the elderly gradually rise, needing interpersonal and self-actualization spiritual needs to be met, based on such needs corresponding to the ICT ability also needs to be more improved. The current ICT education services for the elderly tend to be purely functional and do not focus on the emotional needs of the elderly in ICT. The findings of this paper can provide some reference for ICT services and education for the elderly, suggesting to focus on the spiritual needs of the elderly, and further improve the current situation of ICT usage among elderly users based on more segmented population research in the urban population where the initial access gap of the data divide is basically satisfied.

Based on the above, the following principles are summarized for improving the current situation of ICT usage and learning styles of the elderly: 1) low barriers and low threshold (usability/motivation), according to the research elderly people have some fear and resistance to ICT, and should be introduced from low threshold features, emphasize ICT usability to elderly users, and motivate the elderly. 2) ease of use (trustworthiness), in the teaching process. Medium. Highlighting the tool attributes of ICT, digital devices and digital technology is just a medium and tool, and there is already a trend to develop a senior model in the use of smart devices, to be inclusive and considerate for the operating habits and difficulties of older people. 3) Practicality (convenience), ICT learning can help older people in all aspects of urban life, through practical functional uses for older users to show a more 4) Fun, older people also need motivation above the basic needs of life in the process of learning, hobbies and fun are all ways to stimulate

the enthusiasm of older people for learning.

4.2 Suggestions for optimization based on analysis of existing services

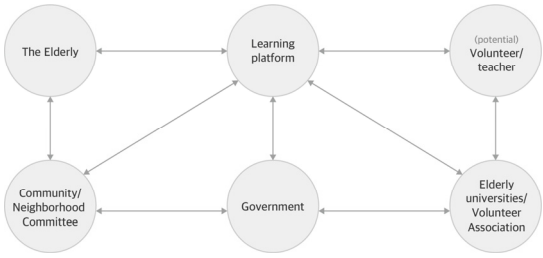

Fig. 4. ICT education conception for the elderly

Based on the perspective of service design, a preliminary elderly service system based on the existing elderly learning research is constructed and proposed, based on the characteristics and needs of the elderly ICT users analyzed in the previous paper, an ICT education service concept is proposed as shown in Fig. 4, and combining the existing home digital feedback, community activities After the preliminary ability assessment, the ICT senior users will be initially graded through simulation tests with reference to the previous research, and then they will be exposed to different teaching resources and methods according to their individual abilities and needs, and institutions such as senior universities and communities can also differentiate from the existing extensive teaching model to select students with a uniform and graded level. Uniform and graded students. This will increase the accessibility and motivation of ICT education for older users.

5. Conclusion

Aging and the digital divide are important social issues worldwide. This study takes a representative sample of Chinese urban elderly as the research target, and analyzes and organizes the current situation of the needs and abilities of the corresponding population in using and learning ICT through survey research. Weakening the impact of the digital divide on the elderly and improving their ICT capabilities is an important measure to deal with the problems of an aging society. Based on the perspective of user experience and service design, this paper takes urban elderly people in China as users of ICT services, analyzes such users meticulously with the perspective and methods of user analysis and user needs, clarifies the needs and abilities of elderly users based on the analysis results, summarizes the shortcomings of existing services, and provides suggestions for optimizing existing services. However, the shortcomings are that this study may have special characteristics and limitations in terms of research analysis and design concept extension for the elderly in urban China, and cannot fully present and solve the ICT usage and learning problems of the elderly. Here, to hope that this study can provide new ideas for related aging issues and the digital divide faced by the elderly.

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