

An Analysis of Digital Reading Development of the Elderly from the Perspective of Active Aging

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Abstract— Based on the background of "active aging", this paper analyzes the current situation and problems of digital reading for the elderly from the intelligent way of digital reading for the elderly, combined with algorithms, interaction design, emotional satisfaction, the value and significance of digital reading for the elderly and other aspects. In order to better improve the reading interest of the elderly, the "digital + reading" mode needs to be further improved for the aging, and the digital reading ecosystem of the elderly should be built through intelligent technology to empower the elderly digital reading.

Keywords— Aging; Digital reading; The algorithm; Interaction design.

I. INTRODUCTION

With the continuous transformation of emerging media, people's way of reading is quietly changing. Digital reading is emerging and entering more and more people's lives. Digital reading, the digital form of reading, relies on emerging media to present text in the form of pictures, video, audio and so on, which is different from the traditional way of reading with the help of paper.

At the fifth Session of the 13th National People's Congress (NPC), the 2022 Government Work Report mentioned the need to "further promote nationwide reading". This is the ninth consecutive time that "nationwide reading" has been included in the government work report since 2014, indicating that the country attaches great importance to the improvement of people's reading habits. Among readers of all ages, the elderly have a higher recognition of traditional paper books and newspapers due to their reading habits and preferences accumulated over the years. However, with the growth of age, the physical function of the elderly gradually decline, and by a variety of other factors, the reading amount of the elderly group decreases with the growth of age. [1] With the popularity of digital and intelligent mobile phone is widely used in the elderly, the digital reading gradually entered the view of the elderly, and the popularity of digital reading in the elderly group to ascend to the old reading interest, improve the overall cultural level, increasing the number of the elderly to read, the aging of the positive construction has a certain role in promoting.

II. THE DEVELOPMENT STATUS AND PROBLEMS OF AGING DIGITAL READING

In the Age of The Internet, digital reading, with its advantages of diversification and portability, has changed people's reading styles, including the elderly, and has gradually become an important channel for the elderly to obtain

information. With the rise of a series of mobile reading carriers and functions, and the disconnection between the lack of interesting and life-like elements of traditional paper media and the current needs of the elderly, the reading habits and preferences of the elderly are gradually moving toward the digital trend, and the elderly are expected to become the main force of digital reading in the future [2].

1. The current situation under the background of "active aging"

Active aging corresponds to the concept of "doing things in the old age" advocated by China, which is based on "learning things in the old age", and reading is an important way of learning. With the deepening of aging society, the elderly have become a huge group in the society. With the increasingly "old" population structure and the increasingly "new" media form, the elderly were once referred to as the marginalized digital vulnerable group in the wave of new media.

In the digital age, the rapid development of communication technology and the continuous extension of media influence promote the "mediated" survival of modern society to become a common phenomenon. One of the necessary ways for the elderly to actively integrate into the digital society is to participate in social interaction through Internet technology and new media platforms. According to the theory of "media as message", integrating into media life is the prerequisite for the elderly to adapt to society and have a close relationship with society. Promoting digital reading for the elderly is an important measure to implement the concept of active aging, change the current negative situation of supporting the elderly, and promote the elderly to carry out their old age life from both personal and social perspectives.

At present, China is trying to deal with the challenge of aging with a positive "digital integration" mentality. It can be found in the seventh census that 36.69 million people over the age of 60 have high school education or above, and the educated class has entered into the elderly group. While the overall cultural quality of the elderly group has been improved, the spiritual and cultural needs of the elderly are also increasing accordingly. With the popularity of smart phones among the elderly, the Internet has spawned a new culture of the elderly who are positive and sunny, young in mind, and try to get rid of the title of "digital refugees". The number of the elderly netizens continues to increase, and the number of digital readers increases accordingly. Digital reading for the elderly is a development opportunity. According to the 18th National Reading Survey report released in 2020, middle-aged and

elderly people aged 50 and above account for 23.2% of those who have been exposed to digital reading methods, and more and more middle-aged and elderly people have entered the digital reading army. Among them, mobile phones account for the highest proportion of reading time of different media, and mobile phones become the choice of more people to read.

In the context of aging population, aging readers and general improvement of cultural quality, it has become an important topic in the field of digital reading to integrate the concept of active aging into the digital reading of the elderly and stimulate more elderly people to return to reading life and improve their reading willingness through emerging media. At the same time, it is also to help the elderly group to get a sense of achievement, to achieve active aging, and then build a learning society.

2. Aging digital reading existing problems

Elderly past life and reading habits, make its have very familiar with the traditional paper reading model, the influence of traditional thinking pattern, as well as the physiological function of the aging, causing them to learn about emerging things digital content, digital literacy is low and relatively insufficient risk assessment is insufficient, currently in the process of using digital reading products still exist some obstacles.

2.1. Rumor "firewalls" have yet to be built

The elderly are vulnerable to false news and false news, and they have poor information identification ability and are more inclined to spread rumors. Undeniably, the simple and easy-to-use wechat provides a low-cost path for the elderly to break through digital barriers. However, while we are pleased that more and more elderly people have started to contact digital reading, the quality of digital reading content of the elderly can not be ignored. In the digital reading environment with complex and diversified contents, low-quality contents emerge endlessly, and inaccurate information affects the physiology and information health of the elderly, making them lost in the era of intelligent reading.

In the public accounts commonly used by the elderly, there are endless rumors about health maintenance, and the elderly are very fond of reading and forwarding such content. Some studies show that wechat has gradually become the main channel for the elderly to obtain health information [3]. Some wechat public accounts are targeted at the elderly and provide targeted content for their reading interests and information needs. However, these public accounts lack formality, resulting in low-quality content. Middle-aged and young people often make errors in identifying the authenticity of information, not to mention the elderly who are not familiar with the era of intelligence. The spread of online information and rumors does not have positive significance for the elderly to actively participate in the society, but may have negative effects and even become the object of ridicule by other groups, resulting in resistance to the emerging media. This requires the platform to do a good job in the control of the content publishing end, use big data technology to screen out fake news, rumors and other negative information for the elderly in advance, establish a "firewall" to screen rumors, guide attention to authoritative

public accounts, and create conditions for them to actively engage in digital reading.

2.2. Inadequate technology for aging

Digital reading for the aged has both universality and particularity. At present, the main target groups in the process of digital transformation are mainly young people, and the attention to the elderly market is relatively lacking, and the elderly digital reading market is not mature enough. Although now in the elderly population outbreak era digital reading the number is increasing rapidly, but for the elderly to apply digital reading technical means for failing to keep up with, there are ICONS identification difficult, complex font size is too small, interface interaction and so on, for the elderly, they need easier access to information operation, reduce the difficulty of its digital reading. The simplicity of digital interface affects the willingness of the elderly to read digitally, and the lack of effective technical support will easily cause the group to have "technology phobia".

In terms of reading media, most of the smart reading devices that the elderly can access at present are mobile phones. Single and passive digital reading media is also a big obstacle for the elderly to digital reading. In December 2020, China released the Special Action Plan of Internet Application for Aging and Barrier-free Transformation, aiming to focus on promoting the aging transformation of mobile apps and websites closely related to the basic life of the elderly. With the introduction of policies, the aging transformation process has been constantly upgraded. However, how to more effectively help the elderly to learn the use of digital reading devices without barriers and focus on the needs of the elderly is still worth thinking about, and the application of the aging still needs to be improved.

III. THE INTELLIGENT WAY OF AGING READING

The development of digital reading for the elderly is closely related to their reading habits and the convenience of equipment. After the digital reading industry has experienced the transformation from PC terminal to mobile terminal, it has now realized the transformation to intelligent digital reading mode based on big data, intelligent recommendation and scene precipitation. However, China's aging digital reading is still in the transitional development stage from mobile to intelligent [2] From simple "seeing" in the past, today's "reading", "seeing" and "listening" coexist in various ways. In terms of intelligence, it can be divided into the following four types: public account reading and forwarding, e-book related reading, audio book reading, and third-party video narration. Among them, the first two main users are the elderly group with certain reading ability, while the users of the latter two reading methods are more widely educated.

Public account reading and forwarding mainly refer to the forwarding between wechat public account push text and friends. Studies have shown that socializing is the main driving force for older people to use wechat [4]. If wechat is the starting point for the elderly to access digital media, then the official account can be said to be the starting point for the elderly to access digital reading. Compared with systematic and focused continuous reading for a long time, and affected by the decline of physical function, the fragmented, short, interactive and

social reading mode of the public account is more in line with the physiological characteristics and reading characteristics of the elderly. According to the research data of Professor Zhou Yuqiong's team in Shenzhen University, the proportion of reading and forwarding on the official account of the elderly group is 74.5% and 62.4% respectively, and the articles on the official account of wechat have become a common function of the elderly wechat users. The strong readability and easy-to-grasp reading and forwarding experience of articles on official accounts make wechat official accounts and moments become important sources of news and information for the elderly.

E-books related reading, including e-book applications (such as Ireader APP, wechat Reading APP) and e-book readers (such as Kindle). Compared with traditional paper reading, e-books require eyes to "read", but the medium has changed. E-book software adopts "books and social" mode, social and interactive features of their own reading to be infinite amplification, such as WeChat "circle" function, make reading closely integrated with acquaintances social, by implementing timely review and share interaction between the reader and make it possible to have the elderly in reading timely communication, from sharing in the process of each other, It also indirectly increases the reading interest of both parties, which to some extent accords with the proposition of active social participation advocated by active aging. E-readers are less eye-damaging and more focused than e-book apps found on mobile phones, but the market has yet to reach a certain size for the elderly.

Audio book reading refers to reading and output the content of books by means of voice narration, mainly including Ximalaya, Dragonfly, Yunting and other listening apps. "Ear economy" is the old digital reading to read one of the hot trend of development of multiple intelligences, listening with valet APP through lively, the elderly and the sound of reading way, with the help of voice, literature or news events, make the elderly by only hearing can discern information or experience characters portrayed scenes and stories. Compared with the former two types of digital reading, reading books can effectively liberation of the old man's eyes and hands, just use auditory system can obtain the knowledge in the book, for there is no ability to read, have vision problems, no free time paper reading these three elderly people, audio book reading restrictive smaller, in line with the broader group characteristics of the elderly.

Douyin and other short video platforms tell books, that is, watch Douyin through short videos, and obtain information in the way of audio-visual combination. Previous studies have shown that the desire to "cope with the challenge" is one of the important factors of reading motivation in the elderly. [5] However, as far as the current situation is concerned, reading alone cannot meet the needs of coping with the challenges of old life, and some old people are forced to turn to reading for entertainment. Short video knowledge explanation video is rising in the elderly group. Because it contains two functions of acquiring knowledge and entertainment, it fits in with the reading needs of the elderly. In addition, the visibility and richness of short video make it quickly become the "new favorite" of digital reading for the elderly.

IV. TRACKING AND CUSTOMIZATION OF AGING DIGITAL READING

Personalized digital reading customization is the core element of user experience, which affects readers' interest in reading and experience stickiness. If algorithm recommendation and personalized customization technology fail to keep up with the development of digital reading market of the elderly in time, the elderly will increase their resistance to digital reading. Under the influence of traditional thinking habits, the elderly tend to feel strange when using digital technology products and have insufficient cognition of various functions of digital products. Therefore, it is a necessary process to acquire the needs of the elderly digital readers by combining intelligent data algorithms, and carry out data tracking and custom design for them.

1. *The application of algorithm in aging digital reading*

The emergence of digitalization is an innovation of traditional reading mode. With the continuous evolution of digital technology, digital reading is also constantly presenting one after another new characteristics. In the era of big data, users have an increasingly strong demand for intelligent and personalized reading, and algorithms begin to empower reading to help elderly readers get a good digital reading experience and emotional experience, playing an important role in the connection of reading value, in order to improve the effect of intelligent experience of digital reading. Old digital reading in the process of bringing forward social attributes, thumb up, comments, etc. all recorded data platform precise, platform will digital reading of the old time, content, and preference and so on reading habits generate big data, and through the calculation of algorithm and data can provide a more personalized reading services for the elderly, to arouse the reading interest of old people.

The algorithm recommendation attracts many old digital users in this era, but it still needs to be improved in the practical application of the algorithm. In the traditional information reading platform, the audience needs to "pull" the news, but in the digital era, the algorithm recommends the news and information to the audience automatically [6]. In the process of digital use, the elderly readers are passive receivers. In addition, the elderly users are unfamiliar with digital technology, so it is easy to have the algorithm push of low-quality content. Due to the complexity of individuals, people's reading needs show different performance. The decline of cognitive organs of the elderly leads to varying degrees of deterioration in their perception function, memory function and learning and understanding ability, which makes them have certain cognitive impairment in the use of digital media. For the elderly, they need more concise functions and information access channels. This requires more accurate algorithm tracking and the integration of cognitive psychology, and the use of digital mining technology to analyze the personality characteristics of elderly digital readers, so as to grasp their reading habits and cultural appeals, so as to realize accurate personalized services and provide convenience for the elderly to carry out digital reading.

To help the elderly to achieve benign reading through intelligent algorithm platform, it requires more high-quality information provision and supervision, as well as high-quality information algorithm recommendation. Big data and algorithm, powerful content publicity and distribution, etc. all provide help to improve the market activity of digital reading for the elderly group. Of "information cocoon room" as a result of data algorithm caused the old people in the age of digital reading is more difficult to handle, with the support of 5 g technology, still need to continuously optimize user tracking mode, based on the algorithm design and user demand, to grasp the user demands and behavior, shape intelligent reading role, establish a multi-dimensional data model of the user experience.

2. Customization: digital reading interaction design

The elderly are prone to visual fatigue and tiredness when reading traditional paper books, and the diversity of digital reading provides more convenience for the elderly. However, without targeted digital information services for the elderly, it is difficult to provide better digital reading services for the elderly. At present, the aging process of digital reading interaction design in China still needs to be continuously improved, and the use experience of the elderly still needs to be continuously tracked.

User's cognition of digital interface is the result of external information stimulation and memory experience storage [7]. For the elderly, the interface interaction functions of some digital reading products are still complicated, and they hope that the operation steps and page layout can be simpler. Therefore, it is necessary to help the elderly to clear their minds and operate by adopting concise and focused guiding function design. Now mobile phones are becoming the most common medium of digital reading, but the lack of "elderly" smart phones on the market, in older people's lack of a unified, group targeted the use of media, so the preferences of the elderly, optimum aging reform is needed in the application of digital reading focuses on power. Today, trill, quickly, today's headlines, Himalayan APP are designed, such as speed, faster and more convenient to users to browse information, you can see the reading and listening APP on the optimal aging transformation efforts, but some applications on specific link set is still not enough detailed, such as reading in WeChat, palm reading, such as reading in the APP, Readers can choose the font color and font size, and free switching mode at night in the day, and these functions for young people, but more trouble for digital equipment strange old people are still struggling, with the elderly in the field of digital reading more and more important to participate in, to old people need according to older users as the center of reading interface physical characteristics, One-button "simple version" design for the elderly group is carried out to meet the needs of the elderly for interactive operation.

Process of digital reading is a process of user interaction with digital media, and users to participate in the process of social experience, as user thinking as the starting point of interaction design, based on the requirements of its desire to facilitation, from the emotional dimension of people's social

characteristics are collected, according to the older users demand for data analysis and interaction design, while adding features services, Also put forward requirements for the use experience. Interaction design of the optimum transform aging is an ongoing process, the algorithm for the readers tracking and demand analysis, based on the need for the user requirements in terms of visual design, optimization of the digital service blueprint, continuously make old people adapt to the development of new technology and new products, in the form of visual and audible for older readers better reading experience. The complexity of reading pages will virtually increase the digital reading barrier of the elderly, and it is easier to take advantage of malicious induced links, pop-ups and other undesirable content. While providing comprehensive content services for readers, it can reduce cognitive load and improve readability of digital reading by maintaining overall consistency of interface design elements, paying attention to coordination and unity of interaction modes, and abandoning excessive decoration and complex typesetting. In terms of typesetting and background texture, appropriate pseudo-object design can be adopted in accordance with the traditional typesetting style of paper books in line with the cognitive characteristics of the elderly to increase the naturalness of the interactive interface, reduce the operation difficulty of users and meet the needs of the elderly.

V. EMOTIONAL SATISFACTION IN AGING DIGITAL READING

The physical and mental health of the elderly is a necessary condition to promote active aging and realize the realization of learning and doing. Today, with the rapid development of aging and urbanization, loneliness has become a major problem for most of the elderly due to the deterioration of physical function and the lack of children to accompany them. Its special body function and makes the elderly more abundant free time on digital reading needs the differences with other age groups, the significance of reading for the elderly is not just about entertainment or obtain the knowledge level, but also help old people to learn how to cope with elderly life's challenges, more positive and optimistic in the face of retirement social role transformation, To achieve the meaning of easing emotions, widening social and social integration.

The emergence of digital reading provides the elderly with a variety of reading ways and a large number of reading resources, helping them to read at home, anytime and anywhere. At the same time, no matter what kind of digital reading method, it covers a lot of social attributes, and it is the integration of social attributes in reading that enables the elderly group to share reading emotions, maintain physical and mental health, and obtain spiritual comfort through communication with other users, so as to build self-identity. Wechat is an important medium for them to keep in touch with their children who are not often around and their relatives and friends in their hometown. In the traditional way of reading, readers are in a closed state, unable to carry out timely content exchange and feedback, while digital reading methods such as wechat reading realize the possibility of timely interaction. WeChat reading APP "inner circle" of the function, the equivalent of reading

"friends" in the interface, and here you can publish their reading e-books view of a sentence or a book, can also see friends published in the "inner circle" of content, operation method is relatively simple, through the way of reading content sharing, expand the readers' reading space, It enriches his digital reading experience and is of great benefit to emotional satisfaction.

From the perspective of productive aging, reading is one of the important ways to realize lifelong learning. The participation and integration of the elderly in digital reading is not only to meet their own cultural needs or prevent physical diseases such as senile dementia, but also an important channel to realize self-development and social value. Intelligent media era under the function of the network of social attribute, and easy to share Settings and the way of reading, to see and hear for the elderly to a cheerful mood, reduce loneliness, plus a short video platforms such as immersion in the browsing experience for the elderly to fill emotion vacancy and enrich the lonely time also have a profound effect. Despite various obstacles and difficulties encountered in the process of digital reading, the reading needs of the elderly are still strong.

"There is an old family as there is a treasure", the physical and mental health of the elderly is related to the happiness of the family and individual, but also related to national development and social harmony. Scientific and technological innovation provides solutions for actively coping with aging, and examples of information technology to meet the life needs and emotional needs of the elderly can be seen everywhere. The participation of digital technology avoids the separation of the elderly from the social system. Although the digital reading model of the elderly is full of false information and false information in the process of digital reading, wechat and other social media are important channels for the elderly to communicate with the outside world, which can effectively reduce their loneliness in life. Therefore, improving the digital integration of the elderly group, which accounts for a large proportion of the population, and helping the elderly to devote more time to reading in their leisure time play an important role in improving their sense of gain and happiness and enhancing the well-being of the elderly.

VI. CONCLUSION

Under the background of media convergence, the mobile phone has gathered more and more features, it became a graphic, sound, video, and other media elements of the collection, no matter on the subway or in the study, all can be read by a screen anytime and anywhere, reduced the space limit, paper books is no longer of choice for some people to acquire knowledge, all media for reading demand is also more diverse, Visualization, audibility and intelligent reading came into being.

Digital reading in the elderly, followed by the old digital reading some important obstacle is still to be solved urgently, such as lack of interface interaction design optimal aging, the algorithm recommended, such as digital media limited, plus the number of old people demand is not high, the lack of fear of science and technology, digital thinking, these are all lead to the old man number skills is difficult to realize the qualitative leap. In the digital era, through data analysis and interaction design,

digital reading communication for the elderly is well done to provide technical and emotional security for digital reading for the elderly, and it is incumbent on the society to guide the active aging.

With the progress of intelligent technology, the era of "media for everything" has arrived. Multi-dimensional digital reading combines static text with dynamic scenes to increase people's experience of reading, make them immersed in it and feel it effectively, so as to improve the pleasure of reading. In the future, with the development of emerging technologies, intelligent device type gradually rich, also will be more fully meet the demand of readers, integration and expand more reading service, the main carrier of the old digital reading will not only limited in the mobile terminal, conditioned by phone this carrier, and will permeate every aspect of life in a broader level, wearable devices, intelligent household and so on, The development of artificial intelligence, VR, AR and other technologies has gradually been applied in digital reading for the elderly, and the two-dimensional pictures in books have begun to become three-dimensional images. From reading books to reading screens, from PC reading to mobile reading, and from mobile reading to intelligent reading, more and more elderly people are joining in the digital revolution. The transformation and upgrading of intelligent devices are suitable for aging, and the seamless switch between various terminal reading devices enables the elderly to grow up through participation. By adapting to digital reading and integrating into the digital era, the elderly can enhance their confidence, further realize the interconnection of all things, and let more intelligent media content accompany their later life.

REFERENCES

- [1]. Chen Tao: Survey on the Reading Status and Countermeasures of the Elderly in Yunnan under the Background of "Active Aging", *Journal of University Library and Information Science*, Issue 11, 2021, page 30-35.
- [2]. Hu Dahai, Lu Sihua: Research on the Development Strategy of Digital Reading for the elderly in China under the Background of New Infrastructure, *Editor's Journal*, Issue 11, 2021, page 13-18.
- [3]. Wang Wenkai, Yu Haitao, Cao Xia, Liu Jingliang, Pei Li: Survey and Analysis of community elderly using smart phones to obtain and use health Information, *Chinese Journal of Medical Library and Information*, Issue 08, 2019, page 71-80.
- [4]. Zhou Yuqiong: The Rise of digital Disadvantaged Groups: A Study on the Influencing Factors of wechat Adoption and Use by the Elderly, *Journalism and Communication Research*, Issue 07, 2018, page 66-86.
- [5]. Liang Xingkun, He Mengjie, Chen Yan, Zhao Xinyi: Heterogeneous motivation of reading among the elderly: An Interpretation from the perspective of productive aging, *Library and Information Knowledge*, Issue 05, 2021, page 63-76.
- [6]. Xiang Yangchun: Research on the Influence of Algorithm-driven News Push on User immersion experience, *Information Exploration*, Issue 11, 2021, page 39-44.
- [7]. Ding Mingzhu, Wang Haibo, Li Jun: Research on Interaction Design Strategy of Mobile News Client Based on Cognitive Characteristics of Elderly Users, *Art and Design (Theory)*, Issue 04, 2020, page 99-101.