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Digital Access and Remote anti-parenting: How it's Possible to Alleviate the Digital Divide for Older People Left Behind in Rural Areas-----The case of Z village in Anhui Province

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Abstract

In the era of digitalisation and informatisation, artificial intelligence influences and changes the cognitive and behavioural life of individuals, and the elderly are gradually becoming "digital refugees" and "digitally trapped people" in the era of artificial intelligence.Compared with the urban elderly, the rural left-behind elderly have a deeper degree of digital isolation, and exploring the logic of the formation of the digital divide among the rural left-behind elderly as well as the path to alleviate it has become the focus of this paper.The author takes the left-behind elderly in Z village in Anhui Province as the object of ethnographic observation, and interviews 10 left-behind elderly in depth.The study found that the formation of the digital divide among the rural left-behind elderly is closely related to the lack of digital equipment, closed digital thinking, and difficulties in digital feedback.It is necessary to alleviate the problem from two aspects of digital access and remote feeding,on the one hand, to promote access to digital infrastructure and access to the digital spirit of the elderly left behind;on the other hand, to strengthen the children and grandchildren of the elderly left behind to reverse remote digital parenting, with the help of information and communication technology to implement the reverse upbringing, and to promote the elderly left behind to take the initiative to access the digital equipment.This paper aims to truly intervene in the digital life of the rural left-behind elderly, based on interview communication, to accelerate digital spiritual access and intergenerational digital care for the rural left-behind elderly.

Keywords

artificial intelligence; rural left-behind elderly; digital divide; digital access; remote counter-parenting

Introduction

In the era of artificial intelligence, algorithmic technology is rapidly innovating, smart applications are widely popular,digitalisation is changing the way of life of millions of households, and the technology is also providing convenience for healthcare, education, and transportation in many aspects.However, while other groups are enjoying many digital dividends, the digital divide faced by the rural left-behind elderly group has been further highlighted, and the popularity and application of smartphones have become problems.Therefore, as smart technology becomes more and more popular, how to keep up with the pace of the smart era, alleviate the negative impact of the digital divide, and adapt to the digital environment of the smart era has become a

social problem that needs to be solved urgently.

Literature Review

Digital Divide

Along with the innovation of intelligent technology, digital inequality has been highlighted, and digital divide has gradually become a perspective to focus on the inequality of disadvantaged groups. Many scholars as well as organizations at home and abroad have different views on the definition of digital divide.

Hoffman identifies the digital divide as "the gap between those who have the tools of information technology and those who do not"(Hoffman & Novak, 1998). According to Toffler, a leading American futurist, the digital divide is a divide in information and digital technology, an unequal distribution of the re-diffusion of new technologies(Alvin & Heidi, 2000). Subsequently, the public's attention was drawn to the specific description of the phenomenon of the digital divide in the 1995 report of the U.S. Department of Commerce's Office of Telecommunications and Information Administration (NTIA), entitled The Forgotten Corners of the Internet: A Survey of America's Urban and Rural Informationally Poor, which revealed differences in the adoption and use of the Internet by different segments of the population in the United States.Since then, the digital divide has attracted attention.

Our government has been concerned about the digital divide mostly since the 21st century,The academic communities put perspective into this area.Some scholars systematically conceptualize the digital divide (Cao, 2001), Other scholars also believe that the digital divide is mainly understood from two perspectives, one is the understanding of digital; the other is the understanding of the divide, due to the differences in class, gender, occupation, income, etc, different groups in the popularization and use of Internet technology will appear in different degrees of digital divide (Jin, 2003). It is widely recognized that the digital divide is essentially an inequality of participation in a digital society, a gap in access, use and effectiveness of information communications technology (ICT)(Zhou, 2016).

Along with the information revolution and the evolution of artificial intelligence, researchers have paid attention to the digital divide from different perspectives, exploring the causes of the digital divide phenomenon in depth in terms of economic, age, gender, education, geography and other factors.

The digital divide in old age

Data from the seventh national population census conducted by the National Bureau of Statistics and the State Council showed that the population aged 65 years and over was 190 million, accounting for 13.50 per cent of the population, representing an increase of 4.63 percentage points in the proportion of the population aged 65 years and over, compared with the sixth national population census (National Bureau of Statistics, 2021), It can be seen that the aging of our population has deepened and the proportion of the elderly group has increased.In this context, the contradiction between "digitization" and "aging" has been aggravated, and the phenomenon of digital divide among the elderly has attracted the attention of academics.

It has been argued that age is one of the most important factors in the formation of the digital divide (Niehaves & Plattfaut, 2014), older age groups are more prone to cognitive impairment than other age groups, affecting their receptive application of new knowledge (Xu &Ma, 2020). Most of our research focuses on the manifes-

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tations, causes, and paths to bridging the digital divide among the elderly (Wu &Zhu, 2023; Wang & Jiang, 2021; Liu, 2020; Huang, 2020), for example, the knowledge gap theory, social exclusion theory, diffusion of innovations theory, technology acceptance model, use and fulfillment theory and other perspectives are used to explore the reasons for the formation of the knowledge gap as well as the paths for bridging it (Pan & Qiu, 2021), but in his latest book, The Digital Divide, Van Dijk suggests that the digital divide cannot be bridged, only mitigated. In terms of research methodology, researchers mostly use the rootedness theory to generalize information and construct theories to explore the important influencing factors of the formation of the digital divide among the elderly and their internal logical connections (Liu et al., 2022).

However, for the elderly, the inequality of the digital divide between urban and rural elderly groups is not exactly the same, the income gap between urban and rural residents has widened, the imbalance between urban and rural resources has been highlighted, the per capita arable land in rural areas has been decreasing, and more and more young rural laborers are flocking to the cities to work, which has resulted in the emergence of a large number of elderly people who have been left behind(Liu, 2022). They have less access to smart media, less digital care and less digital inclusion, and fewer studies have focused on digitalisation amongst the rural left-behind elderly.

In summary, this study takes the rural left-behind elderly as the research object, with ethnography and in-depth interview method.To explore the current situation of digital exclusion of the rural left-behind elderly, the reasons for it, and the measures to alleviate the digital divide among the rural left-behind elderly, with a view to improving the digital inclusion and care for the rural left-behind elderly in many aspects of the smart era.

Research Objectives and Methods

Research Objects and Ideas

This paper takes the rural left-behind elderly as the object of observation, they are different from the urban elderly and the ordinary rural elderly, the left-behind elderly means that their children are not with them for a long time, and their contact with the outside world mostly belongs to the state of being at a loss and not being able to keep up with the pace of intelligent technology, which shows the individual's resistance to the change of society and inferiority complex.But in the age of artificial intelligence, digital living has become the norm for most people's lives, and as James said, “No man is an island where the wave of technology goes” (Burke, 2019), elderly people left behind are also part of the society, they can easily accept the arrival of new things when they are young, but along with the advancement of technology, age, and cognitive disabilities, they are unable to cope with the difficulties caused by artificial intelligence.Therefore, it is necessary to take the left-behind elderly as the main body of research, focusing on the discussion of the logic of the formation of the digital divide of the rural left-behind elderly and the measures to alleviate it.

This study examines Z village in Anhui Province for a number of reasons:firstly, as a village with a large population base in Feidong County, Hefei City, Anhui Province, Z Village has 400 registered villagers and 10 registered elderly people, but according to the author's visit to the survey, there are as many as 80 unregistered elderly people, accounting for 20 per cent of the total number of villagers, which makes people wonder why there are more than 50 elderly people living in Z Village, which is 37 kilometres away from the city centre of Hefei City, and how a digital divide arises in this group;Secondly, the place is close to the author, and for

rural fieldwork, acquaintance interviews are more likely to make interviewees let down their guards, which facilitates in-depth interviews as well as the organisation and supplementation of subsequent interviews.As Fei Xiaotong describes in Native China, in Chinese vernacular societies, the unique "private" creates hierarchical relationships determined by kinship and geography (Fei, 2019)□So familiarity not only facilitates the follow-up of the interviews, but also provides a degree of assurance of the authenticity of the interviews.

Research Methodology

Using the researcher as a research tool, this study uses a variety of data collection methods to explore social phenomena holistically in naturalistic contexts, analyses data and develops theories using an inductive approach, and obtains interpretive understandings of the behaviour and meaning constructs of the subjects of the study by interacting with them(Chen, 2000).In the research practice of this paper, the author adopts the research method of combining ethnography and in-depth interviews.

The author used Z village in Anhui Province as a field research site to collect data and information, and at the same time, conducted participatory observation of Z village for more than 6 months, visited and recorded the current situation of the left-behind elderly in Z village, conducted in-depth interviews with 10 left-behind elderly for 20-30 minutes in accordance with factors such as gender, age, occupation, presence of grandchildren accompanying them, and frequency of their children's return to home, etc. Informal interviews were conducted with grandchildren of a number of left-behind elderly, to provide more fulfilling field materials and to improve the research information (Deng, 2021). After the interviews, the author categorised and extracted and analysed in-depth the audio recordings and interview transcripts.

In order to improve the objectivity of the study and the authenticity of the interviews, the author verified the interview transcripts with the village leaders of Z village as well as other villagers to conduct the research reliability and validity tests. The sample size of the in-depth interviews in this study was 10 people, and the relevant information of the interviewees was anonymised and permitted to be used.

Table 1 Basic information about the respondents

Number	Genders	Age	Occupation	Number of children	With or without grandchildren	With or without a partner	literate or illiterate
W01	female	79	farming	5	NO	NO	NO
W02	female	81	farming	5	NO	YES	YES
W03	female	74	farming	3	YES	YES	NO
W04	female	69	Tofu self-employed	3	NO	YES	NO
W05	female	67	farming	3	YES	NO	NO
M06	male	82	Former Village Cadre	3	NO	YES	YES
M07	male	73	farming	2	NO	YES	NO
M08	male	83	Former Village Cadre	2	NO	NO	YES
M09	male	78	Worked as a production team leader	5	NO	YES	YES
M10	male	67	farming	4	NO	NO	YES

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The Formative Logic of the Digital Divide among the Rural Left-behind Elderly

As an important social phenomenon in the digital era, the concept of digital divide originates from the information and knowledge gaps. Along with the sudden advancement of the wave of intelligent technology, the connotation of digital divide has gradually evolved, from the initial network access and access, to the skills and literacy of network use after access, as well as the development and rational use of the data in today's intelligent era (Zhong &Fang, 2022), it has shifted from the access gaps to the use gaps and then to the intelligent gaps.

As most participants in any social system gain access to technology, the second digital divide starts to become more important than the first one (Riggins & Dewan, 2005). However, digital access is still important for the rural elderly left behind who have never been exposed to digital technology, and digital use and digital literacy are largely incomprehensible to this group.Therefore, in the following research, this paper mainly explores the digital access dilemma of the rural left-behind elderly in three aspects: physical access, intensive access, and educational access.

Physical access gaps: lack of digital equipment

At the onslaught of the digital wave and the arrival of the smart era, human beings are exchanging and surviving in cyberspace in a form of data, the digital transformation has become an irreversible process, and we can't refuse to join the digital network and return to the printing era (Nicholas Carr, 2015).

Rural left-behind seniors have a much lower rate of access to digital devices than urban seniors or even the average rural senior.Among the 15 left-behind elderly people pre-interviewed, only 3 of them have smart phones, only 1 of them has a smart electrical appliance (connected TV) at home, and the vast majority of them use non-smart phones to receive phone calls, use radios to listen to news or comedy, and use satellite reception equipment to watch TV, not to mention being unable to comprehend the use of smart phones.Respondent W03 spoke on the use of smartphones:"All I know is that I can play games, and my third sister's son (interviewee W03's third daughter) is always playing games on it, so I don't know what's available."

In addition to access to devices, access to basic networks is also problematic among the rural left-behind elderly population.Respondent W02 is the older person in Village Z who is more fluent with smartphones, and when it comes to whether or not she can use a smartphone, the other interviewees mentioned Respondent W02 as being very good at playing with her phone.Interviewee W02 probably understands that smartphone use requires internet access, but she does not have internet at home, as she bluntly told the author:"I'm rubbing my neighbor's Internet, and it's not good enough to ask my subordinate ("subordinate" means "child" in Hefei dialect) to install an Internet."Respondent M06 similarly stated:"I'd like to get a cheaper (mobile phone) and see what happens, but it seems like I have to connect to the network, I can't get that, I don't really know how to do that, and I still have to pay for it every month."

Access to digital devices requires financial support, most of the elderly left behind in rural areas live frugally, they do not understand the cost of digital access, and they are unable to ask their children for it. The lack of hardware makes it difficult for the elderly left behind in rural areas to have normal access to digital devices, and over time, they are rejected by the digital society, resulting in digital fear and digital cognitive disorders.

Deep Access Gap: Digital Thinking Closed

While access communication has often been understood as simply access to devices in previous studies of the digital divide, the Dutch scholar Dijk creatively developed the perspective of "mental access," which refers to the lack of basic digital experience due to the lack of attractiveness of new technologies, the lack of interest on the part of users, and the lack of digital anxiety(Dijk & Hacker, 2003).The degree of willingness to "mentally access" is referred to as "mental accessibility", i.e., people can only further access and use ICTs if they have a positive attitude towards them.

The elderly left behind in rural areas have been in digital isolation for a long time, and have developed fear and resistance to the use of smart products.Respondent M08, who lives alone, said:"I don't use that, I just watch TV, I have an old people's machine, I don't even want to answer when they (the kids) call, it's not like there's anything going on."When the author said can can teach the elderly to use smart phones to watch news, serials, the interviewee M08 first shook his head repeatedly, that they can not use smart phones, and then carefully asked how to watch the news.Respondents W04 and W05 were equally resistant to the use of smartphones, saying they were afraid of trouble, but when the author said they could use smartphones to watch Jitterbugs like respondent W02, respondents W04 and W05 were ambivalent, believing that it was still possible to learn how to do it, but they were afraid of not being able to learn.

Specifically, the rural left-behind elderly are not totally resistant to digital products and smart life, they also aspire to smart life, but they do not have the means to understand this aspect, and they do not have the means to expand and cultivate their digital mindset, and they do not have a negative attitude towards ICT, but they are afraid that they will not be able to learn it, and they are afraid that they will get into trouble, and the phenomenon of the digital divide among the rural left-behind elderly is further deepened by their closed digital mindset.

Educational access gaps: the difficulty of feeding the digital back

Digital feedback has often been cited in previous research as a possible pathway to mitigate the digital divide, and is derived from cultural feedback, which is "the process of extensive cultural absorption from older to younger generations that occurs in times of rapid cultural change" (Zhou, 1988). Through digital feedback, the younger generation transmits information and communication technologies and related digital concepts to the older generation, which helps the older generation to integrate into the digital society and at the same time strengthens intergenerational connections within the family (Zhou, 2016).

However, for the rural left-behind elderly, children are often not around, the family and social discourse system due to technological empowerment and "a shift in the strong" position of the younger generation is difficult to achieve the temperature of the digital feedback, coupled with the cultural level of rural left-behind elderly people affect the state of digital acceptance, the discourse and the cultural background of the left-behind elderly digital access limitations.Interviewees M06 and M09, both of whom worked at the village office when they were young and have a certain level of literacy, mentioned during the interviews that they were willing to learn how to use smartphones and to learn about changes in the outside world with the help of smartphones.Left-behind elders with an educated background have a broader digital cognition and are more open to new changes.

Although there are other left-behind elderly who have not received cultural education and are willing to ac-

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cept digital feedback, the number of this part of the elderly is relatively small. On the whole, the rural left-behind elderly have been living on this piece of land for many generations, and have been indoctrinated by the Confucian culture of humanism and ethics, so it is more difficult for them to accept that their children and grandchildren are in the dominant position in feeding them; on the other hand, most of the left-behind elderly have not received any formal education, and they can't even read or write, so it is difficult for them to provide digital feedback.Interviewee W01 said in this regard:"I can't read and I have a bad ear, I can't learn, go ask Second Grandma "Second Grandma" (interviewee W02), she can read and she can look at the phone." In conclusion, the rural left-behind elderly are also living in the smart era, while other groups are exploring how to further alleviate the use of the gulf, smart gulf, the rural left-behind elderly have not even crossed the digital access gulf.The formation of its digital divide is closely related to the lack of digital equipment, digital thinking closed, and the difficulty of digital feeds.

Paths to mitigating the digital divide among rural left-behind elders

The author in the previous article mostly focuses on the digital access gap to elaborate the logic of the formation of the digital divide.Therefore, in the mitigation measures also mostly focus on access, the digital access problem for the rural elderly left behind the top priority of the mitigation of the digital divide.According to the information compiled from the interviews, alleviating digital access for rural left-behind elders is mainly done in two ways:First, village committees or children should actively publicize and educate to alleviate the spiritual digital resistance of the rural left-behind elderly; second, strengthening the reverse digital remote parenting of children, alleviating the evacuation of family relations brought about by the digital divide, and using family needs to promote the active contact of the left-behind elderly with digital devices, so that the left-behind elderly in the countryside can truly enjoy the digital dividends of the smart era.

"It's okay to learn": enhancing digital equipment and deeper access

The mitigation of the digital divide among the rural left-behind elderly cannot be separated from the understanding of external information, the primary channel for understanding external information is the combination of the Internet and smart products, so the access to smart devices and the Internet is essential.Relevant departments should continue to increase the Internet penetration rate, so as to provide convenience for the elderly left behind in rural areas to "touch the Internet".The Statistical Report on the Internet Development Situation in China shows that the Internet penetration rate in rural areas is 61.9%, up 4.3 percentage points from December 2021 (China Internet Network Information Centre, 2023). Because the elderly left behind in rural areas have not been in close contact with the fast-changing external world for a long time and do not understand the cost of infrastructure access, children should face up to the needs of the elderly in their digital lives, provide financial support for the elderly left behind in their families, equip them with the appropriate smart devices and networks, and alleviate the elderly left behind's digital fear and digital pressure, so as to increase the rate of the access to digital devices for the elderly left behind in rural areas.As interviewee M06 indicated:"I don't know how much it is, but I'd be willing to look at it if children bought it for me, and who wouldn't want to be loose on their cell phone, but I just don't know how to say it."In this regard, the author specifically contacted the interviewee M06's granddaughter, whose granddaughter said that a smartphone will be arranged

as soon as possible to teach the interviewee M06 use.

Most of the left-behind elderly people have difficulties in accessing the Internet and deep access, during the interview and observation, most of the left-behind elderly people are in a state of contradiction in digital access due to trouble and economic problems.On the one hand, they are worried about not being able to master digital devices;on the other hand, they want to video with their children and grandchildren through their smartphones to alleviate the thoughts and bitterness of their hearts and to obtain emotional fulfilment, but most of the left-behind elderly people have shown their willingness to learn and to access the digital devices after the author's explanation.It can be seen that sophisticated access for the elderly left behind is indispensable.Village cadres can invite professionals into the village to explain, and children of left-behind elderly people should also be introduced to more digital knowledge, to avoid preconceived notions that the elderly have difficulty learning.The reason why interviewee W02 has become a very cell phone savvy person in the eyes of other left-behind elderly people is that his grandson often teaches the elderly how to use it at home and puts up steps on the wall to use the cell phone, so the elderly people also take the initiative to dial up their grandson's video for video calls when there is an Internet connection.

In general, children and society should not stereotype the left-behind elderly as "clumsy" or "old-fashioned". Instead, they should take the initiative to improve the provision of digital access equipment and spiritual access for the elderly left behind in rural areas, and work together to alleviate the access difficulties of the elderly left behind in rural areas.

"I'd like to video them more too": children reverse digital remote parenting

Digital remote parenting mainly refers to the parenting behaviors of parents who communicate with their children remotely through information and communication technologies to provide emotional support, learning guidance, moral guidance, and care arrangements, etc., when they are geographically separated from their children (Gao, 2023). However, it is often the case that parents not only have to raise their children but also have to support their parents, and the reason for the existence of left-behind elderly people is that they are unable to be supported by their children face-to-face, or even for short-term, fixed-time visits.As a result, digital tele-support for the left-behind elderly and the alleviation of the problem of the digital divide among the left-behind elderly have become a multi-purpose measure.

Firstly, children's remote digital support for the left-behind elderly can increase the willingness of the left-behind elderly to be digitally active, so that the left-behind elderly are compelled to have "digital access". This coincides with the case of interviewee W02, who, because of her age and living alone, often has to talk to her children, so she owns three smartphones and makes sure that each of them is always charged, and in the course of the interview with the author, W02 actively showed the author her three mobile phones.

Secondly, remote digital reverse parenting relieves the left-behind elderly of missing their children, unlike the sense of surveillance under digital remote parenting, where children may feel watched by their parents' electronic parenting enquiries, most of the left-behind elderly don't care about their private lives being watched over by their children at all times, and frequent contact with their children is a manifestation of the elderly being loved.Interviewee M09 does not use a smartphone, but his partner often uses a smartphone to communicate with his children, and his home was the only one in the author's interviews where a camera was found. In response, M09 said:"The kid insisted on installing it, saying he could see what I was doing at his place and he was relieved."Although the interviewees uttered it in a tone of dislike, it is easy to see that the elderly enjoy the love and care of their children.

In this context, strengthening digital reverse parenting for the left-behind elderly can not only alleviate the

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digital divide but also promote family closeness, make the left-behind elderly feel cared for, and promote the active use of digital devices for the left-behind elderly.

There is a long way to go to alleviate the digital divide among the rural left-behind elderly, which is not simply a matter of the use of digital devices, but lies more in the issue of digital awareness and access.Simple external infrastructure access and internal digital emotional mediation in the eyes of other groups should both be necessary to mitigate the digital divide among rural left-behind elders.Alleviating the digital divide of the rural left-behind elderly is not only conducive to the overall digital construction of the countryside, alerting the digital society to the concerns of the group of left-behind elderly, but also conducive to picking up the self-confidence of the rural left-behind elderly, and protecting the digital dignity of the rural left-behind elderly.

Conclusion

As members of society, the elderly left behind in rural areas also contributed to the building of society when they were young. However, as they grow older and the social process accelerates, the arrival of urbanisation, intelligence and the digital age has made it impossible for rural left-behind elderly people to adapt to it, and they dare not take the first step beyond the cognitive, coupled with the fact that they cannot live with their children, they are gradually being abandoned by the digital life, both actively and passively.This study focuses on the left-behind elderly in Z Village, Anhui Province, and conducts in-depth interviews with 10 left-behind elderly of different genders, ages, occupations, and backgrounds to explore the logic of the formation of the digital divide among the rural left-behind elderly and the initial path to alleviate it.

The study found:first, the formation of the digital divide among the rural left-behind elderly is mostly based on the digital access gap, and there are different gaps in access to digital devices, access to digital thinking and access to digital feedback, which add up to a digital divide that the rural left-behind elderly are unable to cross; Second, in order to alleviate the digital divide among the elderly left behind in rural areas, a long-term solution is needed, starting with basic access to digital network infrastructure and the popularisation of digital devices and networks. Based on digital devices, children can guide the digital thinking and emotional mediation of the elderly left behind in rural areas, and guide the elderly to form a positive state of digital contact. At the same time, children can realise remote reverse parenting by means of digital devices, so as to promote the active contact and use of digital devices by the elderly, and to form a close family digital relationship.

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