

Interview-based Study about the Impact of the COVID-19 Pandemic on Smartphone Use among the Seniors in China's First-tier Cities

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ABSTRACT: The outbreak of the COVID-19 pandemic was a sudden disaster for all human beings. To prevent the spread of the pandemic, China used smart facilities to manage it, especially relying on smartphones. This study examines what the impact of the pandemic is on the use of smartphones by seniors, a group that is weaker in the use of smart devices. The study looks at the situation with seniors in the new media environment, seeking to help them cross the digital divide and bring social attention to their plight during the pandemic. The authors conducted in-depth interviews with 52 seniors from first-tier cities in China and then did a discourse analysis of the interviews. The study found that the pandemic increased the smartphone penetration among the seniors, and helped them mitigate the digital divide and increase their social adaptability. However, it is still noteworthy for smartphone addiction.

1. INTRODUCTION

From the end of 2019, the COVID-19 epidemic is sweeping the world. In order to prevent and control it, governments are imposing strict requirements on the extent of population mobility, with people's lives shifting via the internet. Online working, online learning, online socialising and online consumption have become normal for most people. While the development of smart living brings a lot of convenience to people, it has also created a "digital divide" among older people, which has become an insurmountable problem in dealing with the challenges of ageing. According to the latest Chinese census data, by 2020, there will be more than 260 million people aged 60 and above in China, but only 110 million people have access to the Internet (CNNIC, 2021).

In China's first-tier cities, intelligent epidemic management methods have reached a very popular stage. Therefore, this paper explore the impact of COVID-19 on seniors in first-tier cities in order to make recommendations on how to better reduce the "digital divide" in the post-epidemic era.

Most of the previous studies focused on the situation of smartphone use among the seniors in a country or a certain age of people in a place. Different from previous studies, the authors focus on the seniors who live in China's first-tier cities and discover the impact of the COVID-19 pandemic on smartphone use among them.

The research can contribute to the discovery of the seniors' social adaptation, seniors' digital divide, and the development of the senior-friendly apps. Because some of the operations are too complex most of the interviewees said they have difficulties using smartphones. Also, the size of the buttons is too small for the seniors to touch accurately. Some seniors can't type pinyin while the voice input sometimes can't tell their accent correctly so they can't express themselves clearly. Therefore, the app designers and developers need to provide more senior-friendly operation apps for the seniors to use.

In-depth interviews can be used for exploration and analysis for the following research to obtain more unique research directions and perspectives, and truly and accurately reflect the needs of the elderly.

2. LITERATURE REVIEW

The term "digital divide" was first coined by an American think tank in the 1990s and is still very influential today. In previous experience, the seniors were at the very poor level of the information society, both from the perspective of social stratification and age division [1].

The outbreak of Covid-19 at the end of 2019 is an important turning point for digital survival [2]. During the pandemic, in order to avoid cross-virus infection, the Chinese government advocates the display of health QR codes, and encourages people to use mobile payment as much as possible [3]. At the same time, the news often

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reports on seniors who are turned away because they don't have a health code or can't use online payment to buy groceries. Marginalisation seems to be even more pronounced for seniors who can not keep up with the 'digital trend'. They seem to be separated from society by an invisible wall [4]. In this regard, studies by Van Jaarsveld (2020) and Llorente-Barroso et al.(2021) both show that the negative impact of the digital divide on elder populations during the COVID-19 pandemic is increasing and measures are needed to address the impact.

However, most of the previous studies are based on the situation that there is a large digital divide between seniors and other age groups which focus more on the negative impact of the Digital era on the seniors and the solutions to reduce seniors digital divide. The previous studies also ignored the positive impact of the COVID-19 pandemic on the use of smartphones among seniors.

3. METHODS

3.1. Data Collection

The study adopted in-depth interview methodology to extract the influence of the pandemic on the use of smartphones by the elderly from the communication with the elderly. In order to further research the influence of the pandemic on participants, the study narrowed down the scope of the elderly to the elderly in first-tier cities. The classification of cities is based on the data of the Chinese Mainland· Top 100 Cities Summit. Seven first-tier cities including Beijing, Shanghai, Shenzhen, Wuhan, Nanjing, Chengdu and Chongqing were selected for the study. Participants were selected by random sampling in multiple large public areas. The standard of target sampling is to select the elderly aged between 60 and 80. The reason for selecting this age range is that China's law on the protection of the rights and interests of the elderly (general Office of the Standing Committee of the National People's, 1996) clearly clarify that the age of the elderly is over 60.

The study conducted 52 interviews online and offline from March to April 2020. Shanghai selected data online due to the impact of the current pandemic, and the other six cities took offline interviews. The elderly distributions were Beijing (17%), Shanghai (15%), Shenzhen (12%), Wuhan (12%), Nanjing (17%), Chengdu (21%), and Chongqing (6%). Among the elder, 33% were boys, 67% were girls, 33% were elderly who didn't live with their children, and 67% were elderly who lived with their children. All participants used smartphones during the pandemic and were familiar with the basic use methods.

The interview questions were semi-structured. The interview place and time were randomly selected and the permission of each interview, recording and transcription was obtained. The interviewers asked the elder to share the problems related to the use of smartphones before and during the pandemic, getting the main data to support the study of the influence of the pandemic on the use of smartphones by the elder and understanding the thoughts, behaviors, values and living habits of the elderly. In the interview, the researchers made corresponding

adjustments according to the specific answers of the elderly, to improve the elder's interests and leave space for further research and exploration.

3.2. Data Analysis

The data analysis of the study applied the three-level coding method of text analysis. The author formed the new theory and framework through open coding, spindle coding and selective coding of interview records, and repeated discussion combined some previous theories with first-hand information to solve differences. The author first extracted, analyzed, decomposed and compared the transcribed material through open coding. The research adopted the way of self-creating code and using the existing name code, and then extracted the keywords and named the concept category from the collected interview records. Secondly, the author integrated and connected the open coding through spindle coding. Finally, selective coding was used to find the internal strong connection and key role in secondary coding. The three-level coding made the research structure clear, the relation close and the theme consistent.

4. RESULTS

The data revealed the impact of smartphone use on seniors during the pandemic, covering four main themes: widespread use of smartphones, bridging the digital divide, increasing social adaptability, and the addiction to smartphones. The first theme illustrates the phenomenon of the widespread use of smartphones led by the pandemic. The second theme presents how the digital divide has been mitigated by the increased ability of seniors to use smart devices and analyzes the specific reasons for it. The third theme analyzes how the widespread use of smartphones has improved the social adaptation of the elderly in terms of both interpersonal adaptation and adaptation to social change in general. The fourth theme addresses the issue of addiction to smartphones that may arise among seniors during the pandemic.

4.1 Widespread Use of Smartphones

All participants were currently using smartphones, and they all reported that most of their peers around them were also smartphone users. The vast majority of participants indicated that the outbreak of COVID-19 pandemic had greatly increased the frequency of smartphone use and that smartphones were becoming a necessary tool in their daily lives. Several participants (N = 8) strongly indicated that they could no longer live without their smartphones during the pandemic., with one participant stating:

The pandemic forced me to use my smartphone every day. I need to scan all kinds of QR codes to enter public places, and even back home. It is really hard to get around without my phone now!

4.2. Bridging the Digital Divide

All participants agreed that there is a difference in their

ability to use smart devices with young people. Young people can use their smartphones to operate different features and access the information they need to know. Due to the declining learning ability caused by age, participants are generally not proficient in operating smartphones and using the Internet, which leads to a gap between young people and them. It also makes them unable to enjoy the convenience and high efficiency brought by smart devices. This polarizing trend is a reflection of the “digital divide”. However, the vast majority of participants stated that the digital divide has been mitigated by the COVID-19 pandemic.

Most participants reported that the pandemic allowed them to spend more time learning how to operate their smartphones, so their ability to use them was gradually strengthened. All participants learned at least one new smartphone skill during the pandemic. The most mentioned were using health codes, checking COVID-19 nucleic acid reports, and other information related to the pandemic. One participant compared the way she learned information related to the pandemic at the beginning of the outbreak to how she does it now. She noted:

At the beginning of the pandemic, I had to be informed by my daughter about the latest information. Only young people were able to keep up with current events, and I was a bit behind. But now, I can use the smartphone to keep up with the information that young people can access. I feel that I am getting closer to them.

Smartphones served as a major form of entertainment for seniors during the pandemic. To avoid the risk of the virus, seniors prefer to stay at home, and they can learn the entertainment functions on their smartphones to kill time during this period. Participants mentioned that the functions they had learned included watching videos, singing, reading books, playing games, and so on. These functions are mainstream entertainment for young people and are also areas that are difficult for seniors to operate. As more and more older people participate, it can make the digital divide gradually narrow. One participant proudly showed off many of the features on TikTok that she learned during the pandemic. She said:

During the time when the pandemic was serious, I was bored at home, so I wanted to post some short videos on TikTok by myself. I followed the instructions on TikTok step by step, and now I have learned to edit videos, put music to them, and so on. Some of the features I can use young people may not know yet!

The environment under the pandemic has helped to bridge the digital divide for two main reasons. The first reason is that the recognition of using smart devices for pandemic management motivates the willingness of seniors to learn to use smartphones. The second reason is that the pandemic has contributed to the phenomenon of digital feedback.

4.2.1. Recognition of Using Smart Devices for Pandemic Management

Most participants agreed that using smart devices for pandemic management was a good thing. They mostly

mentioned the wide use of QR codes. The health code is the most common one, which is generated based on the individual’s travel trajectory and physical condition, thus making it easy to initiate timely measures for people with potential risks. The ID code is a QR code that needs to be scanned for nucleic acid tests. If a person tests positive, he or she will be promptly notified of quarantine. Participants appreciated the use of the QR codes, which they felt was a very efficient way to manage the pandemic and ensure their safety. Therefore, they were willing to learn how to use the QR codes. One participant commented:

The health codes bring me a sense of security. At the beginning of the pandemic, I was afraid that I would be at risk of getting the virus when I got out. But then I realized that whenever we went to a public place, we were asked to show the health code and only those with the green code were allowed to enter. This way makes me know that everyone around me was healthy, and I would not be that worried anymore.

Participants (N = 17) indicated that they were self-learning the features on their smartphones during the pandemic, and they all expressed a willingness to learn more features of their smartphones. Overcoming the virus is very important at the moment, so they are motivated to learn more smart features to facilitate government management.

4.2.2. Promotion of Digital Feedback

The majority of participants reported that they maintained close interactions with their children during the pandemic. Most participants (67%) lived with their children during the pandemic, while some (26%) did not live in the same house but were in the same city as their children.(see Figure 1 in Appendix) Due to some regulatory policies, many cities have implemented work-from-home or avoid business trips, which has allowed young people to spend more time at home. This provides more opportunities for communication between seniors and their children. As a result, young people can help deal with their parents’ problems with smartphone use promptly. The vast majority of participants indicated that their children often teach them skills about using smartphones. One participant shared the experience of learning to apply for a health code with the help of her children, she noted:

The health code was taught to me by my son. At first, he applied it for me, so I just directly opened it. Then I found that I needed to re-report my health status after 14 days, but I did not know how to do it. So I asked my son, and he taught me step by step and helped me solve it without any problem. I asked my son several times afterward, but now I know how to operate and I can do it by myself.

While teaching seniors to use smart features, young people are attempting to use effective ways to help them avoid the negative effects of not being able to use smart devices. The authors interviewed a volunteer who works with scanning ID codes at a nucleic acid test station, and she reported that she rarely encountered problems with seniors due to smart devices in the course of her work. She explained:

Most young people bring their parents to get tested. They usually help the seniors apply for the ID code on their smartphones in advance. If seniors do not have smartphones, their children will apply for a family health code on their smartphones. We will scan their smartphone directly. I have also encountered some young people who will print off their parents' ID code ahead of time and we scan the printed code directly, which is also valid.

Although the digital divide has been mitigated by the COVID-19 pandemic, most participants believe that the gap between themselves and younger people still exist. Smartphones still present many difficulties for seniors who need to rely on the help of younger people to solve them. There were two main difficulties reported by the participants. The first was the complexity of the operation, which included "not being able to download apps", "not being able to shop online", and "not being able to use online banking". The second is that the user design of smartphones is still problematic in terms of accessibility for seniors. They often mentioned that "the keyboard on the phone is not easy to type", "the text size is too small", and "the volume is too low". Even if the pandemic forces seniors to learn and use smartphones, the digital divide will continue to grow over time if the ability of seniors to use smartphones remains at the current stage. One participant said she experienced the complexity of operation in learning to use the smartphone, making her believe she did not need to continue learning. She said:

I know all the basic functions, such as health code, online chat, online shopping, etc. But I do not know how to use other apps. It is too complicated to operate, and I have to ask my children every time. To be honest, I think it is enough to master these functions now, and I do not want to learn anymore.

4.3. Improving Social Adaptability

4.3.1. Interpersonal Adaptability

After retirement, the social environment and roles of older people are constantly changing. Li Debin (2011) summarised the role transition of older people into three areas: occupational roles into leisure roles, subjective roles into dependent roles, and the change from spouse roles to single roles. In addition, the scope of social interactions among older people tends to narrow, social networks continue to shrink, and the form and content of social interactions become monotonous. Older people need to continue socialising and learning new things in order to improve their social adjustment from multiple perspectives and better face the challenges posed by the epidemic era.

The survey showed that most participants (n=42) use online chatting software such as WeChat, and some indicated (n=30) that they were proficient in a number of skills such as chatting, WeChat groups and friend circles during the epidemic. WeChat has gradually replaced traditional telephone calls, changing the way older people interact with each other, breaking the social inconvenience of the stricter crowd management in the epidemic, giving

retired people a larger social circle and improving their interpersonal adaptability.

The most basic and important feature of WeChat is instant messaging, which is also the most widely used feature by the elderly. Features such as voice input and video calling have greatly weakened the use of WeChat by the elderly. Even when children and relatives are not around, they can communicate online anytime and anywhere, bringing the emotions of parents and children closer.

I can't type, because of the epidemic quarantine at home, and my son does not live together, afraid of my son's work busy also dare not call casually, then began to learn to use WeChat, can send voice, very convenient, at any time can send, also not afraid to disturb him.

We use WeChat every day, and there are family groups. Although we can't just hang out anymore, we can use our phones to chat with relatives, and the kids even have videos if they're free, so it's like we're all together.

(see Figure 1 in Appendix)

Older people have a relatively poor cultural life and have a strong need for circle culture. Many participants (n=5) said that they often missed their friends from school and work, and that before the epidemic they used to talk on the phone and meet up every once in a while, but after the epidemic they rarely even went out to the community due to some epidemic prevention restrictions. Once the elderly became more proficient in using WeChat, they were able to set up WeChat groups with their past friends, and even if they could not meet offline, they would still share fun things in the group chat every day. In addition, some respondents (n=15) were also good at exploring the various new features of WeChat, reconnecting old friends through various WeChat groups such as friend circles, video numbers and small programs to counteract the spatial constraints imposed by the epidemic and further facilitate their interpersonal interactions.

I used to be a teacher in a primary school and my former colleagues created a WeChat group. Although we don't work together anymore, we still chat a lot, exchanging songs, analysing the flowers we keep at home and posting articles on public websites, which is fun.

We have a group of classmates in junior high school, and we have very strong feelings for each other. One of our classmates unfortunately passed away during the epidemic, and we couldn't go to the local area, so ah our old class president used a small program on WeChat to hold an online memorial service, and we all remembered that classmate together, which I think is very meaningful.

Due to the strict requirements of population mobility for epidemic prevention and control, the trajectory of many older people is confined to the community. Regular nucleic acid, and group purchasing in some areas, have gradually made the community the main locus of interpersonal interaction for older people.

Older people in the community like me ah every day take their grandchildren for a walk downstairs, the

epidemic is three years old, we all know each other and we can still have a chat when we meet.

McLuhan said that the medium is an 'extension' of the person, and this interviewee also mentioned that once the elderly got to know each other, someone suggested setting up a WeChat group, which at first did not talk very often until a time when the epidemic was more severe and home quarantine was required, and the group became popular.

People will share constantly about cooking every day, forward a lot of articles about epidemic prevention, and kind of look out for each other during special times. Online chat tools help older people to have larger social circle and more opportunities to communicate, effectively improving their quality of life.

4.3.2. Adaptability to Overall Social Change

The ubiquitous new media, which permeate the daily lives of today's people, have created a new information environment and shaped new ways of thinking. As digital existence becomes the social norm in the post-epidemic era, it seems that very few older people are able to "live healthy" and move freely in the digital space. However, through the research, this paper found that in these times of great change, it may seem that new media has domesticated older people, making them "digital immigrants" and making life difficult for them in the epidemic era; but in fact, older people are always trying to tame their smartphones through their own efforts, thus enhancing their own adaptation to the overall changes in society.

The Health Code is a product of the needs of the new pneumonia epidemic and the development of digital technology, which requires a Health Code to be presented in all public places in order to pass. For older people, it is a new product and a new technology in the era of the epidemic. The vast majority of respondents (n=45) said they were able to use the code themselves, with 18 seniors learning to apply for the code themselves by following an online tutorial, and 26 seniors being helped by their children or staff. Respondents said that they are now used to having their health codes automatically presented when entering and leaving shopping malls and getting vaccinations, without having to be reminded at all.

I didn't know how to use the health code or trip code before, but now I know how to use them all; I know to report my whereabouts when I do nucleic acid, and when I go on a trip or go to the mall I flash the QR code myself, I don't need to be taught.

I now know I show my health code when I get a vaccination or go to the doctor.

Older people keep up with the times by improving themselves by learning new technologies, improving their cognitive skills, actively adapting to the social changes that are now taking place and observing the special social order of the epidemic era.

In some areas, due to the epidemic closure, traditional shopping in malls is very inconvenient and online payment has become an almost mandatory part of life, with online shopping becoming the quickest way to buy essentials. Half of the respondents (n=26) had the ability

to shop online, with some seniors saying that learning to shop online is a must in times of epidemic.

Occasionally during the epidemic when I had a minor illness or pain, if I couldn't get out of the house, I consulted doctors, prescribed and bought medication online, which I hadn't really thought about before the epidemic.

Now that the epidemic is recurring outside, it's not safe, and there's no way to go out, so I have to learn to shop online. For instance, Taobao, Jingdong, Jindo, after two years of the epidemic all learned, very convenient.

In the Internet age, smartphones are helping to optimise the social adaptation process for older people, allowing them to return to group life and not become a 'marginalised group', overcoming the physical distance caused by the epidemic control and expanding the range of interpersonal friendships and reconnecting with family and old friends. At the same time, most older people are also making the most of their self-efficacy, updating their outlook and adapting to the changes in society as a whole, even if their lives are deeply affected by the epidemic and they have difficulty getting around, learning all the applications of their smartphones to improve themselves and keep up with the times.

4.3.3. Addiction to Smartphones

In the era of the epidemic, smartphones bring fun and convenience to seniors in their enclosed time, but at the same time many problems ensue. Older people have more free time as they are not under pressure from work or school, and this, coupled with the strict management of movement of people during the epidemic, has greatly reduced the opportunities for older people to go out. The internet is gradually overtaking traditional media as the main tool for older people to pass the time of boredom and leisure. Older people who have experienced a time of information isolation will devote a lot of their time and energy to the virtual internet if they have poor self-control after being exposed to it, and over time, it will be very easy to become addicted.

Some respondents (n=10) said they spent more time on their mobile phones for recreation after the epidemic, such as watching short videos like ShakeTime, while some seniors (n=12) said the general situation of the epidemic had increased the frequency of checking their phones and they had to keep an eye on WeChat groups, news apps and other sources to follow more information about the epidemic.

Studies have shown that more and more older people are joining the ranks of the "heads down" crowd, and if the length of their mobile phone use is not properly controlled, it can cause "shoulder and neck pain", "deteriorating eyesight" and many other problems. This is a problem. Therefore, for older people, there is a need to strike a balance between online and offline life.

5. DISCUSSION

This study explores the impact of the COVID-19

pandemic on the use of smartphones among seniors in China's first-tier cities. The finding is that COVID-19 has eased the digital divide among the seniors in China's first-tier cities and improved the social adaptations of the seniors in these cities. The reasons are as follows: first, the pandemic makes people have to bring their smartphones to go out to show their health codes. The data show that most seniors have their own smartphones after the pandemic. From the interview, some seniors said they began using their smartphones only after the pandemic, which shows that the pandemic has increased the popularity of smartphone use among seniors. Also, the lockdown policy restricts the seniors from traveling around and doing outdoor entertainment freely so they have more time to use their smartphones and learn about the operations of the apps. Besides, after the pandemic, many daily routines such as shopping tend to be done online, while WeChat Pay and Alipay also reduce the risk of infecting COVID-19 through hand-to-hand contact, more and more seniors realize that technology can bring convenience to their lives. In the interview, most of the seniors show the opposite attitude to intelligent life. Because of the convenience, most of the interviewees have a strong willingness to learn to use smartphones. Results of this research found that escaping psychology is a major factor that hinders the seniors from learning to use smartphones [5]. This research found that the pandemic makes seniors know the convenience of smartphones which makes seniors have great willingness to use smartphones which is the main factor to ease the digital divide. Second, the lockdown of communities makes seniors who live with their children get in contact with their later generations longer. The results of these researches all show that generation communication which is called "digital feedback" has a great influence on easing the digital divide [6][7][8]. In this study, the data show that most seniors would turn to their children for help when they met some operational difficulties. Later generations help greatly solve seniors' problems, enabling them to make better use of their smartphones, which has reduced the digital divide. Third, due to the limitation of the spatial distance of the pandemic, most of the meetings and communications among seniors and their relatives and friends have changed from offline to online. The research data shows that most seniors learn to use WeChat to keep in touch with their families and friends. WeChat is the main social app in China and it provides an easy-to-promote way for the seniors to overcome the digital divide [9]. The easy-to-use feature has greatly increased the popularity of WeChat among the seniors. Besides, WeChat has many functions that seniors can not only use it to communicate with others but also use it to read the news. The data show that most seniors can use apps to read the news. The use of social apps prevents seniors from being marginalized in this digital era, which enhances their social adaptations. Also, in the interview, many seniors said they can live without their smartphones, the necessity of using smartphones to show their health codes and tripcodes forces the seniors to take the initiative to use smartphones, and they gain more information through the internet, which helps them narrow the gap of the ability to obtain information between them and young people. It

greatly enhances their social adaptation. In addition, it is worth mentioning that in this research, most of the interviewees said they spend a lot of time using smartphones, so it is necessary to protect the seniors from Net Synthesis.

Different from previous studies, this research focuses on the use of smartphones among seniors in China's first-tier cities, so the results of this research are only applicable to China's first-tier cities. This study shows that family financial situation has affection on the use of smartphones among seniors [10], therefore, later studies can focus on the use of smartphones among seniors in China's second- and third-tier cities and the impact of the digital divide on the urban seniors at different levels. Moreover, the research data shows that many seniors still have difficulties in using smartphones, the later study can also focus on the development of a senior-friendly divide.

Because of the limitations of time and space, the research did not interview the seniors from all the China's first-tier cities. Also, the number of interviewees is not large, the age of the interviewees is between 60 and 80 so the results can't fully represent the situations of all the seniors in every city, but can only represent the situation of the elderly in the age group this paper interviewed.

6. CONCLUSION

This research finds that the outbreak of the COVID-19 pandemic has facilitated the learning and use of smartphones by the seniors, which contributes to bridging the digital divide and enhancing the social adaptability of the seniors. With the pervasiveness of smart management for the pandemic in China, smartphones have become an essential tool for people, including the elderly population. They generally recognize this management approach and are therefore actively willing to learn to use smartphones. The emergence of digital feedback has subsequently been effective in addressing the difficulties that seniors encounter when using smartphones and enhancing their ability to use them. More and more seniors tend to use their phones for personal needs, including physiological needs, social needs, and entertainment needs. They enjoy the convenience brought by smartphones and are more adapted to the smart lifestyle prevailing during the pandemic. As a result, the digital divide is also being gradually narrowed.

Objectively speaking, the government should ensure the construction and improvement of "digital life" infrastructure; Street communities can set up some classes or courses for the elderly to help the elderly better learn how to use smartphones, Their families could increase the number of teaching the use of smartphones and improve the teaching methods at the same time, which are easy for the elderly to understand and imitate to practice; Smartphones and media products improve the buttons and interface design to create products which are suitable for the elderly to quickly master the operation. Subjectively speaking, the elderly need to enhance their willingness to learn and take the initiative to learn complex operating processes.

APPENDIX



Figure 1 Living Conditions of the Seniors During the Pandemic

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