Keep Elders in Touch under Covid-19: Analysing WeChat's Usability for Chinese Elders

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Abstract

During the Covid-19 (or formally, SARS-CoV-2) pandemic that started in late 2019, governments around the globe constantly deployed local, neighborhood-wide lockdown or self-isolation measures to scrub virus spread from the early beginning of every potential infection chain. One of the consequences is that elders might be forced into situations where they have to live separately with their children during the lockdown or self-isolation period. During this period, elders' daily activities might be seriously affected, including the loss of face-to-face chat opportunities with family and friends. This means that elders are pushed to live online and adapt to the use of social media. Therefore, a well-designed application with good usability design and HCI experience would be favored and welcomed by the elders.

In China, WeChat is one of the most trending apps for contacting others. As an app with communication, payment, location, and many other services, WeChat has features that promote an online communication way of life. Is WeChat also promoting elder-friendly design and function? What problems do elders often encounter when they are using WeChat? This paper starts with a preliminary survey and need-finding user studies, and then moves into interface analysis using both HCI and statistical methods and further try to build user models via classification methods.

This thesis ~~project~~ serves as part of the broader "keep elders in touch" project and it aims to investigate the characteristics of Chinese elders' behavior during the Covid-19 pandemic, including the difficulties they encounter when they are using modern technologies as well as a detailed WeChat interface analysis. This paper contributes in 4 aspects: a) examine the current keep-in-touch situation of Chinese elders during Covid-19; b) review the literature on recent and relevant academic projects; c) analyze the WeChat user interface in detail and construct the links to past projects; and d) collect data on WeChat using HCI methods, including questionnaire, think aloud and heuristic evaluation, thus highlight usability issues of WeChat, which could potentially improve Chinese elders' experience during lockdowns or self-isolation periods.

Do you mean to prevent the spread of the virus?

from

Perhaps it would be better to say this could be valuable for elders.

This is to colloquial – how about saying that it is one of the most widely used …

Can/Does

thesis

is

encountered

better as - synthesise previous research on …

I think it is worth adding a sentence at the end about potential benefits for the broader challenges elderly people face with isolation how this work could contribute to tackling those.

Acknowledgements

- Judy

- KiT group

"Good academic writing communicates idea clearly and effectively, not necessarily stylish", "Write simple, be comprehensible, use active voice". I want to thank Shaun Ratcliff (Sydney), Cassandra Woloschuk (Tsinghua) and Kristin Sainani (Stanford) for correcting my previous myths about academic writing. No fancy GRE vocabulary!

I would also want to thank many who are not directly related to this project but are important to me. They shaped my life journey, pulled me out of quandaries and made me a better person.

When I was an exchange student in Philadelphia in 2018, I suffered desperately from loneliness and depression: dissatisfying Gaokao score, bad oral English and no friends disturbed me deeply. However, Robert and Elizabeth Scheyder (Penn) kindly invited me to their apartment for many warm chats with life guidance and free beverages. I felt relieved. I also appreciate that Robert and Elizabeth hosted my parents at a hot-pot restaurant on New Year's Eve during my parent's visit to the United States. Frank Chance (Penn) also invited me to his aesthetically-decorated house on Larchwood Avenue after his Japanese Aesthetics course ended. I was astonished by his abundant Japanese art collections in his house, and his matcha skills, too. Andrew Petersen (Penn) provided me with lots of useful information on Australia, Andrew's birthplace, before I attended the University of Sydney in 2019.

I spent a nice year in Sydney. After the outbreak of the Covid-19 pandemic, I came back to my hometown Guangzhou and studied 3 years online since 2020. I re-encountered the city, as well as many great people here. Su Yongqi, my high school classmate and a brilliant Psychology student at South China Normal University (SCNU), gave me ideas and detailed instructions on becoming a registered volunteer as well as ethics approval processes at SCNU. Mrs Cai and Mrs Gu at the Chebei Street Social Service Station are also very kind.

Guangzhou is such a lovely city! I would like to thank all doctors, health workers, and Covid testers, including Prof Zhong Nanshan, who protected Guangzhou city and ensured a smooth

running of daily activities without long or citywide Covid lockdowns. Efficient and humanitarian city!

My girlfriend Shimei Li is wonderful! She encourages me when I am down and suppresses my over-confidence whenever necessary. She is able to solve complex problems in a simple but effective manner, and she is always ready and willing to assist me on all sorts of issues, from postgraduate application to weight-loss diets. So lucky that I met her since December 2019 when I came back to Guangzhou from Sydney! Destiny.

Lastly and most importantly, I would like to thank my family's support during this hard time. My dad gave me investment and political guidance, whereas my mum gave me lots of confidence and care. My grandma cooked delicious cuisine on a daily basis and my grandpa proudly taught me the glorious, but somehow tragic, family history.

Oops, I am going to help my grandma with the lunch preparation again, today we might enjoy a four-dish cuisine! So bye-bye, see you in the formal thesis text...

Change from previous draft (TEMPORARY)

Since April 28, 2022

MOST of the below changes are made accordingly, abide to Judy's suggestion

- Moved limitations from Discussion to Conclusion, and added future work part
- Deleted synchronous KiT section
- Merged Background and Lit Review into new Chapter 2 as suggested
- Applied new thesis statement proposed by Judy
- Added support for Positive Psychology's relevance
- Added papers relevant to elderly loneliness and social media use

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Chapter 1

Introduction

Social connections are important for everyone but are critically important for older people. Research from around the world, such as in South Africa (Harling et al., 2020), China, (Liang et al., 2017) and the United Kingdom (Evans, 2019), all showed that regular social interaction helps to delay the onset of cognitive decline and frailty. In order to prevent elders from accelerated cognitive loss, and psychological illness caused by loneliness and to promote elder's health and well-being, my fellow group members of the "Keep-in-Touch" (KiT) undergraduate research group at the University of Sydney's Human-Centred Technology Research Cluster and I work together and investigate relevant research topics to keep elders in touch under the Covid-19 and future pandemics.

Use capital S in contexts like this.

In section 1.1, I illustrate 4 reasons why the Human-Centred Technology Research Cluster decided to launch the KiT project in 2022. In section 1.2, I specify the aim of the thesis and relevant research questions that our research is going to tackle. Section 1.3 listed personal contributions and distinguished parts where I received help from other people. Section 1.4 provides an overview of the thesis structure and specific topics discussed in each chapter.

1.1 Motivation

We urgently need to improve communication tools for the elders. My argument can be derived from four facts and evidence observed in our life: 1) The world is aging; 2) Elders have more trouble when using smartphones than the younger generation; 3) Elders are living separately with children around the world; and 4) Lockdowns and self-isolation measures are required in future pandemics, especially when the virus is extremely dangerous, even lethal. I will discuss the 4 phenomena in this order.

First of all, **the world is aging** due to longer life expectancies and decreasing birth rates. In developed countries like the United States, the aging problem is growing. Analysts projected that in 2034, there will be more people over the age of 65 years old than under the age of 18 for the first time in US history (Overberg, 2018). Not to mention Japan, a country with strict immigration laws and policies, is facing much more pressure on aging issues as they are moving towards a *chō-kōreika shakai* (super-aged society).

The aging issue is not an issue for advanced economies only. In developing countries such as China, the number and proportion of the elderly population in China is growing faster than any other age group because of similar reasons: the increase in life expectancy and a decrease in birth rates (Zhao et al., 2020).

Moreover, **elders are usually not good at using smartphones**. This adds difficulty for them to keep in touch with family and friends. Many theoretical and field works could provide potential explanations to support the case that elders might have more trouble than their children when they are using smartphones. According to Zhao et al. (2020), numerous factors were identified as challenges for the elderly use of smartphones, such as a decline in cognition, limited attention, and habitual thinking.

The explanation for the above factors is straightforward: due to cognition decline, elders might have difficulties finding buttons on smartphone apps, such as dial icons or other functionalities. Elders might also get lost in rather fancy apps because of limited attention. I argue that the most important factor might be the last one: current smartphones are not designed by the elder generation, thus from all design aspects - heuristics, aesthetics, and conceptual mappings, are originally not targeting the elders as a major market segment at all. From the human-computer interaction perspective, it makes sense. The first-generation computers, such as ENIAC from the University of Pennsylvania, are all operated by professional "refrigerator ladies" since it was built in 1945. Later computers are often renewed by young engineers and college graduates, with elders rarely involved.

The first two facts are related to the need based on population: when a growing proportion of people who are not good at communicating with apps on smartphones, we simply require more effort and resources poured into many training sessions. As a volunteer who is working at an "elderly smartphone classroom" organized by local social service stations, I would argue that

teaching a dozen ~~of~~ elders how to use a very specific application (for instance, booking a visit at a local GP or buying flight tickets) once a week will not work. Most software updates on a weekly or monthly basis, and not all elders in our community can join our class regularly. We need a more efficient design that does not require tutoring and many instructions. In other words, we need good usability.

It is fine to refer to your experience of the people use available apps. However, the reasoning here could be improved by stating that any design involves trade-offs and that simplicity versus functionality is one of these. You seem to be referring to the problem close apps are not simple.

To make things worse, **children tend to live separately with elders**. This is common sense in western culture because people from countries such as the United States stress individualism more than the concept of family, and in Butler's view and Gullette's critique, people do tend to hold a negative view of aging and becoming older itself in contemporary western societies (Sasser, 2018).

Chinese family traditionally shows huge respect to elders by real actions like taking care of elders at home. Confucius proposed the concept of *dàtóng* (grand harmony) society two millennia ago - it's an ideal society where "the aged can find a fitting close to their lives and have appropriate last years" (Chen, 2011). This tradition is, to a certain degree, still preserved today. However, the situation is changing rapidly because of urbanization. Due to the growing economy, a large scale of the rural labor force has been drained off from rural societies and this migration of the rural workforce to urban centers has degraded the welfare of the left-behind elderly significantly (He and Ye, 2014).

Lastly, temporary lockdowns or self-isolation measures will be the new normal in future pandemics. The prevention and control of a pandemic is not just a local matter, it needs cooperation between cities or even at a national level. When the pathogenicity of a novel virus is unknown, travel should be avoided and self-isolation becomes necessary until scientists discover pathogenesis and work out safe medicine or clinical solution.

1.2 Project Aim

The aim of the project is to gain an understanding of the ways that elderly Chinese people use WeChat to keep in touch with the very small circle of their closest family and friends.

This is a conceptual model – it is not a concept map.

I created a concept map [1] for the topics of this thesis as shown below.

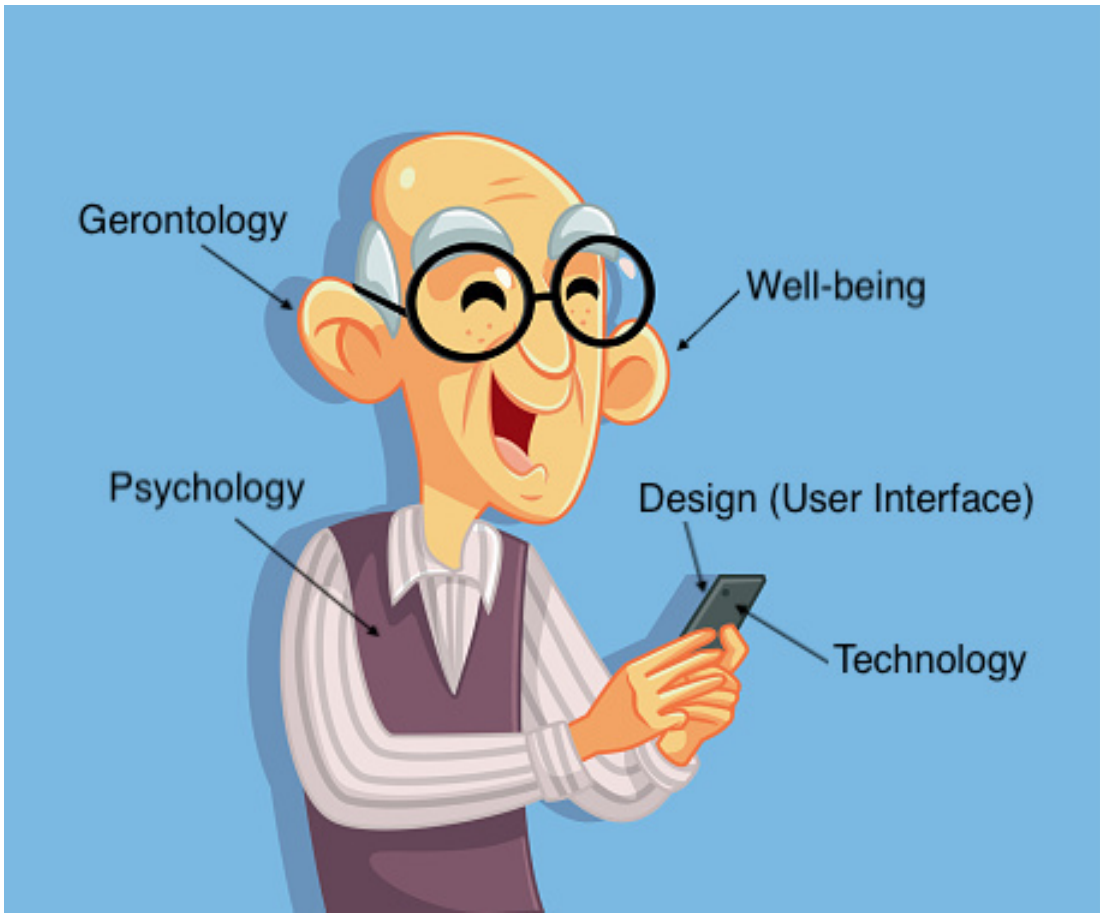

Figure 1.1. Conceptual Model of the Thesis

In this study, the focus is on the very small circle of elders' closest family and friends because the concept of aging-in-place is widely adopted and recommended in recent gerontology studies: instead of moving to care homes, elders should stay at their residencies where they had been living for years or decades. This approach is hugely beneficial because elders are more familiar with the environment, feel less lonely, and most importantly, able to keep in contact with their old friends who are also living in the same neighborhood for a rather long time.

I restricted the focus of this study to Chinese elders only, it's majorly due to the fact that the Covid-19 pandemic prevented international travel, especially for Chinese nationals. Living and taking care of my grandparents, I feel obliged to conduct studies on gerontology so that I can get

[1] This image is originally adopted from the Internet. Credit: https://www.vectorstock.com/royalty-free-vectors/grandpa-cartoon-vectors

to know what they feel about keeping in touch with their close friends when using smartphone apps.

In China, elders are defined as a group of people who are above 65 years old.

Notice that *well-being* refers not only to the physical condition but also to the psychological health of the elders, such as happiness and a sense of engagement. For instance, Martin Seligman (2011) purposed the "PERMA" framework of well-being in his book *Flourish*. More details will be illustrated in Section 2.3.1 Positive Psychology.

To achieve the project aim, several research questions are proposed and listed below:

Don't you mean current – you can't really measure trends since you're not looking at the history

RQ1. What are the trending "keep-in-touch" methods that are frequently used by Chinese elders?

RQ2. What are the issues with commonly-used telecommunication applications for elders to keep in touch?

RQ3. What are the psychological impacts when elders cannot keep in touch with family and friends regularly and frequently?

RQ4. What are the commercial products' effective design heuristics especially for the elders to easily keep in touch?

The project is mainly focused on studying the current situation. Instead of building a new product or developing an algorithm, this thesis focuses on the user aspect of keeping elders in touch. The thesis asks specific questions like "What contact methods do the elders use to stay in touch with their family members?", "What kind of difficulties did they encounter when they use modern technology?", etc.

1.3 Contribution

[Under construction] Please see the notes in the Google sheet on how to improve the next two sections.

- Raised the
- Reviewed past academic projects and analysed their functionality link with WeChat;

- Designed an original questionnaire on WeChat usability for elders;
-

1.4 Thesis Structure

This thesis will discuss how to keep elder and frail people in touch with their families, friends, and/or carers. Chapter 2 first introduces key concepts behind this project from various disciplines, including Gerontology, Technology, Psychology, Design, and Human-Computer Interaction (HCI); then it reviews past relevant projects and efforts, and identify unknown areas and high-level taxonomy. Chapter 3 identifies commonly-used methodologies to conduct experiments.

Chapter 4 documents research conducted by the author and the corresponding results are documented in Chapter 5. Research questions are labeled with Q1, Q2, etc accordingly. Chapter 6 discusses biases and points out potential work in the future and Chapter 7 makes final conclusive statements of the thesis.