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Bridging the Digital Divide: Senior Chinese Immigrants' Experiences with Health Technologies in Canada

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Abstract: The global aging population is increasingly impacted by the digital divide, which affects their quality of life and access to services. Chinese senior immigrants in Canada face great challenges navigating digital environments due to language barriers, cultural adaptation issues, and limited access to digital resources. Using Cultural-Historical Activity Theory (CHAT) as a theoretical framework, this study explores the key factors of the digital divide among Chinese senior immigrants, challenges of their use of health-related technologies, and their strategies in adapting to these digital tools. Through semi-structured, in-depth interviews with 9 Chinese senior immigrants in Canada, this study argues that the digital divide is not merely an issue of technological access but a socially situated, culturally mediated, and historically developed phenomenon shaped by social structures, community supports, learning, and well-being. By framing digital literacy as a socially situated and developmental process, this study contributes to health communication by proposing a Cross-Cultural Digital Health Literacy Nexus (CDHLN) that enhances cross-cultural digital health engagement, improves senior immigrants' access to health information, and promotes well-being among aging immigrant populations.

Keywords: Digital Divide, Chinese Senior Immigrants, Cross-cultural Communication, Health Technologies, Digital Literacy Learning

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Introduction

The global aging population faces a digital divide despite technology's role in enhancing independence. Senior adults face tremendous challenges in terms of using internet, smartphone applications, and digital technologies for health and living. The population of individuals aged 60 and above is experiencing a dynamic increase, attributed to advancements in healthcare, improved social conditions, and enhanced financial status (Levy et al., 2015; Marangunić & Granić, 2015). Health technologies refer to digital tools and platforms, such as mobile health apps, telemedicine services, and wearable devices, that are designed to support individuals in managing their health, accessing care, and maintaining overall well-being (WHO, 2018). These technology plays a key role in fostering independence among older adults, helping them with daily tasks and monitoring their physical, emotional, and mental well-being.

Despite these perceived benefits, older adults remain entrenched in the digital divide (Pirhonen et al., 2020). Chalghoumi et al. (2022) documented stress and confusion among senior participants when utilizing smartphone applications, attributing these feelings to declining visual and auditory abilities. Alfalah (2019) corroborated that security, privacy, and trust on the Internet are significant barriers among the elderly. Beyond evidence indicating lower computer and internet usage among older individuals (Al-Ammary, 2010), an urgent need exists for updated research due to significant differences in information access between developing and developed countries (Chalghoumi et al., 2022; Lund & Maurya, 2022).

The goal of this research project explores how Chinese senior immigrants in Canada experience health-related technology access and learning. The research questions are how Chinese senior immigrants in Canada navigate health information

through digital technologies, and what communication barriers impact their access to health services.

This study addresses three key areas: (1) identifying the underlying factors contributing to the digital divide among Chinese senior immigrants in Canada; (2) examining the specific challenges and barriers they face in accessing and using health-related digital technologies; and (3) exploring how they navigate health information through digital platforms and what communication barriers affect their access to health services. By framing digital literacy as a socially situated and developmental process, this study proposes a Cross-Cultural Digital Health Literacy Nexus (CDHLN) that enhances cross-cultural digital health engagement, improves senior immigrants' access to health information, and promotes well-being among aging immigrant populations.

Literature Review: Digital Engagement among Chinese Senior Immigrants as a Socially Situated, Culturally Mediated, and Historically Developed Practice

As Canada's population ages and diversifies, Chinese senior immigrants have increasingly become a visible and vital part of Canadian society (Zhu & Zhang, 2019). The adoption of digital technology has reshaped how people sustain interpersonal relationships and community participation. For Chinese senior immigrants in Canada, digital tools such as WeChat, video chat applications, and social media platforms have become crucial bridges for maintaining family ties and emotional connection (Ekoh et al., 2023; Wang et al., 2021). Hence. the integration of digital technology into senior immigrants' daily lives is not simply a matter of technical proficiency, but a socially situated, culturally mediated, and historically developed practice.

One major theme in the literature concerns the specific purposes and preferences guiding technology use among this group. Studies consistently show that Chinese senior immigrants predominantly use digital tools to maintain contact with family

members, access Mandarin-language news, and participate in religious or community activities (Ekoh, et. Al., 2023). WeChat, in particular, plays a central role—not only because it offers an accessible Chinese-language interface and versatile features such as voice messages and video calls, but also because it helps preserve familiar cultural practices across distance. Other platforms, such as YouTube and Zoom, have enabled elderly immigrants to watch online programs or join virtual religious gatherings (Wada, et. Al., 2025). However, scholars note that these digital engagements often remain largely within the Chinese community itself, reinforcing cultural enclaves rather than fostering broader social integration into mainstream Canadian society (Wang, Liu, & Walsh, 2021).

Socioeconomic status plays a key role in digital inclusion. Seniors with higher education and income are more likely to adopt and use digital technologies (Fee et al., 2020), highlighting the interplay of age, migration status, and economic inequality. Family support is another critical factor. Children and grandchildren often introduce seniors to platforms like WeChat and assist with technical and emotional challenges (Jin & Qu, 2025). Community organizations in cities like Toronto and Vancouver also offer digital literacy classes in Mandarin and culturally tailored training, which has helped many seniors gain confidence (Lin et al., 2023).

Despite these supports, significant barriers remain. Seniors commonly report a cycle of "learning and forgetting," worsened by the complexity and frequent updates of digital systems (Arcury et al., 2020). Language remains a major issue. While some apps such as WeChat support Chinese, essential services like healthcare portals, government websites, and banking apps are often English-only, making independent navigation difficult (Hyman et al., 2023). Concerns about online security and misinformation further restrict digital engagement. Limited digital literacy makes seniors vulnerable to

scams and inaccurate health information (Kemp & Erades Pérez, 2023). Fear and mistrust often discourage exploration of unfamiliar digital platforms.

Researchers finds that digital communication strengthens intergenerational ties, reduces loneliness, and increases community participation, which could improve seniors' health and wellbeing (Lin et al., 2023). However, some culturally specific platforms such as WeChat may lead to "double boundaries," which means these platforms could both facilitate community connection and limit cross-cultural integration (Ho et al., 2022).

Health literacy is central to understanding these dynamics. According to Nutbeam (2000), it includes not only reading and understanding health information but also applying it meaningfully. Many Chinese seniors struggle with functional health literacy due to limited English, which reduced their ability to use online health portals or schedule appointments independently (Hyman et al., 2023). Digital health literacy, which includes evaluating online sources and navigating health-related apps, is even more complex. While WeChat is widely used for communication, seniors rarely engage with formal digital health platforms, leaving them vulnerable to misinformation (Fee et al., 2020; Balyasnikova & Ahn, 2024).

Health communication is deeply social. Family members often serve as interpreters and guides, mediating seniors' access to digital health tools (Lin et al., 2023). Community-based workshops and peer-support networks are shown to build trust and improve digital confidence (Wada et al., 2025). Trust in healthcare providers and digital platforms strongly influences whether seniors use digital health tools (Crook, 2015). Many prefer in-person consultations due to fear of miscommunication, influenced by both language barriers and cultural norms around authority and expertise (Jin & Qu, 2025).

Digital technology use among Chinese senior immigrants is shaped by their migration trajectories and generational contexts. Many participants migrated from environments where digital infrastructure was underdeveloped, and their education may have offered limited exposure to computers or mobile technologies (Arcury et al., 2020). Their digital skills today are thus rooted in uneven historical access and ongoing learning efforts in later life. Even as they adopt new tools, many face challenges such as "learning and forgetting," rapidly changing platforms, and a lack of continuity in support (Fee et al., 2020). These challenges reflect the historically developed nature of digital engagement—practices shaped by long-term structural inequalities, personal histories of adaptation, and ongoing negotiations with aging, identity, and migration (Ho et al., 2022; Zhu & Zhang, 2019).

To sum up, digital engagement for Chinese senior immigrants is not simply about mastering devices or apps. It is a socially situated process supported by family and community, a culturally mediated experience shaped by language and values, and a historically developed practice rooted in migration and aging.

Theoretical Framework

This study employs Cultural-Historical Activity Theory (CHAT) (Engeström, 1987, 1999, 2001) as its primary theoretical lens to explore the digital divide experienced by Chinese senior immigrants in Canada. CHAT offers a dynamic framework for understanding human activities as socially situated, culturally mediated, and historically developed processes. It provides a comprehensive approach to analyzing how individuals' interactions with technology are not isolated actions but are deeply embedded within broader socio-cultural contexts.

CHAT offers a framework emphasizing six interrelated components. They are: 1) the subject (Chinese senior immigrants), 2) the tools (digital devices and

applications), 3) the object (health-related goals, such as accessing medical information), 4) the rules (language use, cultural expectations), the community (family, peers, community organizations), 5) the division of labor (e.g., who offers digital support), and 6) the outcome (levels of digital engagement and health empowerment). By examining the dynamic interplay among these elements, CHAT provides insight into how digital practices are negotiated, shaped, and constrained within participants' everyday lives.

Moreover, CHAT is well-suited to capture the complexities of cultural and linguistic barriers that are central to this study. Rather than viewing digital literacy purely as a technical skill, CHAT allows us to explore how broader historical factors (such as migration histories and educational backgrounds) and social dynamics (such as reliance on family support) influence seniors' ability to engage with health-related technologies. In other words, technology adoption is not viewed as an individual endeavor but as an activity shaped by community practices, systemic structures, and cultural legacies. By integrating this framework, the study could examine both the structural factors that shape digital access and engagement (such as language norms, institutional practices, and community support) and the dynamic processes of learning and adaptation that occur within these contexts.

Through semi-structured in-depth interviews, this study aims to uncover the cultural, psychological, and sociological mediators affecting technology use among Chinese senior immigrants. Factors such as language barriers, cultural norms, familial roles, and community resources will be examined in relation to participants' digital engagement patterns. The use of CHAT will allow for a deeper understanding of the challenges and possibilities facing this population and will inform the development of

CDHLN model for promoting digital inclusion, supporting health literacy, and enhancing overall well-being among aging immigrant communities.

Methodology

This study employed a qualitative research design to explore the digital using for health and wellbeing experienced by 9 Chinese senior immigrants in Canada. The qualitative approach allowed researchers for an in-depth exploration of Chinese senior immigrants lived experiences, the challenges they faced, and the cultural factors that shaped their engagement with digital technologies. Through rich, narrative-driven interviews and a thematic analysis (Braun & Clarke, 2006), the study proposed a *CDHLN* model to enhance digital inclusion among aging immigrant populations.

Participants

The participant group consisted of 9 Chinese senior immigrants residing in Canada. During the year of 2024-2025, participants were purposefully selected to capture a diverse range of experiences with variation in age, gender, and length of residence in Canada. Recruitment occurred through established networks within community organizations, senior centers, and social circles embedded in the Chinese immigrant community. Researchers communicated with the local Chinese senior immigrants' community center in Vancouver and Toronto and successfully recruited 9 senior immigrants who are willing to participate in this research project.

Table 1 showed the demographic table of the 9 Chinese senior immigrants. Participants ranged in age from 65 to 84 and came from various regions in China and Canada. Their educational backgrounds varied from high school to university degrees, and they had diverse professional histories including education, healthcare, journalism, and real estate. Settlement locations included Vancouver, Richmond, and Toronto (North York). Arrival years ranged from the mid-1980s to 2021s. By engaging

participants from different backgrounds and experiences, the study sought to capture the multifaceted nature of the digital divide within this demographic.

Table 1

Participants' Demographic Table

No.	Name	Gender	Age	Education	Hometown	Country of Origin	Current Residence	Status	Arrival Year	Occupation
1	W1	Male	73	Bachelor's	Jiangsu	China	Vancouver	PR	2021	Education
2	W2	Female	69	Bachelor's	Jiangsu	China	Vancouver	PR	2021	Education
3	W3	Female	84	Bachelor's	Zhejiang & Jiangsu	China	Toronto	PR	2008	Magazine Editor
4	W4	Female	77	Technical College	Jiangsu	China	Toronto	PR	2013	Education
5	W5	Female	75	High School	Hong Kong	China	Vancouver	Citizen	1985	Management
6	W6	Female	76	Associate Degree	Hong Kong	China	Vancouver	Citizen	1997	Journalism & Education
7	W7	Female	65	Bachelor's	Shandong	Canada	Vancouver	Citizen	2000	Real Estate
8	W8	Male	71	Associate Degree	Tianjin	Canada	Toronto	PR	2001	Auto Services
9	W9	Female	80	Bachelor's	Hunan	Canada	Toronto	Citizen	2006	Physician

Data Collection

Data were collected through semi-structured, in-depth interviews. The interviews were about participants' experiences with health-related mobile applications (e.g., PC Health, Telus Health) and other digital health tools.

To ensure transparency and reproducibility, the core interview guide included five to eight key questions, for example: "How do you usually access health information through digital tools or apps?""When you encounter technical barriers, how do you ask for help?""How confident do you feel about understanding the health information provided online or in apps?""Have you ever stopped using a digital health tool because of language or usability difficulties?""What role do your community centers, family, or friends play in helping you use these technologies?"

Interviews were conducted in Mandarin to reduce communication barriers and foster a comfortable conversational environment. Each interview lasted approximately

60 to 90 minutes and was held either in person at familiar community-based locations (e.g., senior centers) or online through secure video-conferencing platforms such as Zoom. With participants' consent, all interviews were audio-recorded, transcribed, and translated in English for data analysis.

The interviews were conducted between 2024 and 2025. Recruitment continued until data saturation was observed. By the 8th and 9th interviews, no additional themes emerged, and the team determined that the sample size was sufficient.

Interview Procedure

Interviews were conducted in the participants' preferred language to minimize communication barriers and reach a comfortable conversational environment. With participants' consent, each interview was audio-recorded and later transcribed verbatim for detailed analysis. Interviews lasted between 60 and 90 minutes and were held either in person at familiar, community-based locations (such as senior centers) or online through secure video conferencing platforms, such as Zoom. This flexible approach ensured that participation remained convenient and accessible.

Data Analysis

Following transcription, the interview data were analyzed using thematic analysis (Braun & Clarke, 2006). The thematic approach is well-suited for identifying recurring patterns and constructing meaningful categories across qualitative datasets (Braun & Clarke, 2006). The coding process involved both inductive and deductive strategies: while remaining open to emergent themes, the analysis was guided by pre-established interests in digital literacy learning, technological barriers, health communication practices, and cross-cultural mediation.

To ensure transparency in the analytic process, a coding table was developed to group interview data into themes. The themes identified in the coding table include

instrumental adoption of AI and digital tools, digital usage and engagement, community-based support and learning, family involvement, cultural barriers, digital barriers, and the use of health-related digital applications, among others. The researchers used the coding table to organize the interview data into initial codes, sub-themes, and broader themes. This method provided a transparent "road map" of the data analytic process, which allows researchers to see how patterns in participants' narratives were identified and how the final themes emerged from the data.

The interpretation of findings was anchored in CHAT frameworks. CHAT provided a lens for understanding how seniors' interactions with digital health tools were mediated by cultural norms, community supports, language practices, and institutional rules. This framework illuminated the dynamic, socially situated processes that shaped digital health engagement among Chinese senior immigrants.

Ethical Considerations

This study followed ethical guidelines to protect participants' rights and confidentiality. Ethical approval was obtained from the university review board prior to the commencement of data collection. All participants were informed about the nature and purpose of the research before providing written consent. Confidentiality was maintained by anonymizing all identifying information in transcripts and reports. Participants were reminded that their involvement was voluntary, and they retained the right to withdraw from the study at any stage without any negative consequences.

Findings: Digital Divide of Senior Chinese Immigrants in Canada

This study explores the digital practices of Chinese senior immigrants in Canada using CHAT as its theoretical framework. CHAT reveals the complex interactions between rules, community support, division of labor, mediating tools, subjects, and objects that collectively shape digital engagement in later life (See Figure 1). In the

following sections, we analyze qualitative interview data through the six components of CHAT to examine how Chinese senior immigrants experience the digital divide and encounter barriers to digital inclusion.

Figure 1

The "Iceberg" Model: Using CHAT to understand senior immigrants' technology engagement

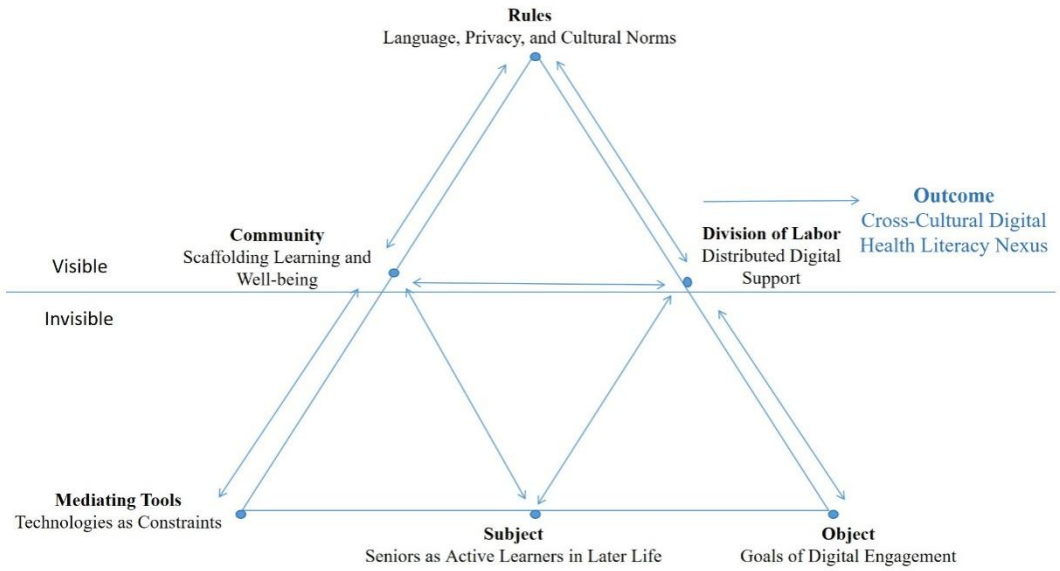

Figure 1 shows the organization of our research findings using the CHAT framework in the form of an iceberg model. The visible tip emphasizes the sociocultural conditions that most readily shape digital engagement: rules (language barriers, privacy concerns, cultural norms), community (peer support, intergenerational learning, and immigrant associations), and the division of labor (distributed roles across family, institutions, and seniors themselves). Beneath the surface, the invisible foundation reflects the deeper drivers and constraints of participation: the mediating tools of technology, often experienced as usability challenges; the underlying object of digital engagement, including health access and social connection; and the subject, Chinese senior immigrants as active learners adapting to later-life digital environments. The

outcome of this activity system is conceptualized as the CDHLN. It reframes digital participation as a culturally mediated and socially scaffolded process rather than a purely technical skillset.

Rules: Language, Privacy, and Cultural Norms

Participants' digital engagement is deeply shaped by language barriers, privacy concerns, and cultural expectations about aging and independence. For example, W2 explained,

"If I don't understand something, I just don't use it."

W6 also said, "Poor English has hindered me a lot."

W2 highlights that how language becomes a barrier to access these digital tools, and W6 shows how institutional rules such as English-only government platforms, exclude many older immigrants.

In addition, there are many concerns about online fraud and data security, which also influence the senior immigrants' behaviors. W6 noted,

"If you have to link it to your credit card or something, that's when I become cautious."

These examples show how both spoken and unspoken rules could constrain participants' ability to fully engage in digital life. Rules mediate the interaction between the subject and the object. Here, they frequently act as obstacles, which illuminates how the sociocultural environment and embedded expectations limit digital access and comfort.

Community: Scaffolding Learning and Well-being

Community networks play an essential role in supporting seniors' digital learning and well-being. Participants regularly mentioned learning from their children,

peers, and community organizations. W5 talked about how intergenerational support provides both access and confidence to engage with technology. As W5 remarked,

"My grandson helped me download it."

W6 discussed more about how informal community programs assist ongoing learning. W6 shared,

"After our smartphone class, we could go to the instructor and ask questions."

W9 also highlighted the value of peer relationships within the community:

"In our WeChat group, we often share health information or tips on how to use apps—if someone doesn't know how to do something, they ask, and someone else will show them."

These forms of support demonstrate the co-constructed nature of learning and adaptation. For older immigrants, community is not just a backdrop but an active space for lifelong learning. They believe that a network of social relationships with family, peer groups, or community centers could provide emotional support, technical guidance, and contextual understanding. Based on the data, we find that community plays a role for learners stretch their capabilities through collaborative scaffolding.

Division of Labor: Distributed Digital Support

Digital participation among Chinese senior immigrants is not an isolated or individual task, it is a shared, social process that depends on a well-defined division of labor. Family members, especially younger generations, often play a foundational role in introducing technology into seniors' lives. For instance, W5 noted,

"My son bought me this big computer."

W5 showed how access to digital devices is frequently facilitated by children or grandchildren who act as providers and initial guides. These moments reflect more than

material support, rather, they signal trust, care, and a recognition that digital access is essential to modern life.

Yet, this dynamic is not one-sided. Seniors also take proactive steps to develop their digital skills, which is usually driven by personal interests and daily needs. As W6 expressed,

"I mostly use apps on my iPad… I'm quite interested in church activities...Whenever I don't understand something, I ask."

This reflects a shift from passive reliance to active engagement, where seniors are no longer simply recipients of help but become co-learners in their digital journeys. They reach out to instructors, family, or peers, ask questions, and try to solve problems independently, which demonstrates a learning process grounded in both motivation and social interaction.

The division of labor here includes family members as tech facilitators, community centers or churches as learning hubs, instructors as scaffolds, and peers as mutual supporters. Each plays a distinct yet interconnected role in enabling digital learning. The finding shows that when these roles are clearly distributed and supported, senior immigrants are more likely to become digitally confident. They are curious, persistent, and resilient.

Mediating Tools: Technologies as Constraints

Participants' heavy reliance on mobile technology, such as WeChat, illustrates how deeply familiar digital tools are woven into their daily lives. For many Chinese senior immigrants, WeChat is more than a communication platform, it is a lifeline that connects them to family, community news, health information, and social networks both in Canada and abroad. This reliance highlights the importance of cultural and linguistic familiarity in technology adoption; when digital tools are accessible in one's

native language with cultural norms, they are more likely to be used frequently and meaningfully. In this way, WeChat becomes not just a technological convenience, but a vital mediating tool that supports emotional well-being, transnational relationships, and functional independence in later life. For example, W3 told us,

"I feel that my life is basically inseparable from (mobile phones) now," and W8 shared,

"Now making calls and checking WeChat—I get about 80% of my information from WeChat."

According to the interview data, these technologies function as mediating artifacts, as tools that enable individuals to accomplish communication goals and maintain transnational family ties. However, access to technology alone does not guarantee empowerment. Many participants used a limited range of applications, shaped by their comfort zones and previous learning experiences. While seniors could independently navigate basic functions, their potential to master complex digital tasks depends on structured guidance and sustained social support.

Subject: Seniors as Active Learners in Later Life

The participants in this study are older Chinese immigrants ranging in age from 65 to 84, with diverse occupational backgrounds and varying lengths of residency in Canada. Despite differences in education, work history, and tech literacy, each participant demonstrates agency and initiative in learning to live and age in a digitally mediated society.

As W6 noted,

"I am now retired… I attend English classes and study the Bible at church."

W6's words show that retirement becomes a gateway to both learning and community-based interaction. Seniors position themselves not as passive recipients of

care, but as active learners engaging with technology and institutions to sustain well-being and autonomy. Their willingness to restructure routines and seek new opportunities for engagement counters deficit-based narratives of elderly passivity.

Similarly, W9 shared:

"Now, I basically use my phone every day. I also go online to read articles, look up herbal medicine developments, and learn what's new in Chinese medicine. I often study these things myself."

Her use of digital tools reflects self-directed learning rooted in her cultural and professional identity. Despite facing challenges with language and digital platforms, she actively accesses online resources to remain informed in her medical practice.

These narratives demonstrate that older immigrants continue to assume productive roles and invest in knowledge acquisition as part of their social participation. The learning process is neither random nor passive. Rather, it is embedded in their identity and shaped by meaningful life goals.

Object: Goals of Digital Engagement

For these participants, the object of their activity system is not merely using technology for its own sake, but leveraging digital tools to achieve meaningful life goals. The goals include staying connected with family, accessing health and transit services, learning new skills, and participating in social or religious communities.

For example, W8 shared,

"I live half the year here and half in China...like a migratory bird."

W5 said,

"I looked it up... to check what supplements I could use Google for health-related inquiries."

W8's life reflects a transnational lifestyle supported by digital tools that allow communication, planning, and continuity between two countries. W5's actions show that digital engagement is driven by practical needs and personal agency in health self-management. These examples reflect object-oriented activities focused on personal well-being, ongoing learning, and autonomy. The object serves as the motivational core of each participant's engagement. By clarifying how digital tools serve larger life purposes, this analysis reframes digital adoption not as compliance with technological trends but as purposeful, situated practice rooted in senior immigrants' everyday needs.

Discussion: Towards a Cross-Cultural Digital Health Literacy Nexus

This study explores how Chinese senior immigrants in Canada experience digital technology access and learning. It reveals that language barriers, limited digital literacy, unfamiliarity with mainstream technologies, and lack of culturally sensitive support systems are major contributors to the digital divide. Although participants often had access to smartphones and internet, their use of digital tools was shaped by the extent of support from family or community and their prior exposure to technology. These structural and cultural factors, such as English-dominant interfaces or fear of scams, impeded full digital inclusion, particularly in health and public service contexts.

In addition, the study identifies both technical and social barriers. Technically, the complexity of apps, particularly in English, poses significant obstacles. Participants shared that they avoided platforms they could not understand, often defaulting to a narrow range of tools like WeChat. Socially, cultural values around independence and not burdening children limited their willingness to seek help. These challenges were compounded by the absence of digital training. However, the presence of peer networks, multilingual workshops, and intergenerational support provided meaningful pathways for overcoming some of these barriers.

Moreover. participants navigated health information primarily through trusted platforms like WeChat and YouTube, and through assistance from family and social workers. While some used apps like PC Health or translation tools to access services, many avoided government or health apps due to language limitations or mistrust. Communication barriers, especially low English proficiency and limited access to interpretation, hindered their ability to use digital platforms to manage health. This finding shows the need for more culture and language friendly health technologies and training programs.

Drawing from the findings, this paper proposes a *CDHLN* Model (see Figure 2). This model is grounded in the understanding that health communication and digital literacy are not individual or technical skills alone but culturally mediated and socially constructed practices. For Chinese senior immigrants, engaging with digital health technologies is shaped by language proficiency, generational identity, lived experiences, and relational ties to both community and institutional actors. Rather than framing these seniors as digitally deficient, the model highlights their collective resilience, interdependence, and the relational dynamics that support learning and equitable access.

Figure 2

Cross-Cultural Digital Health Literacy Nexus

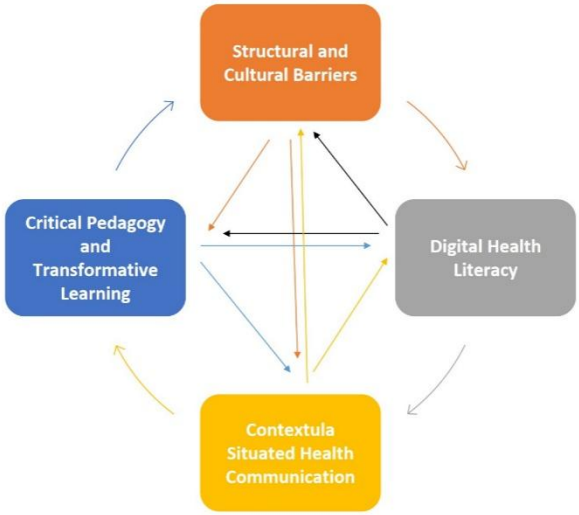

Figure 2 shows the *CDHLN* model. The *Cross-Cultural Digital Health Literacy Nexus* as a conceptual model that integrates four interrelated components essential for understanding and supporting senior immigrants' engagement with digital health technologies. They are: 1) Structural and Cultural Barriers; 2) Digital Health Literacy; 3) Contextually Situated Health Communication; and 4) Critical Pedagogy and Transformative Learning. The Structural and Cultural Barriers highlights the external and internal obstacles that hinder digital participation, including English-dominant app interfaces, complex digital systems, and culturally embedded values such as independence and reluctance to seek help. The Digital Health Literacy emphasizes the need to foster functional, interactive, and critical health literacy, which enables seniors not only to use technology but to evaluate and act upon health information meaningfully. The Contextually Situated Health Communication emphsaizes the importance of cross-cultural communication strategies, which could recognize the effective health communication that flows through familiar channels and is shaped by transnational care networks and local trust. The Critical Pedagogy and Transformative Learning repositions seniors as active learners and knowledge producers, which advocates for

critical and participatory transformative learning that respects their lived experience and promotes agency.

Figure 2 illustrates the CDHLN as a dynamic and interconnected model rather than four separate parts. The four dimensions are not isolated but continuously influence one another. *Structural and cultural barriers* shape the possibilities for digital engagement, yet these constraints could be addressed through the development of digital health literacy. In turn, digital health literacy is reinforced and made meaningful through culturally situated health communication, which flows through trusted networks and familiar practices. *Critical pedagogy and transformative learning* weave through all dimensions, which enables seniors to critically reflect on barriers, strengthen literacy, and reframe communication practices in empowering ways.

In the field of health communication, the network is grounded in the view that health information must be contextually situated. As Kreps and Sparks (2008) suggest, effective health literacy involves understanding not just content but also the cultural and interpersonal channels through which it flows. Chinese senior immigrants often approach health information through personal histories shaped by transnational care systems, culturally specific notions of health, and varying degrees of institutional trust. Within this network, digital literacy is reframed through Nutbeam's (2000) three levels of health literacy, including functional, interactive, and critical. Participants are not simply taught how to use digital platforms; they are engaged in reflective processes that enable them to evaluate, contextualize, and act upon health information in personally and culturally meaningful ways.

The network also draws on foundational principles of adult education, particularly critical pedagogy and transformative learning. Grounded in Freire's (1970) pedagogy of the oppressed and Mezirow's (1991) theory of transformative learning,

this model recognizes Chinese senior immigrants not as passive recipients of knowledge but as active knowledge producer in participating in the digitalized world. Learning within the network is not hierarchical but collaborative, which emerges through shared narratives, collective problem-solving, and reflection. As learners engage with digital tools, they could also examine the broader structures of access and exclusion that shape their technological experiences. Digital health literacy, in this model, is not merely about knowing how to click or download, but about reclaiming agency in spaces often perceived as inaccessible.

The senior participants in this study rarely engaged with new technologies alone; rather, they operated within a web of assistance, from adult children, peers, community educators, and social workers. These relational supports constitute the very scaffolding, where seniors stretch beyond their comfort zones and achieve digital tasks previously out of reach. The network formalizes and extends this dynamic, facilitating ongoing, culturally grounded learning partnerships that fits seniors' needs.

In addition to its pedagogical grounding, the *CDHLN* advances a justice-oriented model of health communication. It recognizes that digital exclusion among immigrant seniors is not an individual failing but a systemic issue linked to linguistic marginalization, ageism, and the lack of culturally adaptive infrastructure. Intercultural communication theory reminds us that seniors bring diverse communicative traditions, preferences, and values. Whether it is hesitance to ask for help, fears around digital privacy, or a preference for in-person interaction, these preferences must be seen not as barriers but as entry points for designing responsive and respectful engagement. The model, in this sense, is an ethical intervention, which is considered as a living system that adapts, listens, and evolves with its community.

These four components form an interconnected and justice-oriented approach to digital health inclusion, which is deeply rooted in sociocultural learning, adult education, and health communication theories. *The CDHLN* represents a paradigm shift from viewing digital literacy as an individual skillset to cultivating an interconnected support system. Grounded in four key components, the model envisions a collaborative learning environment that links older adults, families, educators, and community organizations. Rather than isolating seniors in traditional training models, the Nexus fosters cross-cultural, relational, and empowering pathways toward digital health inclusion rooted in equity, accessibility, and intergenerational solidarity.

Implications and Contributions

The findings of this study have important implications for practice, policy, and community engagement. First, it is important to recognize the role of family, community and social support for fostering linguistic and cultural needs of Chinese senior immigrants. Simply providing access to technology is insufficient. There is a need to effectively include senior immigrants in the digitalized society through providing cross-cultural supports in terms of language, culture, and well-being. From a policy perspective, governments and public institutions should allocate funding toward the development and dissemination of translation technologies and multilingual digital health resources to accomendate senior immigrants' needs. For example, the government could encourage partnerships between healthcare providers, technology companies, and immigrant-serving organizations to provide cross-cultural health-rated apps or tools for senior immigrants. Such collaborations could help ensure that digital tools and health communication platforms are not only technically accessible but also socially and culturally inclusive for immigrant senior populations.

Conclusion

This study sheds light on the multifaceted challenges Chinese senior immigrants face in accessing and using digital technologies in Canada. Participants' experiences demonstrate that digital engagement is not simply a matter of individual skill acquisition, but a deeply social, cultural, and relational process. By applying CHAT, this research illustrates how older immigrants navigate digital life within networks of support, constraint, and learning.

To address these issues, this paper proposes a model of *CDHLN* that reconceptualizes digital inclusion as a collective and holistic effort grounded in community-based service and learning. This model recognizes older adults not as passive users of technology, but as knowledge producers whose learning journeys are shaped by their relationships, cultural identities, and lived experiences.

Bridging the digital divide for immigrant seniors demands more than isolated training sessions. It calls for coordinated strategies that include cross-cultural literacy programs, investments in multilingual health technologies, and policies that foster collaboration between health providers, technology developers, and community organizations. Ensuring digital equity is not just a technical goal, it is a matter of social justice, health equity, and human dignity for aging immigrant populations. This study suggests future research to transform digital health environments into spaces of inclusion, empowerment, and intergenerational solidarity.

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