Exploring Digital Agency and Digital Competence of Immigrant and Refugee Older Adults: A Qualitative Study

Jordana Salma, Alesia Au, Ghada Sayadi, Manal Kleib

Submitted to: Journal of Medical Internet Research
on: May 14, 2024

Table of Contents

Exploring Digital Agency and Digital Competence of Immigrant and Refugee Older Adults: A Qualitative Study

Jordana Salma[1] MN, PhD; Alesia Au[1*] BSCN, MN; Ghada Sayadi[1*] MA; Manal Kleib[1*] MSN, MBA, PhD

[1]Faculty of Nursing University of Alberta Edmonton CA
[*]these authors contributed equally

Corresponding Author:
Alesia Au BSCN, MN
Faculty of Nursing
University of Alberta
Edmonton Clinic Health Academy
Edmonton
CA

Abstract

Digital agency refers to an individual's ability to use information and communication technology to meet personal preferences and needs, while also ensuring safety, security, and independence. However, the concept of digital agency for immigrant and refugee older adults (IROA) has not been thoroughly studied. This research employed a qualitative descriptive approach, using the DigComp 2.2 framework, to explore this topic. A total of 31 IROAs were recruited and participated in the study, which involved semi-structured interviews, focus groups, observations, and iterative co-design cycles. Through reflexive thematic data analysis, patterns in the research were identified. The findings revealed that the digital agency of IROAs is influenced by their access to information, engagement in digital communication, and ability to troubleshoot. Participants also faced challenges in exercising agency in a post-migration context due to intersecting barriers of digital competence and language skills, which impeded their access to resources and services for aging in place. This study highlights the urgent need to address the specific learning requirements of IROAs in order to prevent their marginalization and digital exclusion. Thus, it is essential to develop accessible and engaging group-based educational initiatives that cater to the unique needs of older immigrants.

(JMIR Preprints 14/05/2024:60547)
DOI: https://doi.org/10.2196/preprints.60547

Original Manuscript

Title: Exploring Digital Agency and Digital Competence of Immigrant and Refugee Older Adults: A Qualitative Study

Abstract:

Digital agency refers to an individual's ability to use information and communication technology to meet personal preferences and needs, while also ensuring safety, security, and independence. However, the concept of digital agency for immigrant and refugee older adults (IROA) has not been thoroughly studied. This research employed a qualitative descriptive approach, using the DigComp 2.2 framework, to explore this topic. A total of 31 IROAs were recruited and participated in the study, which involved semi-structured interviews, focus groups, observations, and iterative co-design cycles. Through reflexive thematic data analysis, patterns in the research were identified. The findings revealed that the digital agency of IROAs is influenced by their access to information, engagement in digital communication, and ability to troubleshoot. Participants also faced challenges in exercising agency in a post-migration context due to intersecting barriers of digital competence and language skills, which impeded their access to resources and services for aging in place. This study highlights the urgent need to address the specific learning requirements of IROAs in order to prevent their marginalization and digital exclusion. Thus, it is essential to develop accessible and engaging group-based educational initiatives that cater to the unique needs of older immigrants.

Keywords: Digital literacy; Older Adult; Co-design; Intersectionality; Community-based participatory research

Introduction

Information and communication technologies (ICTs) is defined as the spectrum of digital and social media used for communication and access to information [1]. Internet access rates have more than doubled for those 65 and older in Canada [2]. Access to ICT has been declared a fundamental human right with strong evidence that the digital divide, lack of or limited access to the benefits of technology, impact quality of life in older age [3]. Information and communication technologies provide several benefits for older adults, including: social connectivity, opportunities for continuous learning, access to health-related information, and entertainment [4–8]. The benefits older adults accrue from technology depends on the types of technologies adopted and their competence in using these technologies [9–12].

Digital competence is defined as: "the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking" [13(p10)]. Digital competence is a useful construct for older adults as it incorporates attitudes and motivations which are essential predictors of ICT use in older age [14–16]. Enhancing the benefits accrued using ICT not only requires improving technological skills and knowledge but, also, understanding the attitudinal and socio-emotional aspects of technology utilization [17]. Older adults are willing to adopt technology that is deemed beneficial to them and that has positive implications for their daily life [6,18,19].

Canada continues to welcome high numbers of immigrants and refugees with an increasing percentage from Arabic-speaking countries [20]. There is minimal evidence on ICT use and digital learning needs of older Canadian migrants and none identified focused on those who are Arabic-speaking (blinded for review). Younger cohorts of immigrants demonstrate high levels of proficiency in using technologies to adapt within post-migration contexts [21–23]. The extent to which this proficiency translates to immigrant and refugee older adults (IROAs) is less explored. Using Intersectionality, a realist synthesis[24] described the intersections of privilege and disadvantage that shape barriers and facilitators to ICT use in older adults emphasizing the relevance of diverse social positionalities, such as age, gender and immigration status, on ICT use and digital learning. Older Arabic-speaking immigrants in Canada and other European and North American migration contexts experience loneliness, social isolation, and barriers to access and use of aging-supportive resources and services due to the intersecting influences of structural ageism and racism (blinded for review). Arab immigrants traditionally belong to extended family models and value close interpersonal relationships within kin local and transnational networks [25,26]. The adoption of technology is especially influenced by social identities and roles across local and transnational spaces [27,28]. Gender, income, education, and technology infrastructure in countries of origin shape use of technologies and motivations to develop particular knowledge and skills [24,29,30].

To support digital competence and create avenues for digital learning, it is critical to understand the unique individual, cultural, social, and migration related influences on ICT use in older immigrants [31]. While the lack of theory linking aging and technology use is well cited in the literature [32], there remains little integration of migration as a key factor in gerotechnology as it impacts the lives of IROAs with diverse intersecting barriers to aging in place post-migration [27]. This paper aims to explore the "messiness of practice" [33(p11)] that sheds light on the ways IROAs

actually interact with technologies in their daily lives, their exercise of agency, and their digital competence.

Methods

Conceptual Framework

The DigComp Framework encompasses five key areas defining the scope of digital competence: Information and Data Literacy, Communication and Collaboration, Digital Content Creation, Safety, and Problem Solving [34]. The initial three domains focus on competencies associated with particular tasks and applications. The fourth and fifth domains, 'safety' and 'problem solving' are relevant across all digital activities. Each competence area skills, knowledge and attitudes that are essential for digitally literate citizens with proficiencies that range from basic to advanced and which can be used to design competence assessment tools, support education and training [35]. This framework was selected for its comprehensiveness and attention to attitudes across a range of competence areas to cover the range of social, political and economic activities older adults might engage in as ICTs continue to integrate with all aspects of daily living [5,36,37].

Research Design

A qualitative descriptive methodology with a social constructivist paradigm was used and included triangulated data collection methods and iterative co-design cycles with IROAs to explore ICT use, digital competence, and related learning needs in immigrant older adults. Co-design cycles informed a sequence of six learning sessions that participants engaged in to address immediate learning needs identified over the course of data collection as older adults' motivation and interests are key drivers of digital engagement [12,17]. Reciprocity via meeting the needs of research participants to support their immediate digital learning needs helped meet ethical obligations to community and build sustainable partnerships [38]. This study received ethics approval from the Research Ethics Board of the first author's institution and all participants provided informed consent prior to data collection.

Sample and Recruitment

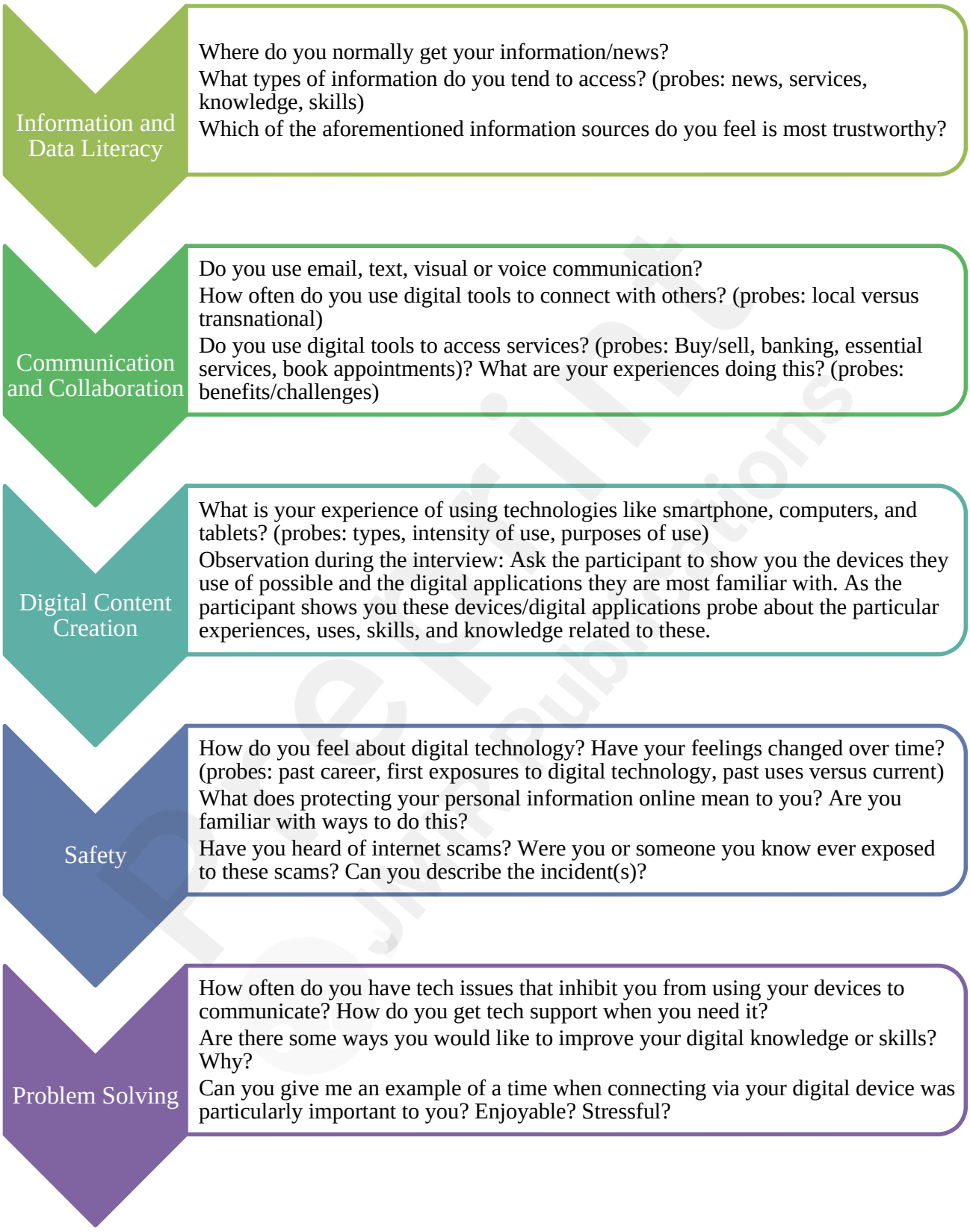
Study participants were community-dwelling individuals: (a) who are 55 years of age or older, (b) self-identify as first-generation Arabic-speaking immigrants, and (c) report using ICTs in their daily lives. Cohorts of Arab-Canadian immigrants differ in levels of education, reasons for migration, religious traditions, and experiences of macro and micro historical and political events across the life course. The majority of Arab older adults in this study were Syrian, Lebanese, Jordanian, or Palestinian, ascribed to the Muslim faith, and had varying levels of education, income levels, and English language fluency. A social service organization that catered to refugees and newcomers and a mosque that included a congregation of Arabic-speaking older adults supported the project by hosting the data collection and aiding recruitment. Flyers in multiple languages spoken by prospective research participants were distributed by the two partner organizations during face-to-face recruitment and served as a means to effectively explain the purpose of the study. These organizations also provided space for the group-based digital learning sessions. Purposive sampling began with service providers at these organizations connecting with IROAs via phone calls and in-person to introduce the study. IROAs with interest in participating were then contacted by the research team for screening and formal consent to

participate. Data saturation was determined by the identification of repetitive patterns of experiences, perceptions and needs communicated and observed in interacting with IROAs over the course of the study.

Data Collection

Data collection included two phases: Phase one involved individual (n=8) and group (n=2) semi-structured interviews to explore older immigrants' experiences of using ICTs and phase two centered on digital learning sessions where observations and focus group discussions allowed for detailed documentation of IROA's digital competencies and learning needs. Triangulation of data sources over a period of time allows access to descriptively rich insights on technology use in older age [19,28]. Individual interviews were conducted in participants' homes from April to June 2022 by an Arabic-speaking interviewer and lasted on average 1-1.5 hours. For the first phase, an interview guide using DigComp 2.2 guided the types of questions asked (Figure 1). Phase two involved co-designed ICT learning sessions between September and November 2022 where an instructor, an engineering university student, and volunteers, fluent Arabic-speaking team members, guided participants through six sessions to address emergent digital learning needs. Participants for these sessions were divided into three groups with a separate men's group (n=3) and women's group (n=10) in the faith-based organization and a mixed gender group (n=8) in the social service organization. Observations (54 hours of observational data) that occurred during these sessions entailed a researcher documenting group learning processes and the digital competencies of participants as they navigated their devices and worked together through lesson material. Focus groups lasted 30 to 45 minutes on average and were used to further explore knowledge, skills, and attitudes around ICT and the digital learning sessions. All individual interviews and focus groups were audiotaped and transcribed verbatim by a professional transcriptionist trained in the Arabic language.

Figure 1: Phase 1 Interview Questions from DigComp 2.2



Data Analysis

Arabic conversations were initially analysed by bilingual team members with key quotes and

codes then translated into English for team discussion and use in knowledge dissemination. A reflexive thematic data analysis approach was used to identify, analyse, and report patterns within the data [39], facilitated by NVivo qualitative data management software. The six phases approach included: familiarizing yourself with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes and writing a report [40]. To ensure trustworthiness in the data analysis we used peer debriefing, data triangulation and reflexivity [41]. Peer debriefing provides external validation, which was done through weekly team conversations in the research team to discuss one's interpretation of the data. Reflexivity was centered on reflecting on the influences of the team's positionality in relation the researched community. Authors have expertise in qualitative methods and aging and migration areas of research. Two authors are bilingual Arabic-speaking academics with the remaining authors being second-generation or first-generation immigrants to Canada and academics, graduate, or undergraduate university students.

Results

A total of 31 IROAs participated in this study with an average age of 64.1 ± 7.7 years. Most participants were women, identified as Arab and were Canadian citizens or Canadian permanent residents. The highest level of education was primary or secondary school for the majority of participants. Two non-Arabic-speaking participants were included because they were spouses of Arabic-speaking participants attending the program. More than half of the participants lived with their spouse and/or their children, reported a family income of less than $20,000 which is categorized as low income in Canada and received some form of government financial support (Table 1).

All study participants used ICTs via their smartphones with only a few reporting having access to and knowing how to use computers. Smartphones were cost effective, accessible, and familiar to IROAs and, hence, the focus of the learning sessions throughout this study was on exploring ICT use on these devices. The themes focus on digital agency which we conceptualized as the agency to use ICTs with sufficient digital competence to meet personal preferences and needs while maintaining safety, security, and independence. We emphasized "agency" as a concept to draw attention to older adults' desire to use these technologies independently and confidently to meet their daily needs. The three themes draw from four dimensions of the DigComp 2.0 Framework: (1) Information and data literacy, (2) communication and collaboration, (3) safety and (4) problem-solving. The dimension of "digital content creation" was not inductively discussed by participants and the scope was beyond the capacity of this study to address (Table 2).

Table 1. Demographic characteristics of participants (n=31)

Characteristics		Overall (n=31)	Phase 1 (n=10)	Phase 2 Organization 1 (n=9)	Phase 2 Organization 2 (n=12)
		n (%)	n (%)	n (%)	n (%)
Age, mean (SD[1])		64.1 (7.7)	61.2 (3.1)	64.2 (6.0)	66.3 (9.5)
Gender (%)					
	Female	20 (64.5)	5 (50)	5 (33.3)	10 (66.7)
	Male	11 (35.5)	5 (50)	4 (66.7)	2 (33.3)

Country of birth (%)				
Lebanon	5 (16.1)	0	1 (11.1)	4 (33.3)
Syria	16 (51.6)	5 (50)	6 (66.7)	5 (41.7)
Palestine	3 (9.7)	1 (10)	0	2 (16.7)
Sudan	3 (9.7)	3 (30)	0	0
Egypt	2 (6.5)	0	1 (11.1)	1 (8.3)
Afghanistan	1 (3.2)	0	1 (11.1)	0
Iraq	1 (3.2)	1 (10)	0	0
Ethnicity (%)				
Afghan	1 (3.2)	0	1 (11.1)	0
Arab	28 (90.3)	10 (100)	6 (66.7)	12 (100.0)
Kurdish	2 (6.5)	0	2 (22.2)	0
Immigration status (%)				
Canadian Citizen	17 (54.8)	4 (40)	7 (77.8)	6 (50.0)
Permanent Resident	13 (42.0)	6 (60)	2 (22.2)	5 (41.7)
Temporary Resident	1 (3.2)	0	0	1 (8.3)
Dwelling (%)				
Spouse	10 (32.2)	1 (10)	6 (66.7)	3 (25.0)
Children	2 (6.5)	1 (10)	1 (11.1)	0
Spouse & Children	10 (32.2)	5 (50)	0	5 (41.7)
Alone	6 (19.4)	1 (10)	1 (11.1)	4 (33.3)
Other	3 (9.7)	2 (20)	1 (11.1)	0
Family income (%)				
Less than $20,000	21 (67.7)	7 (70)	7 (77.8)	7 (58.3)
$20,000 to $40,000	7 (22.6)	1 (10)	2 (22.2)	4 (33.3)
$40,000 to $60,000	2 (6.5)	1 (10)	0	1 (8.3)
Unknown	1 (3.2)	1 (10)		
Family income primary source (%)				
AISH[2]	2 (6.5)	1 (10)	1 (11.1)	0
Government Support	22 (70.9)	6 (60)	7 (77.8)	9 (75.0)
Government Support and AISH[2]	1 (3.2)	0	1 (11.1)	0
Other	6 (19.4)	3 (30)	0	3 (25.0)
Time lived in Canada (%)				
Less than 5 years	12 (38.7)	5 (50)	2 (22.2)	5 (41.7)
5 - 10 years	8 (25.8)	3 (30)	4 (44.4)	1 (8.3)
More than 10 years	11 (35.5)	2 (20)	3 (33.3)	6 (50.0)
Time lived in Current City (%)				
Less than 5 years	13 (42.0)	5 (50)	2 (22.2)	6 (50.0)
5 - 10 years	8 (25.8)	4 (40)	4 (44.4)	0
More than 10 years	10 (32.2)	1 (10)	3 (33.3)	6 (50.0)
Language spoken at home (%)				
Arabic	26 (83.9)	10 (100)	6 (66.7)	10 (83.3)

- English	1 (3.2)	0	0	1 (8.3)
- Kurdish	1 (3.2)	0	1 (11.1)	0
- Bi-lingual (i.e., Arabic and English/ Arabic and Kurdish/ Farsi and English	3 (9.7)	0	2 (22.2)	1 (8.3)
Literacy level of the above language				
- Below basic	2 (6.5)	0	1 (11.1)	1 (8.3)
- Intermediate	2 (6.5)	0	0	2 (16.7)
- Proficient	27 (87.0)	10 (100)	8 (88.9)	9 (75.0)
English/French fluency				
- Excellent	3 (9.7)	2 (20)	1 (11.1)	0
- Good	13 (42.0)	3 (30)	4 (44.4)	6 (50.0)
- Minimal	14 (45.1)	5 (50)	4 (44.4)	5 (41.7)
- None	1 (3.2)	0	0	1 (8.3)
Highest education level				
- Primary	9 (29.1)	1 (10)	2 (22.2)	6 (50.0)
- Secondary	10 (32.2)	2 (20)	4 (44.4)	4 (33.3)
- Post-Secondary	11 (35.5)	7 (70)	2 (22.2)	2 (16.7)
- Other	1 (3.2)	0	1 (11.1)	0

[1] SD, Standard deviation

[2] AISH, Assured Income for the Severely Handicapped

Table 2: Digital competence of participants

1. INFORMATION AND DATA LITERACY	
1.1 Browsing, searching and filtering data, information and digital content	You could navigate for information in Arabic, but you can't be sure if what you found is a trusted site. Likewise, if you look it up in English, you can try to translate the information online into Arabic but it won't be as easy to understand as if it were in Arabic to begin with. (P6 & 7) **K**[a] I do not know English, so I do not access government sites…. In Canada, in the Province of Alberta, anything new on Facebook I receive information from (name), a Syrian activist who speaks Arabic and writes in Arabic, I take news about the province from his page. I see what is new in the Province (P8, FG) **S**[a] Recently P1 and 2 moved from where they were living before and are excited to be connected to the mosque newsletter. P3 already receives the mosque newsletter but wants to see if there is an Arabic version. (Observation) **A**[a]
1.2 Evaluating data, information and digital content	Sometimes I see pictures that are one, two, or three years old and they write that this has happened today, but it's obvious or I remember that it's from a few years ago. (P5) **K** Nowadays, to get the right information, sometimes I have to check more

	than one source and I compare the information…I exchange information with my friends and see if it's accurate. See what they've heard, so they tell me just to try to get the most accurate information…some (friends) are here, and some are back home. It depends. Some in Egypt, some in a different country. (P12) **S** We don't trust everything on Facebook, I mean I don't even trust things on Facebook, not even 10%, but I believe language resources are trustworthy, sports, games, sports game results, yeah, but I don't trust any political news. (P1) **A**
1.3 Managing data, information and digital content	I don't know how to (retrieve and save information that I have accessed)...I don't know where to save it. (P2, FG) **K** My way is that when I find information and it might be of interest to another person, I send it to them on WhatsApp and this way it is saved as I can see it on my end (P7, FG) **S**
2. COMMUNICATION AND COLLABORATION	
2.1 Interacting through digital technologies	P4 didn't realize her friend requests were her friends and family as she can't read in Arabic, so she is now adding them. (Observation) **K** P1 after seeing this slide has mentioned that she gets email messages and she doesn't understand, she doesn't open the message and it is left unread. Doesn't know how to respond to voicemail. (Observation) **S** We learned that P4 isn't using Facebook because she used to have it and accidentally deleted it and didn't want to get it back or go through the trouble of re-downloading it. (Observation) **A**
2.2 Sharing through digital technologies	Setting up friends who can see posts except for select contacts. This appears to be something they are all learning for the first time. (Observation) **K** Going over Facebook slides. P4 wants to learn more about it…She knows how to add people and search for content. Doesn't know how to block people on Facebook. P3 wants to learn how to share on Facebook. (Observation) **S** Sometimes there are things like the skype and internet-related things like video calls when I talk with my kids, my wife helps me with that. I am not very good with technology because we're a bit old school. (P10) **A**
2.3 Engaging citizenship through digital technologies	If I knew English, I would have followed Canadian groups on Facebook, of course but I don't know English so I have to follow the Arabic groups (P1) **K** No, so they don't know anything about accessing health information or banking information online, or any essential services, my understanding. (P1,2,3, Group interview) **S**

	My knowledge is not that wide open to it. But thanks God, my grandkids taught me how to get my bank account and to see, you know, what's in it, and to pay my bills. (P9) **A**
2.4 Collaborating through digital technologies	P6: Quran lessons on ZOOM. P3: I am on ZOOM, we all read the Quran on ZOOM. (FG) **S**
2.5 Netiquette	P3 wants to change the Facebook workshop group she is in, and this requires learning how to change her personal information on her Facebook account. (Observation) **K** P6 wants to learn about how to block somebody on Facebook. (Observation) **S** P5 has a large friend request list containing her in-law side of the family. Although P5 knows them, she didn't want to add them as her friends on Facebook. She wants to keep her privacy, and noted that her husband has a large family (largest family in town), and she doesn't want them on her Facebook. (Observation) **A**
2.6 Managing digital identity	P3 wants to change the Facebook workshop group she is in, and this requires learning how to change her personal information on her Facebook account. (Observation) **S**
3. DIGITAL CONTENT CREATION	
This competency did not emerge as a priority area in discussions with participants and was beyond the scope of the project to address in the learning sessions.	
4. SAFETY	
4.1 Protecting devices	Their bewilderment and lack of awareness says a lot – perhaps they're learning that their children have set up a lot of the functions/accounts on their phones for them and handed the set-up phone to them after so the participants never needed to deal with the set-up process and account/password management. (Observation) **K** P3 had a question about passwords and asked the instructor directly. He asked about what to do when choosing password variations (i.e. using symbols)... It turns out he had trouble finding where to get the symbol part of the keyboard, to which the instructor was able to show him on his phone keyboard. (Observation) **S** Some participants didn't care for privacy e.g. P7 and P6. P7 had mentioned something along the lines of "I'm old now, I have nothing to hide". (Observation) **A**
4.2 Protecting personal data and privacy	P4 asking about if google is safe. Worried about hacking and how pictures without the hijab would be stored. Instructor needed to explain how privacy works on iCloud and Google Photos storage which are more secure than on social media. (Observation) **K**

	The participants who privatized their settings was P1, P2, P3, P4, P6. P8 as well though she already had private settings on. (Observation) **S** I myself used to teach them how to deal with the scammers…If they call you, you got a call from an unknown number, an unknown person speaking English, "You understand English?" Just say, "No English," hang up, that's it. (P11) **A**
4.3 Protecting health and well-being	Block and report someone on WhatsApp. Practicing how to block and unblock…P5 is showing and teaching P3 on her phone in Arabic. (Observation) **S** P5 shared that ever since she moved to Canada she has family and friends asking for money so she wants to block them. **A**
5. PROBLEM SOLVING	
5.1 Solving technical problems	Participant 1 worked through deleting an email and restoring it with the instructor teaching him. He has never deleted an email before. (Observation) **K** P3 wants to change the Facebook workshop group she is in, and this requires learning how to change her personal information on her Facebook account. (Observation) **S** Meanwhile, P1 and P2 want to cancel voicemail because it is annoying and has no use. They don't know how to use it. The instructor explained that when they miss a call (for example from the doctor or the government), a voicemail is left, and P1 and P2 said they were unaware of this. P1 and P2 mentioned that sometimes they get voicemails even when people don't call them. (Observation) **A**
5.2 Identifying needs and technological responses	The instructor and P4 were chatting, and he expressed that he doesn't fully know the importance of email…He is learning that if he wants, he can open emails on a computer and not just his phone, he appears bewildered that it's possible to do that. However, his son has the password to the email, so he is learning that he needs the password in order to access emails online. (Observation) **K** P1: Also learning the English language, we downloaded apps P3: We downloaded more than one app P1: Here it is T: Are there apps on Facebook that teach English? P2: yes, yes **S** Of course, not a lot of people want to go back and learn at this age and start all over again. I feel like my brain doesn't accept it. For example, when my daughter tells me let's create an email for you, I tell her to just do it and leave me out of it [laughter]. Older people don't like this, I am

	not very motivated to learn, I feel like I'm good the way I am. Like, on the computer, maybe it's not good for my eyes or my body to sit for a long time. Maybe I'll get tired. I don't know, maybe it's a thing for all seniors, they like to run away from all this new technology. (P13) **A**
5.3 Creatively using digital technologies	Not identified
5.4 Identifying digital competence gaps	I don't have any idea about anything…I don't have somebody live with me, so when I stuck, I get so upset so that's why I never try again. (P7, FG) **K** I want to be able to learn how to use my phone. Like anytime I need anything, I have to ask for help: 'can you help me with this, can you set up email for me, I don't know how to do it'. Same thing for the computer. I should know how to use it… it's a necessity of life". (P9) **A**

[a] Knowledge (K), Skills (S), Attitudes (A)

Theme 1: "*Here you need to go on the website and see for yourself*": Access to Information

All participants described using their smartphones to access information via social media platforms with WhatsApp and Facebook being the most utilized, followed by YouTube. Search engines such as Google were rarely described as information sources by participants. All participants reported skepticism about the credibility and authenticity of information on social media. Participants most often used family and friends for information checks to confirm or disconfirm what they were viewing on these platforms.

> *Yes, I subscribed with (news media channel) two or three times but I've seen fake news on there because we hear things and they broadcast different and fake things. We ask our friends and family in Iraq if the stuff they talked about has really happened there and they say "no", so all their news is fake.* (P5, older man, interview)

Overall, IROAs were savvy in evaluating information, especially with regards to world events. Information accessed related to Canada and to countries of origin as they followed ongoing political and social trends. Accessing trustworthy information was heavily reliant on connections within transnational social networks that were, also, made possible via the use of ICTs to communicate at a distance via free social media apps that allowed texting, voice messages and phone calls to gather information in real time.

> *Nowadays, to get the right information, sometimes I have to check more than one source and I compare the information…I exchange information with my friends and see if it's accurate. See what they've heard, so they tell me just to try to get the most accurate information…some (friends) are here, and some are back home. It depends. Some in Egypt, some in a different country.* (P12, older man, interview)

Beyond social and political news, participants used ICTs to search for information related to their hobbies, religious practices, resources for immigration and health information: "*For entertainment on YouTube I go and see how to bake a cake, I tried banana bread, amazing. I make things if I like the recipes*" (P5, older woman, FG). Participants often received links to videos and images on social media that allowed them to explore a range of topics of interest and

many reported daily usages for entertainment and information access.

> *Sometimes you will find it (health information) on YouTube and sometimes on Facebook. I type the name of the doctor on YouTube and I listen to what he says about health and about medicinal herbs…if I think the information is correct I follow it and if I do not think it is correct I do not follow it.* (P1, older woman, FG)

Refugee newcomers struggled as they quickly realized that they were expected to access online information needed for settlement. These participants were socially isolated during the COVID-19 pandemic and struggled to use email to access information critical to their daily lives, such as opening newsletters, paying utility bills, reading and responding to government emails, and accessing online banking: *"No, so they don't know anything about accessing health information or banking information online, or any essential services, my understanding"* (translator for P1 & 2, older couple, group interview). While newcomers are connected to a settlement worker in Canada for their first year, this support was not always consistent, available in a timely manner, or continued for a sufficient length of time.

> *Even here when you go to a government office to do anything, for example, they give you a website and ask you to see for yourself…in Syria, they would do that for you, if you needed anything, government employees would communicate clear instructions and you would get it done. Here you need to go on the website and see for yourself and this is hard for seniors, other than the language problem, they don't even know how to open or go on a website. For example, even though I am able to rely on myself, I still find it difficult because of the language. Even when I go on certain websites, their website design is sometimes a little different in comparison to what I was used to.* (P12, older man, interview)

All participants spoke Arabic, Kurdish or Farsi as their native language, displaying diverse levels of proficiency in both written and spoken English. Language posed a challenge to browsing, searching, and filtering digital content in English. Consuming information via social media and specifically audio-visuals was reported as easier by participants. Accessing information via ICTs was not only challenging due to lower digital competence and language barriers, but, also, due to skepticism about trustworthiness of information and applicability of this information to their unique situations. Furthermore, newcomers struggled with engaging with ICTs post-migration due to the difference between technology in Canada and their home country where they had not grown up with technology but shifted into a digital world later in life driven by necessities of migration.

In local contexts finding trustworthy sources of information can be difficult for isolated IROAs who do not have local strong social networks. Language barriers prevented accessing local trusted sources of information such as healthcare practitioners and service providers.

> *There are issues with accessing banking or health information because often we opted to ask people around us locally, but have found that the information that we gathered could be inaccurate and the wrong information can spread quickly.* (P6 & 7, older couple, group interview)

Finding these trusted individuals was especially challenging for newcomers who might not know how to find a physician who speaks their language or might be unaware of seniors' service providers in their local region. Arabic social media groups and social media influencers who share information post-migration about settlement in Arabic was especially helpful.

> *In relation to the YouTube English lessons, someone who used to be an engineer in Syria, he started making YouTube videos in Edmonton that is English and Syrian translation.*

> *This is the content that they watch and he get the video link through WhatsApp through his cousin. They shared that thanks to the YouTube algorithm, they can watch the rest of his videos on his channel.* (P7, older man, interview)

IROAs who had English language fluency or strong social connections within local Arabic-speaking communities were better connected to needed information and did not report these challenges. For some participants, storing and retrieving information was difficult: "*I don't know how to (retrieve and save information that I have accessed)...I don't know where to save it* (P2, older man, FG), while others struggled with understanding search algorithms and the ways data was filtered by social media platforms which caused frustration and inhibited access to preferred information: "*P3 has a question about how to cancel certain posts that she sees on Facebook. She is confused as to why they show up when she has never pressed "like" on these posts*." (Older woman, observation)

Immigrant and refugee older adults described a high level of skepticism about information they found on social media but often this was the most accessible source of information for those who were isolated with low digital literacy and language barriers. IROAs were more comfortable navigating social media platforms in Arabic and the availability of voice and video formats supported those with low reading literacy. This meant that IROAs were subjected to social media trends and algorithms that might bias what information they saw which was countered with a reliance on trusted social contacts locally and transnationally to verify information from these digital sources. This coping strategy was ineffective in local contexts where newcomers with few social contacts lacked access to reliable and needed information about their health and aging-supportive resources post-migration.

Theme 2: "*We are mute*": Active Engagement in Digital Communication

A variety of platforms were used to serve participants' needs to communicate with family, friends and others in their social networks. Most common social media platforms used were WhatsApp and Facebook. For participants who were illiterate or had low literacy, the voice message and video features of these platforms allowed them to engage with others. Some individuals used ZOOM for group lessons and meetings with family. Email was the least used communication tool. Having left Syria before electricity and internet was widely available in their village, one participant explained how the need and opportunity to use social media to connect with family began with their migration journey to Turkey: "*We didn't know Facebook in Syria not even WhatsApp...when we went to Turkey we started a little to learn*" (P1, older man, FG), while the use of email followed due to the need to communicate with immigration official and the service sector in Canada. In local contexts language barriers and use of email was less common. Responding to emails can be particularly important to access government and social supports and health services but a combination of language barriers and digital literacy struggles prevented some newcomer refugees from accessing emails sent to them.

> *P1 after seeing this slide has mentioned that she gets email messages and she doesn't understand, she doesn't open the message and it is left unread. Doesn't know how to respond to voicemail.* (Older woman, observation)
>
> *Participant knows how to open Arabic emails and uses it to track for school or government, doesn't send emails himself due to English barrier, and he communicates through social media more.* (Older man, Observation)

Agency to create a digital identity and manage communication with others was important for

participants. Some participants only received communication and were not able to reciprocate or initiate communication which was a source of frustration.

> *I have been here 46 years, I went to school, I went to high school, I went to university, I did my education. At the time, I did all those but no technology was at the time, and now I have been retired for 10 years. Like on Facebook, if somebody sends me a message, I go back and answer them but for me to open my telephone and call them or send them a message, I do not know how.* (P8, older woman, interview)

Similar comments were made by women in the study who reported wanting to learn to use email and expanding on the usual technologies they used: *"To enter into society…. meaning if my friend sends me an email, I want to learn to respond to her…we read the message but we don't know how to respond."* (P6, older woman, FG). Other participants reported communicating by proxy where family members navigated their devices for them, responding to emails for communication with service providers and initiating contact using their digital devices with family and friends: "*Sometimes there are things like the skype and internet-related things like video calls when I talk with my kids, my wife helps me with that. I am not very good with technology because we're a bit old school"* (P10, older man, interview). While this support was appreciated by some, the majority reported wanting independence to alleviate the burden on their children. There were frequent comments about frustration with not keeping up with the times, being behind their grandkids in understanding technological benefits and not being able to maximize use of these devices:

> *"but how much help from your kids! You know they are always busy, especially for mama, ok later later, tomorrow, tomorrow, and then tomorrow they never showed up for me."* (P8, older woman, FG)

For the majority, the lack of agency was more nuanced and was revealed in observations during learning sessions despite their assertion initially that ICTs were accessible with a high degree of integration into their daily lives. IROAs had difficulty creating digital content, such as initiating picture sharing, starting conversations, and deleting posts. The majority of participants struggled with these skills and required assistance to learn how to complete them during the learning sessions: "*P1 knows how to share existing posts, is unable to save her own picture and share it"* (observation). This resulted in collaboration being one-sided, eliminating the participants' autonomy to connect on their own terms to support preferences and needs. Passive use of ICTs where participants observe but do not comment or create digital content was common: "*I access Facebook daily. I do not participate much but I benefit from world news, political news, religious news"* (P8, older woman, FG) and "*A lot of the participants don't post, rather they are looking at posts"* (observation).

For those who had basic competence levels to communicate by posting, sending voice/text messages, and responding to social media posts, the more technical features of these applications were cited as challenging such as deleting posts, adding friends' requests, hiding posts, and creating private groups. Learning to block others, create private groups for discussion, and add/delete contacts are essential for agency in digital spaces:

> *P3 mentioned that she only blocks people on her phone, not on Facebook. She thinks it is really important to learn how to do this. Going over the Facebook slide, P4 wants to learn more about it…She knows how to add people and to search for content. She doesn't know how to block people on Facebook.* (Observation)

Transnational communication was prevalent within this population, and many participants connected to family, friends and acquaintances overseas, with the lack of digital skills translating

to some evidence of gendered power inequities where women reported not being able to filter information or restrict access by families within transnational spaces:

> *P5 has a large friend request list containing her in-law side of the family. Although P5 knows them, she didn't want to add them as her friends on Facebook. She wants to keep her privacy, and noted that her husband has a large family (largest family in town), and she doesn't want them on her Facebook. But G. noticed that she also doesn't really post. H. wonders if once we teach them how to manage privacy settings on posts, maybe she may want to post more and may feel more comfortable to do so.* (Observation)

Communication via ICTs was an ongoing feature of participants' lives and for some who were physically more isolated it was the main source of daily communication. While on the surface it appeared IROAs had a high degree of competence due to the intensity of reliance on ICTs, during the learning sessions and interviews, it was apparent that agency was constrained due to limited digital competence that would allow them to control how, when and what was communicated. Creating digital content, communicating with preferred social contacts, and using communication to access local sources of support to age in place were major challenges.

Theme 3: "*Don't give me a fish, teach me how to catch it*": Troubleshooting ICTs

Safety online and troubleshooting to address issues like storage, function changes, and device accessibility were challenges for IROAs. Safety related to sharing information online, password management, and privacy in virtual communications. Participants relied on practical approaches to store their passwords, such as digital word documents, notebooks, or family members. Learning sessions were often interrupted to troubleshoot password and security functions of their devices:

> *Their bewilderment and lack of awareness says a lot-they're learning that their children have set up a lot of the functions on their phones for them…so the participants never needed to deal with the set-up process and account/password management.* (Observation)

One participant described using the notes application on their phone to store their passwords, but was fearful as to what would happen to their digital identity if they misplaced their phone: *"She has issues with remembering her passwords. She had written down her passwords in her phone but when she lost her phone, she couldn't recover her passwords"* (P6, older woman, FG). Participants had a difficult time synthesizing strong passwords and tended to use the same password across applications. They, also, reported trouble remembering passwords and were required to use the password reset feature which posed additional complexities. One participant felt overwhelmed with the number of passwords that are required to utilize ICTs and the need to synthesize complex passwords:

> *Yeah, I can't deal with, you know, like if I want to search about something on a Google, I pray, I go, or if they ask me to put my password, probably I have 200 passwords and I don't know which one. You know, like I'm not capable to action and I write down my password. I write down my email, whatever, and the next day I forgot something or some letter.* (P10, older man, interview)

Generally, the participants were well-equipped to deal with security issues. There were instances where participants could recognize scam calls and phishing emails. They were skeptical and hesitant about making new friends online, joining Facebook groups they did not recognize, and sharing photographs online. This hesitance is outlined by one participant:

> *You don't trust like on the Internet to find somebody new, or you don't know nothing, and*

> *you don't know if he's a con artist or thieves or, you know, eat your life. I don't like to meet those people that I don't know them. But if I knew a neighbour, you know, "Good morning, good afternoon." She visits me, I visit her. Yeah, I would like to communicate and be a friend and help her and she help me, accepted. But somebody like introduced, met on a – or I met on the Internet, and I don't believe those to be follow.* (Older woman, FG)

Instances of scams were not described by participants except one who talked about learning to avoid accepting phone calls from unknown numbers. While the majority of participants reported not responding to calls from individuals they did not know, this participant described in detail learning to be safer using ICTs after falling victim to a scam:

> *In the beginning, I have many problems with this. Sometimes I answer and I give my, you know, my information. Yeah, because, when I came here, I thought that it's trustworthy… this is a country of laws and never imagined this type of stuff would happen here to be honest. I had a few issues and I even had to cancel my credit card and so I learned, so now, whatever I don't understand, I don't engage in…Sometimes I don't even answer and I miss appointments… Sometimes they are calls from Canada that are important for me and I miss them.* (P12, older woman, interview)

Privacy when using digital devices was of concern for majority of participants who tried to navigate this by not sharing or posting on social media and not adding people who were not part of their social network as well: *"Daily I get friend requests…people I don't know so I ignore them completely* (P3, older woman, FG). Privacy for women related to religious and cultural expectations of modesty and to perceptions of avoiding envy or gossip. Simply not posting versus restricting privacy settings so certain people could view the posting was easier as described by women participants. According to one participant, "*I do not post my pictures on Facebook*" (P4, older woman, FG). Another participant agreed and added "*because this is something private, it is not necessary for the whole world to know about it*" (P3, older woman, FG).

A group of women discussed an incident where a video of their gathering where they were clapping and singing was shared without consent of one of the participants on social media. Due to religious views about modesty, the women requested this video be removed. The conversation centered on the importance of privacy and consent when posting content with other individuals visible: *"It was a misunderstanding…we let our guard down with our friends…she was afraid and didn't want this to spread"* (P4, older woman, FG3). Yet, often IROAs were unaware of how to navigate privacy settings on different devices and platforms:

> *Activity on how to make account more private: Participants needed to be verbally and individually guided to find the settings menu for privacy. All participants changed their settings to be more private for friends' requests, even when facilitators described it in a neutral way.* (Observation)

Troubleshooting for accessibility of devices, not everyone knew the possibilities but some did with Google Translate and other apps that can support this. Many participants were only literate in their first language, Arabic; and some were illiterate in Arabic so they used their phones to watch and listen but not to read: "*The message comes to us via phone and we understand a little of it but we then take it to someone who reads English, a friend…I send it to him via phone and he tell me what it is about"* (older man, FG). The use of text-to-voice apps and translation functions were not described by most participants outside of receiving and sending voice messages using social media platforms.

Most participants who had family living with them or nearby used them for support with troubleshooting their devices. IROAs all preferred to learn how to troubleshoot on their own without relying on family and wanted community supports to help expand their digital competence. One participant shared "*They don't have time*" (P6, older woman, FG). Another participant agreed and shared that family members lacked patience as "*They take the device from you, do this and that, okay, how did you do that? How will you learn it if you are not doing it? Don't give me a fish, but teach me how to catch it*" (P1, older woman, FG).

Some IROAs did not have family or friends nearby or lived alone: "*I don't have somebody live with me, so when I stuck, I get so upset so that's why I never try again"* (P4, older woman, interview) These individuals reported frustration and a desire to access support to enhance their digital literacy, citing this as a main reason for joining the digital learning sessions. Participants rarely reported accessing services or programs that help with digital literacy, especially those who were newcomers to Canada and felt unfamiliar with avenues for this support. None reported using the library or other mainstream technology support programs for seniors. Local ethnocultural and faith-based organizations and acquaintances were cited as helping at times: "*… there is no one to help us, we do not have children here, they are all in Syria and Jordan and Lebanon…We take it to the mosque or to someone we know"* (older men and women, FG).

Overall, IROAs experienced significant challenges navigating technical features of their devices which, in turn, restricted the scope and range of digital engagement. Assistance from family, when available, was often a source of support to use ICTs. IROAs, however, preferred to expand their knowledge and skills to gain further independence in navigating their devices. Participants did not report enrolling in any formal digital learning programs before participating in this research project.

Discussion

The purpose of this study was to explore the ways IROAs interact with technologies in their daily lives, their exercise of digital agency, and their digital competence. This study provides a sociotechnical understanding of the ways IROAs use ICTs in their daily lives while focusing on their digital knowledge, skills and attitudes [42,43]. Participants in this study reported fundamental use of ICTs in their daily lives, particularly social media platforms for accessing information, entertainment, and connecting with family and friends. As exemplified by study participants, IROAs use a range of technologies to adapt post-migration by maintaining transnational social networks, cultivating belonging to places of origin, practicing valued social roles such as grandparenting, and navigating barriers to local integration [28,44,45]. Below, we discuss further the nuances of digital agency, appropriate and accessible forms of information for IROAs, and supports required for ICT adoption.

Agency relates to using ICTs that are accessible and affordable in ways that meets one's preferences and needs [5(p702)]. Agency has been a core concept in understanding the interplay of internal and external factors that shape technology adoption and the impacts of technology use [43]. Participants in this study struggled to meet their needs via ICTs and, simultaneously, exercise agency to overcome barriers to digital competence. Participants were not simply users or non-users of ICTs, rather digital use was viewed on a spectrum of low to advanced agency in managing digital tools to meet needs and preferences for aging in place during and post-settlement in Canada. Notably from the results of this study, digital agency was constrained by the lack of digital competence and minimal environmental supports. Constrained digital agency was evident in a lack of choice around digital content viewed via an inability to filter information

or search for new information, lack of selection related to who and when to communicate via not being able to block a contact or create a private friend group, and inability to access new features on their smartphones or troubleshoot due to not owning access to their personal accounts and passwords. Ultimately, older adults are not passive users of technology even when agency is constrained as we see in this study. Rather older adults adapt, overcome or disengage from technologies [42]. In this study, we observed that participants refrained from posting on social media because of privacy concerns stemming from uncertainty about how to control privacy settings or create private groups. Instead, participants used creative ways to store information such as sending the information to peers via WhatsApp, and using trusted individuals as sources to confirm what was viewed on social media. "Hybrid practices", where technology is used to adapt ways of doing things [5(p702)], was evident such as IROAs using social media for information and then cross-checking with their trusted social networks the accuracy of information.

Accessing information traditionally was viewed as most reliable through networks of trust-with family and friends- which is limited post migration for newcomers and isolated IROAs. This was especially evident for refugee newcomers in the study who had arrived during the pandemic and mirrors what has been reported elsewhere [46,47]. Thus, social media became the source of connectivity and access to information for study participants, especially with the ability to use different platforms in Arabic. However, while Arabic sources of information on social media are readily available, participants felt that this information is not always trustworthy or tailored to local post-settlement contexts. Study participants' competence in searching for and filtering information was limited, especially when seeking information related to settlement or aging-supportive resources post-migration. Stereotypes of older adults influence the technologies that become available and adapted for them and also shapes older adults' self-perceptions of their capabilities and the types of technologies appropriate for them [24,48]. Technologies even when not adopted by older adults influence their lives by changing the social world around them [42]. Study participants were deprived of local knowledge due to limited access to Government websites and difficulty searching for information on search engines, while the social media platforms they do use are not being utilized as sites for knowledge dissemination for this population. The example of an Arabic-speaking social media influencer who provided local knowledge of the City participants lived in showcases the potential for social media as a site for effective knowledge dissemination.

Family is a central source of support for older adults' adoption and navigation of new technologies [18,31] which mirrors the finding of this study. Participants, however, were vocal in their desire to strengthen their digital competence to enhance their independence in navigating these technologies in a timely manner that met their needs. Participants in this study were interested in expanding their knowledge and use of ICTs to meet their daily needs and were engaged in the learning sessions, however, the many challenges they experienced was a cause of frustration and over reliance on family to facilitate technology use. Other studies have shown the importance of social support from family and friends in facilitating older adults' access and use of technologies [12,24] and this holds true for immigrants where family support using devices to facilitate culturally and linguistically relevant entertainment, communication and access to information. However, family members of IROAs who are newcomers and/or language minorities may also face similar challenges while simultaneously being cut off from wider formal support systems for digital learning. Offering digital learning sessions and strategies to increase their competence is a way to enhance digital agency [24]. Older adults might use technologies for necessity or for leisure so that developing safe and engaging learning

environments that meet their preferred needs is critical [18,19]. There are few programs that tailor ICT learning to older adults from these communities and IROAs abandon using ICTs, give up on learning about them or creatively use modifications to navigate barriers. Information about aging in place is increasingly digitized but are inaccessible to those with poorer digital and other literacies with IROAs showing evidence of a mismatch between what is available and what they have access to which is mirrored in other studies that point to the intersections of language barriers and poor digital literacy [27].

This study expands on the existing literature on migration, ICT use and aging [28,45,49] by exploring digital agency and the digital competence of IROAs who creatively circumvent challenges as they navigate the digital divide [24]. Aging and technology are co-constituted where technology and older adults are mutually influencing in ways that change depending on the context of their interaction [42]. For IROAs, migration is the context of the interaction between older adults and ICTs and there remains a lack of attention to using digital tools to address the intersecting barriers of age-related disabilities, cultural differences, language barriers, and poor literacies with potentially negative impacts on aging in place post migration. While there is a diverse range of digital literacy programs across Canada that aim to support underserved older adult populations such as the Digital Literacy Exchange Program [50], there is a lack of consistent access to programs that tackle the interplay of language fluency, cultural differences, social support and transnational influences on technology adoption and learning. While ageism is acknowledged in discussing the digital divide [24,42,48], the intersecting influences of social exclusion and discrimination from being a language minority, racialized, and older, requires further understanding to change practices around supporting digital learning in IROAs.

Strengths and Limitations

This study allowed for in-depth exploration over a short period of time of Arabic-speaking IROAs' digital competence and a longitudinal design over a longer period of time could add further insights into evolving digital competence and resulting changes in how IROAs interact with ICTs. This study included a majority of women and, hence, we were unable to explore in-depth gender differences other than with some instances where women reported constrained choices in communication with transnational families due to limited digital competence in the communication domain. Other studies have shown the influence of gender shape use and access to technologies [30,51–53] and this is an area for further exploration. The majority of participants in this study were healthy and younger older adults. Digital technology use and health in older immigrants are linked [12,54], hence, further exploration of technology use in immigrants is required to understand ways to support digital agency to meet their needs of social connectivity and information access. Finally, with the central role social support and, especially, family play in the digital use and competence of IROAs, future studies that include the perspectives of family members and caregivers might be critical, especially in designing digital interventions for this population.

Conclusion

Considering the anticipated and observed growth of Canada's immigrant and refugee older adult population, addressing equitable access to ICTs is imperative to enhance quality of life in older age. Supporting effective ICT use among IROAs has the potential to markedly improve their social connectedness, access to local resources and information, and foster a sense of independence through the exercise of digital agency. This study suggests that engaging group-

based educational initiatives tailored to the unique needs of older immigrants can empower them to actively participate in the digital world. Therefore, it is crucial to provide accessible digital support mechanisms, both in formal educational settings like the co-designed program used in this study, and through informal channels. Further research is needed to inform policy with respect to exploring innovative strategies for disseminating local information and resources, such as leveraging social media platforms, as well as developing targeted programming that addresses language fluency, cultural considerations, and transnational influences on ICT use.

Acknowledgements

The authors would like to express sincere gratitude and appreciation to the community organizations who have contributed generously to participant recruitment and data collection stages of the project. We are indebted to the participants of this study who generously shared their time and knowledge during the co-design process. This work was supported by a research grant from (Blinded for review).

Conflicts of Interest

The authors have no conflicts of interest to declare. We declare that the manuscript is not under consideration for publication elsewhere. The publication of this work has been approved by all authors.

References

1. Collin S, Karsenti T, Calonne O. Migrants' use of technologies: An overview of research objects in the field. *J Technol Hum Usability*. 10(3-4):15-29.

2. Davidson J, Schimmele C. Evolving internet use among Canadian seniors. Published online July 10, 2019. Accessed May 6, 2024. https://www150.statcan.gc.ca/n1/pub/11f0019m/11f0019m2019015-eng.htm

3. Olsson T, Samuelsson U, Viscovi D. At risk of exclusion? Degrees of ICT access and literacy among senior citizens. *Inf Commun Soc*. 2019;22(1):55-72. doi:10.1080/1369118X.2017.1355007

4. Chen X, Frennert S, Östlund B. The use of information and communication technology among older immigrants in need of home care: a systematic literature review. *Ageing Int*. 2022;47(2):238-264. doi:10.1007/s12126-021-09417-x

5. Quan-Haase A, Martin K, Schreurs K. Interviews with digital seniors: ICT use in the context of everyday life. *Inf Commun Soc*. 2016;19(5):691-707. doi:10.1080/1369118X.2016.1140217

6. Peek STM, Luijkx KG, Rijnaard MD, et al. Older adults' reasons for using technology while aging in place. *Gerontology*. 2016;62(2):226-237. doi:10.1159/000430949

7. Sen K, Prybutok G, Prybutok V. The use of digital technology for social wellbeing reduces social isolation in older adults: A systematic review. *SSM - Popul Health*. 2022;17:101020. doi:10.1016/j.ssmph.2021.101020

8. Litchfield I, Shukla D, Greenfield S. Impact of COVID-19 on the digital divide: a rapid review. *BMJ Open*. 2021;11(10):e053440. doi:10.1136/bmjopen-2021-053440

9. Gleason K, Suen JJ. Going beyond affordability for digital equity: Closing the "Digital Divide" through outreach and training programs for older adults. *J Am Geriatr Soc*. 2022;70(1):75-77. doi:10.1111/jgs.17511

10. Köttl H, Allen LD, Mannheim I, Ayalon L. Associations between everyday ICT usage and (self-)ageism: A systematic literature review. *The Gerontologist*. 2023;63(7):1172-1187. doi:10.1093/geront/gnac075

11. Tomczyk Ł, Mróz A, Potyrała K, Wnęk-Gozdek J. Digital inclusion from the perspective of teachers of older adults - expectations, experiences, challenges and supporting measures. *Gerontol Geriatr Educ*. 2022;43(1):132-147. doi:10.1080/02701960.2020.1824913

12. Kebede AS, Ozolins LL, Holst H, Galvin K. Digital engagement of older adults: Scoping review. *J Med Internet Res*. 2022;24(12):e40192. doi:10.2196/40192

13. European Commission, Directorate-General for Education, Youth, Sport and Culture. Key

competences for lifelong learning. Published online 2019. https://data.europa.eu/doi/10.2766/569540

14. Skov A. What is digital competence. Published 2016. Accessed May 6, 2024. https://digital-competence.eu/front/what-is-digital-competence/

15. Szabo A, Allen J, Stephens C, Alpass F. Longitudinal analysis of the relationship between purposes of internet use and well-being among older adults. *The Gerontologist*. 2019;59(1):58-68. doi:10.1093/geront/gny036

16. Tyler M, Simic V, De George-Walker L. Older adult Internet super-users: counsel from experience. *Act Adapt Aging*. 2018;42(4):328-339. doi:10.1080/01924788.2018.1428472

17. Schirmer M, Dalko K, Stoevesandt D, Paulicke D, Jahn P. Educational concepts of digital competence development for older adults-A scoping review. *Int J Environ Res Public Health*. 2023;20(13):6269. doi:10.3390/ijerph20136269

18. Wynia Baluk K, Detlor B, La Rose T, Alfaro-Laganse C. Exploring the digital literacy needs and training preferences of older adults living in affordable housing. *J Technol Hum Serv*. 2023;41(3):203-229. doi:10.1080/15228835.2023.2239310

19. Pihlainen K, Ehlers A, Rohner R, et al. Older adults' reasons to participate in digital skills learning: An interdisciplinary, multiple case study from Austria, Finland, and Germany. *Stud Educ Adults*. 2023;55(1):101-119. doi:10.1080/02660830.2022.2133268

20. Statistics Canada Government of Canada. The Daily — Canada's population estimates: Record-high population growth in 2022. Published March 22, 2023. Accessed May 6, 2024. https://www150.statcan.gc.ca/n1/daily-quotidien/230322/dq230322f-eng.htm

21. Alencar A. Refugee integration and social media: a local and experiential perspective. *Inf Commun Soc*. 2018;21(11):1588-1603. doi:10.1080/1369118X.2017.1340500

22. Diminescu D. The connected migrant: an epistemological manifesto. *Soc Sci Inf*. 2008;47(4):565-579. doi:10.1177/0539018408096447

23. Fortunati L, Pertierra R, Vincent J. *Migration, Diaspora and Information Technology in Global Societies*. Routledge; 2012. Accessed May 6, 2024. https://www.routledge.com/Migration-Diaspora-and-Information-Technology-in-Global-Societies/Fortunati-Pertierra-Vincent/p/book/9780415719711

24. Fang ML, Canham SL, Battersby L, Sixsmith J, Wada M, Sixsmith A. Exploring privilege in the digital divide: Implications for theory, policy, and practice. *The Gerontologist*. 2019;59(1):e1-e15. doi:10.1093/geront/gny037

25. Canadian Arab Institute. Arab immigration to Canada hits record high. Published online 2013. https://static1.squarespace.com/static/5e09162ecf041b5662cf6fc4/t/5e5c6fd9b728573d1bad10b7/1583116249563/Arab+Immigration+to+Canada+Hits+Record+High.pdf

26. Hennebry J, Momani B. *Targeted Transnationals: The State, the Media, and Arab Canadians*. UBC Press Accessed May 6, 2024. https://www.ubcpress.ca/targeted-transnationals

27. N G, S S, N W, K M, E M. A Scoping Review of Ageing Experiences among Culturally and Linguistically Diverse People in Australia: Towards Better Ageing Policy and Cultural Well-Being for Migrant and Refugee Adults. *The Gerontologist*. Published online December 2021. doi:10.1093/geront/gnab191

28. Millard A, Baldassar L, Wilding R. The significance of digital citizenship in the well-being of older migrants. *Public Health*. 2018;158:144-148. doi:10.1016/j.puhe.2018.03.005

29. Haight M, Quan-Haase A, Corbett BA. Revisiting the digital divide in Canada: the impact of demographic factors on access to the internet, level of online activity, and social networking site usage. *Inf Commun Soc*. 2014;17(4):503-519. doi:10.1080/1369118X.2014.891633

30. Kim J, Lee HY, Christensen MC, Merighi JR. Technology access and use, and their associations with social engagement among older adults: Do women and men differ? *J Gerontol B Psychol Sci Soc Sci*. 2017;72(5):836-845. doi:10.1093/geronb/gbw123

31. Schreuers K, Quan-Haase A, Martin K. Problematizing the digital literacy paradox in the context of older adults' ICT use: Aging, media discourse, and self-determination. *Can J Commun*. 2017;42(2):1-34.

32. Schulz R, Wahl HW, Matthews JT, De Vito Dabbs A, Beach SR, Czaja SJ. Advancing the aging and technology agenda in gerontology. *The Gerontologist*. 2015;55(5):724-734. doi:10.1093/geront/gnu071

33. Kania-Lundholm M, Manchester H. Ageing with digital technologies: From theory to agency and practice. *Int J Ageing Later Life*. 2022;15(2):9-21. doi:10.3384/ijal.1652-8670.4309

34. Vuorikari R, Kluzer S, Punie Y. DigComp 2.2: The digital competence framework for citizens - With new examples of knowledge, skills and attitudes. JRC Publications Repository. doi:10.2760/115376

35. Joint Research Centre, Institute for Prospective Technological Studies, Punie Y, Ferrari A, Brečko B. *DIGCOMP : A Framework for Developing and Understanding Digital Competence in Europe*. Publications Office; 2013. https://data.europa.eu/doi/10.2788/52966

36. Seifert A, Schelling HR. Seniors online: Attitudes toward the internet and coping with everyday life. *J Appl Gerontol Off J South Gerontol Soc*. 2018;37(1):99-109. doi:10.1177/0733464816669805

37. Marston HR, Musselwhite CBA. Improving older people's lives through digital technology and practices. *Gerontol Geriatr Med*. 2021;7:23337214211036255. doi:10.1177/23337214211036255

38. Minkler M, Wallerstein N. *Community-Based Participatory Research for Health: From*

Process to Outcomes. 2nd ed. John Wiley & Sons; 2008.

39. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77-101. doi:10.1191/1478088706qp063oa

40. Braun V, Clarke V. What can "thematic analysis" offer health and wellbeing researchers? *Int J Qual Stud Health Well-Being*. 2014;9(1):26152. doi:10.3402/qhw.v9.26152

41. Lincoln YS, Guba EG. *Naturalistic Inquiry*. SAGE Publications, Inc.; 1985. Accessed May 6, 2024. https://us.sagepub.com/en-us/nam/naturalistic-inquiry/book842

42. Peine A, Neven L. The co-constitution of ageing and technology – a model and agenda. *Ageing Soc*. 2021;41(12):2845-2866. doi:10.1017/S0144686X20000641

43. Neves BB, Waycott J, Malta S. Old and afraid of new communication technologies? Reconceptualising and contesting the 'age-based digital divide.' *J Sociol*. 2018;54(2):236-248. doi:10.1177/1440783318766119

44. Khvorostianov N. "Thanks to the Internet, We Remain a Family": ICT domestication by elderly immigrants and their families in Israel. *J Fam Commun*. 2016;16(4):355-368. doi:10.1080/15267431.2016.1211131

45. Nguyen HT, Baldassar L, Wilding R. Lifecourse transitions: How ICTS support older migrants' adaptation to transnational lives. *Soc Incl*. 2022;10(4):181-193. doi:10.17645/si.v10i4.5735

46. Edmonds J, Flahault A. Refugees in Canada during the first wave of the COVID-19 pandemic. *Int J Environ Res Public Health*. 2021;18(3):947. doi:10.3390/ijerph18030947

47. Leung D, Lee C, Wang AH, Guruge S. Immigrants' and refugees' experiences of access to health and social services during the COVID-19 pandemic in Toronto, Canada. *J Health Serv Res Policy*. 2023;28(1):34-41. doi:10.1177/13558196221109148

48. Köttl H, Gallistl V, Rohner R, Ayalon L. "But at the age of 85? Forget it!": Internalized ageism, a barrier to technology use. *J Aging Stud*. 2021;59:100971. doi:10.1016/j.jaging.2021.100971

49. Wilding R, Gamage S, Worrell S, Baldassar L. Practices of 'Digital Homing' and gendered reproduction among older Sinhalese and Karen migrants in Australia. *J Immigr Refug Stud*. 2022;20(2):220-232. doi:10.1080/15562948.2022.2046895

50. Government of Canada. Digital literacy exchange program. Published June 7, 2023. Accessed May 6, 2024. https://ised-isde.canada.ca/site/digital-literacy-exchange-program/en/digital-literacy-exchange-program

51. Adnan M, Özbek Ç. Digital competences of older women in Turkey: gender and ageing as double danger. *Educ Gerontol*. 2023;49(12):1082-1099. doi:10.1080/03601277.2023.2209452

52. Suntai Z, Beltran SJ. The intersectional impact of race/ethnicity and sex on access to technology among older adults. *The Gerontologist*. 2023;63(7):1162-1171. doi:10.1093/geront/gnac178

53. Yang J, Du P. Gender, capital endowment and digital exclusion of older people in China. *Ageing Soc*. 2021;41(11):2502-2526. doi:10.1017/S0144686X20000434

54. Kouvonen A, Kemppainen T, Taipale S, Olakivi A, Wrede S, Kemppainen L. Health and self-perceived barriers to internet use among older migrants: a population-based study. *BMC Public Health*. 2022;22(1):574. doi:10.1186/s12889-022-12874-x

Supplementary Files

Figures

Phase 1 Interview Questions from DigComp 2.2.