Digital Equity in Canada: A Mixed Methodological Study of Digital Access, Digital Use and Digital Empowerment for Immigrants, Youth and Young Newcomer English Language Learners

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Abstract

This sequential mixed-methodological study explores the complexities of Internet use in Canada for immigrants and young people, with a particular focus on the digital lives of English Language Learner (ELL) newcomer youth. Incorporating data from the 2020 Canadian Internet Use Survey (CIUS), online surveys, and interviews with five ELL newcomer participants, the research challenges the existing literature by revealing that immigrant status may no longer be a predictor of digital inequity. Analysis of variance (ANOVA) with CIUS data comparing immigrants and non-immigrants indicates that immigrants report more digital access, skills, and engagement in capital-enhancing activities online compared to their Canadian-born counterparts. A second ANOVA comparing younger Canadians with all other age groups showed significant age-related differences in mean index scores with statistically significant differences in terms of digital access, skills and engagement in capital-enhancing activities. In all cases, youth means were higher than means for all other age groups. The second phase of the research delves into the nuanced experiences of five ELL newcomer youth, highlighting their high levels of digital access and skills while underscoring their limited participation in advanced digital activities due to self-reported language proficiency and safety concerns online. This study emphasizes the necessity of probing beyond surface-level digital activities to comprehend underlying factors influencing digital experiences. This research study offers critical insights at both macro and micro levels that contribute to advancing knowledge, informing policy, and improving practices related to digital equity and the needs of ELL newcomers in Canada.

Keywords: digital equity, digital divide, newcomer, English language learners, mixed method, youth, immigrant, digital inequalities

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Chapter 1: Introduction

The emergence of digital technologies has necessitated enormous transformations in contemporary life (Pangrazio, 2019; Sedivy-Benton, 2016). Access to information communications technologies (ICTs) such as computers, computer networks, and digital platforms have the potential to elevate lives through people's effective participation in society (van Laar et al., 2017). While the prevailing discourse often associates greater access to digital technology with positive outcomes, research highlights the multifaceted nature of this relationship, encompassing negative physical, social, and mental health consequences associated with certain forms of screen time (Featherstone, 2013; Kral, 2014; Smith et al., 2021).

This research study seeks to explore the complexities surrounding digital access and its implications, acknowledging that the impact of technology is multifaceted and culturally nuanced. Internet access of the Canadian population has been on an upward trend and dramatically increased from 51% to 91% between 2000 and 2018 respectively (Statistics Canada, 2001, 2019). According to Smith (2015), however, disparate access to technology has created a digital inequity throughout the world. Without access, there are no opportunities to develop foundational digital skills. Without skills, there are no opportunities to develop digital literacies for meaning-making and participation in digitally networked contexts. Without digital literacies, individuals cannot learn to feel empowered to integrate technology into their lives confidently. The Survey of Adult Skills, a product of the OECD Programme for the International Assessment of Adult Competencies (PIAAC) reveals that adults who are highly proficient in literacy, numeracy, and problem-solving skills in technology-rich environments, "are likely to be able to make the most of the opportunities created by the technological and structural changes modern societies are going through. Those who struggle to use new technologies are at greater risk of

losing out" (OECD, 2019, p. 36). This understanding forms the basis for the utilization of the term capital-enhancing activities. Research (Hargittai & Hinnant, 2008; Hampton & Wellman, 2003; Ragnedda, 2017, 2018; Rainie & Wellman, 2012; Selwyn, 2004) has shown that Internet users can feel empowered when they engage in certain online activities that are beneficial to them. Capital-enhancing activities can be particularly beneficial in that they enable users to become more digitally skilled, to feel a sense of belonging and/or to use digital platforms and technologies in ways that are active rather than passive (De Coninck et al., 2023; Tichavakunda & Tierney, 2018; Ventrella & Cotnam-Kappel, 2023). Ragnedda et al. (2022) highlighted the critical link between digital inclusion and social inclusion, stressing that mere Internet access is insufficient for true inclusion. Their research on UK citizens revealed a correlation between social vulnerabilities and digital exclusion, with disadvantaged individuals more likely to be digitally marginalized. Policymakers are needed to address both online and offline disparities to empower socially disadvantaged individuals digitally.

The importance of digital skills became particularly evident during the COVID-19 pandemic when the Internet became essential to every aspect of our lives. Globally, more services are offered in online formats than ever before, and the ability to navigate digital content efficiently has become crucial. Attending and teaching in schools, communicating with colleagues and family members, and using digital health services – all of these activities went online during periods of strict lockdown and required not just an Internet connection, but also knowledge of how to use a range of applications for a range of professional, academic and personal purposes (Brisson-Boivin & McAleese, 2021; Dow-Fleisner et al., 2022; Guest et al., 2021; van Deursen, 2020; Westheimer & Hagerman, 2021).

According to the Royal Bank of Canada in 2018, technology will disrupt more than 25% of Canadian jobs in the next decade. The World Economic Forum in 2016 also predicted that computer and mathematical jobs will play a significant role in employment. As a result, the use of technology in education is becoming more crucial for students to succeed, as noted by the Council of Ontario Directors of Education in 2011. Analyses of the Information and Communications Technologies in Schools Survey (ICTSS) in partnership with Industry Canada's SchoolNet program (the survey sponsor) show that the foundations of ICT were present in schools twenty years ago. Almost all elementary (98%) and secondary schools (99%) in Canada had computers and were connected to the Internet during the 2003/04 school year (Statistics Canada, 2004). The quality of Internet connection and digital devices, however, may vary in different geographical areas and inconsistencies in Internet connectivity strength and type exist across school communities (Chen, 2015; Hagerman & Neisary, 2024; People for Education, 2020; Statistics Canada, 2004). The communication between schools, parents and students has transitioned to an electronic format. In 2014, 88% of elementary schools in Ontario had teachers who communicated online with parents and students. In 2019, this number increased to 97% for elementary schools and 100% for secondary schools (People for Education, 2019). This shift can pose a barrier to access for those who lack the necessary technology or skills to use it (Sedivy-Benton, 2016).

Digital inequity research in Canada has long focused on the relationship between digital access and the development of the foundational digital skills that enable people to use the Internet for a range of personal, academic, and employment-related purposes (Collins & Wellman, 2010; Howard et al., 2010; Rowsell et al., 2017). It is well understood that more frequent access to the Internet is a predictor of better digital skills (Hassani, 2006; Salemink et

al., 2017; Smit, 2015; van Deursen & van Dijk, 2019). For young people and adults, digital skills predict the level of online activities, pattern of Internet usage, and adoption of beneficial online activities meaning how and for what purposes they use the Internet (Haight et al., 2014; Hargittai & Hinnant, 2008; Wavrock et al., 2021).

Not surprisingly, more frequent access has also been predicted by higher income (Haight et al., 2014, Howard et al., 2010; Wavrock et al., 2021). Age and immigration status have also been identified as predictors of digital access and digital skills (Haight et al., 2014; Noguerón-Liu, 2017; Ono & Zavodny, 2008; Wavrock et al., 2021). In a study conducted by Haight, Quaan Haas, and Corbett (2014), younger Canadians were found to be more advanced users of the Internet than older Canadians. More recent immigrants, on the other hand, were found to have lower rates of access. The rate of online activities of those with access was higher than Canadian-born or earlier immigrants. It should be noted that users' level of online activities in their paper referred to performing various online activities and not necessarily beneficial (capital-enhancing) online activities. Connectivity to social networking sites (SNSs) in their paper was perceived to be associated with capital enhancement, particularly when it involves creation, maintenance, and growth of social capital. Bourdieu (1986) suggests that capital entails dedicating time and effort, with the potential for accumulation, conversion, and the attainment of social benefits. He identifies three fundamental forms of capital: economic (typically convertible to monetary value), cultural (encompassing expertise and skills), and social, which stems from networks of relationships or group affiliations, granting access to shared resources (pp 248-249). In recent years, additional forms of capital have been introduced in Ragnedda's (2018) paper, notably the concept of digital capital which comprises the access, expertise, knowledge, literacy,

and skills essential for acquiring various other forms of capital (Ragnedda, 2017, 2018; Ventrella & Cotnam-Kappel, 2023).

A decade on from Haight's and colleagues' study conducted in 2014, Canada's population has grown through immigration policy (Immigration, Refugees and Citizenship Canada, 2023) and Internet and cell-service infrastructures have expanded (Canadian Radio-television and Telecommunications Commission, 2023). From 2010 to 2022, Canada has welcomed more than 3.5 million newcomers (Statista Research Department, 2023). Internet infrastructure has expanded and across the country, 87% of households have broadband connections with a download speed of 50 megabytes per second (Statistics Canada, 2023a). Even more (84%) Canadians own cell phones that enable them to connect to the Internet at work, at school and in the community using Wi-Fi and data plans (Statistics Canada, 2023a). More Canadians than ever have Internet access (statistics Canada, 2023a), but the requirement to use digital systems has also shifted (Hadziristic, 2017; Gallagher & Rowsell, 2017; Rajabiun, 2020). The Internet has become increasingly embedded in multiple dimensions of life (Hartman et al., 2018; Leu et al., 2017; Mills, 2015; Pangrazio, 2019; Sedivy-Benton, 2016) but we know little about the changing nature of digital equity.

Framed conceptually by a three-part model of digital equity informed by research on the ways that divides of access which was a dichotomy of have and have-nots (van Dijk, 2006), lead to inequities of skill and also to inequities of digital empowerment (van Deursen & van Dijk, 2015, 2019; Wei et al., 2011) and by the theory of digital capital (Hargittai, 2002; Hargittai & Hinnant, 2008; van Dijk, 2005; Zillien & Hargittai, 2009), the current study used data from the 2020 Canadian Internet Use Survey (CIUS) and Interviews with five newcomer youth who are

learning English as an additional language to explore the nuances of digital inequities in Canada today.

Statement of the Problem

Few studies to date have been devoted to the digital inequities experienced by communities with minority status in Canada such as immigrants/newcomers. Although the need to develop understandings of the digital lives and challenges of English language learners and also newcomers has been highlighted in several studies (Burke & Hardware, 2015; Caidi & Allard, 2005; Gallagher et al., 2019; Hadziristic, 2017; Yuan et al., 2019), there is little evidence to inform understandings of the digital dimensions of young newcomers' lives in relation the experiences of their same-age peers who were born in Canada. Haight et al. (2014) whose analysis remains a landmark in Canadian digital equity research, noted that further research is needed to identify early and recent immigrants' digital needs and to bridge the digital inequities that most affect them. Given that the number of immigrant youth aged 15 to 24 in Canada has been growing steadily over two decades, rising from 29,901 in 2002/2003 to 67,576 in 2022/2023 (Statistics Canada, 2024), a better understanding of the digital lives of newcomer youth is essential for schools, policymakers, and organizations that provide systems and resources that shape immigrants' experiences, opportunities, and outcomes in a way that increase their civic participation and social connections (Caidi & Allard, 2005; Thompson et al., 2020).

Disparate circumstances might generate inequity for immigrants/newcomers who have already experienced socioeconomic inequities (Faez, 2011; McLean & Rowsell, 2020). If it is essential to create pathways to inclusion for newcomers (Alam & Imran, 2015; Caidi & Allard, 2005; Warschauer, 2002) then it is crucial to consider the digital dimensions of inequities that ELLs (English language learners) experience as well. These individuals may face additional

challenges in their host country due to language limitations, further hindering their access to technological resources analogous to what they may have had in their home countries. Previous research has described notable digital access differences for newcomers in relation to more established Canadian residents (Haight et al., 2014; Robison & Crenshaw, 2010). Unequal access to digital literacies can hinder newcomers from meaningful and beneficial learning opportunities which, in turn, can lead to disempowered digital participation (Burke & Hardware, 2015; Yuan et al., 2019). Examining the digital inequity that affect immigrants/newcomers is essential as digital inequities can act as a barrier for immigrants and impede their advancement socioeconomically and how they bond into the new country which can impact their social inclusion (Alam & Imran, 2015; Ono & Zavodny, 2008). Newcomers/immigrants need to have access to the full potential of the Internet to evaluate information and be able to compose digital content and communicate through it (Yuan et al., 2019).

The UNESCO Broadband Commission for Sustainable Development ([BCSD], 2017) affirmed:

> Digital technologies now underpin effective participation in key areas of life and work. In addition to technology access, the skills and competencies needed to make use of digital technology and benefit from its growing power and functionality have never been more essential. (p. 4)

The economic, political, or educational participation of individuals in the contemporary world can be influenced by their digital access, skill, and usage (Tichavakunda & Tierney, 2018). Hence, less digitally engaged people, with less access, skills, and usage, are liable to be more vulnerable to social factors (e.g. gender, age, ethnicity, migration status, level of education, income, employment, place of residence, etc.) and this can exacerbate inequities between

persons, positions, and resources (Collin & Brotcorne, 2019; van Deursen & van Dijk, 2019). In Canada, the current conditions of young ELL (English Language Learner) newcomers' lives are poorly understood. The goal of this work is therefore to describe ELL newcomer youth's digital lives across the contexts of home and school and to determine whether, or to what extent, they experience digital inequities compared to their Canadian-born peers.

Rationale and Significance

Although the Internet can facilitate and support learning, scholars also recognize that when systems of schooling fail to provide equitable access to digital tools and learning opportunities, the Internet can perpetuate and exacerbate existing inequities within society (Campos-Castillo, 2015). The mere presence of digital infrastructure will not redress the inequities in skill and confidence that persist and limit access to opportunity (Scott et al., 2015). According to the 2021 Census, 258,740 young people aged 15-19 immigrated to Canada prior to 2021, and 71,570 (28%) of them were new to Canada and arrived between 2016 and 2021 (Statistics Canada, 2023b). Consequently, it is crucial to investigate how ELL newcomer youth attending schools in Canada use digital tools, as many studies have pointed out (Burke & Hardware, 2015; Caidi & Allard, 2005; Gallagher et al., 2019; Hadziristic, 2017; Yuan et al., 2019). Newcomers to Canada are particularly vulnerable when it comes to Internet access but unless their digital needs are fully understood, it is difficult to design a comprehensive program of support.

Close examination of digital (in)equity through research that integrates multiple sources of information and that centers the voices of immigrant youth who may be affected by digital constraints is needed. This mixed-methods research study first explores whether and to what extent immigrants to Canada use the Internet differently than non-immigrants. It also compares

the digital access, skills and capital-enhancing use of digital technologies by youth (aged 15-24) compared to other age groups (aged 25 and older). In the second phase of the study, ELL newcomer teenagers' digital lives are examined through interviews and survey questions about their use of digital technologies at home and at schools.

Research Questions

Using data from the 2020 Canadian Internet Use Survey (Statistics Canada, 2021), interviews with, and brief surveys of young newcomer high school students, this study is framed by the following research questions:

1. Compared to survey respondents born in Canada, do immigrants to Canada access and use the Internet, digital tools, and systems differently?
2. Do youth aged 15 to 24 use digital tools and systems differently from other age groups in the nationally representative survey?
3. Through short surveys and interviews with ELL newcomer youth, what more can be learned about the ways that access, skill, and empowerment (via capital-enhancing activities) affect their use of digital tools and systems at home and at school?

Definitions of Key Terminology

To situate key concepts used in this research study, I provide a list of six essential concepts with definitions that have guided this work.

Digital equity: Digital equity is an equitable condition in which all individuals and communities have the information technology capacity needed for full participation in society. Capacity includes access to broadband infrastructure, digital devices, and proficiency in using digital tools and platforms. It encompasses not only physical access to technology but also the ability to leverage it effectively and confidently for educational, economic, and social

opportunities (Clark, 2017; Hagerman & Neisary, 2024; Scheerder et al., 2017; Zillien & Hargittai, 2009).

Digital literacies: Digital literacies can be interpreted as skills, strategies, social practices, mindsets and dispositions that entail reading, writing, and multimodal meaning-making through the integration of a variety of digital technologies (Hagerman, 2017; Knobel & Lankshear, 2014; McLean & Rowsell, 2020; Marsh, 2019; The New London Group, 1996). It should be noted that there is no single, agreed-upon or common definition or evaluation method for digital literacies (Gallagher & Rowsell, 2017; Hadziristic, 2017). However, there is broad agreement in the field that digital literacies are deictic (Leu et al., 2013; 2017) and that meaning-making in relation to, with and through digital technologies is situated socially, culturally, and technologically (e.g., Morrell & Rowsell, 2020; Zaidi & Rowsell, 2017).

English Language Learners (ELLs): English language learner (ELL) is a general term used to describe speakers whose native language is different from English or who have a non-standard dialect (Yuan et al., 2019). ELL in this study refers to those who self-identify as English language learners.

Immigrant: An immigrant is, or has ever been, a landed immigrant or permanent resident in Canada. This includes individuals granted the right to live permanently in Canada by immigration authorities, as well as those who have acquired Canadian citizenship through naturalization (Statistics Canada, 2016).

Newcomer to Canada: A recent immigrant (also known as a newcomer) refers to a person who obtained a landed immigrant or permanent resident status up to five years prior to a given census year (Census of Population, 2017). For the purpose of this research, newcomers are

those who have been in Canada for five years or fewer, having arrived from a country other than Canada, regardless of their status as temporary or permanent residents.

Youth digital lives: Interactions, activities, practices, and experiences of the youth on the Internet through digital devices (Pangrazio, 2019).

Youth: The United Nations, for statistical purposes, defines 'youth', as those persons between the ages of 15 and 24 years. In the first phase of the study, those who are between 15 to 24 years old and in the second phase of the study school-aged youth between 15 to 18 are considered as youth.

The purpose of the next chapter is to understand three-level digital inequity extensively for immigrants/newcomers, youth, and English language learners around the globe and in Canada. A thorough review of the literature was conducted which led to the identification of two major frameworks of digital inequities and critical pragmatism that are foundational in exploring the digital lives of ELL newcomer youth to Canada. An overview of the epistemological and theoretical frameworks employed in this research study is discussed in the next chapter.

Chapter 2: Review of the Literature

As described in the introduction, we know little about the dimensions of digital inequities that frame the digital lives of young newcomers to Canada who are also learners of English. In this chapter, I review the broad and intersecting bodies of scholarship that have framed the design of this research study. Specifically, I explore what is understood about the underlying mechanisms of digital equity and their impacts on the academic, social and economic outcomes for young adults. I examine what is understood about the digital literacies skills and practices that predict empowered participation across the many dimensions of young adults' lives, including their academic and economic outcomes. I also present the theoretical foundations of this work through a review of critical pragmatism (e.g., Midtgarden, 2012; Zimmermann, 2018).

Conceptualizing Digital Inequity

In the early 1990s, the digital divide became a topic of interest as Internet access and personal computers were then becoming prevalent in academic, professional, and personal contexts (Scheerder et al., 2017). The Clinton-Gore Administration in the United States championed the Internet as a government project to aid democratic public life and education (Fabos, 2008). For a long time, studies of digital inequities concentrated on access to the Internet and characterized the digital divide as a dichotomy of possessing or not possessing a digital device (Warschauer, 2002). But scholars gradually began to recognize multiple implicit layers in the digital divide which went beyond issues of access (Clark, 2017; Zillien & Hargittai, 2009) to widening gaps in individuals' digital ability to improve their socioeconomic status through the use of digital systems (Kim, 2016).

With the prevalence of the Internet and digital tools, individuals have more opportunities to enhance their digital competence. However, digital content cannot function independently, as

it requires appropriate infrastructure for sharing and utilization. Recent studies (Chang et al., 2014; van Deursen & van Dijk, 2019) have established a direct correlation between the quality of digital infrastructure and the quality of information used. The unequal access to the Internet and digital affordances results in disparities in users' digital skills, Internet usage, and online activities. Still, there are students who have limited access to technology compared to their peers living in more affluent neighborhoods or urban regions and cannot engage in meaningful online activities that the broadband Internet and high-quality tools offer to them to foster their critical thinking (Hagerman & Neisary, 2024; Rowsell et al., 2017; Sedivy-Benton, 2016; Yu et al., 2018).

Digital Inequities in Canada: Dimensions, Mechanisms, and Impacts

In Canada, geographical, economic, linguistic, cultural, and racial diversities predict digital inequities (Haight et al., 2014). For example, urban individuals are more digitally connected and digitally skilled than rural individuals (Rajabiun, 2020; Wavrock et al., 2021). The students, particularly those in rural areas of Ontario, face significant challenges in accessing digital resources and participating fully in online activities due to inequities in computer and Internet access (Hagerman & Neisary, 2024). Indigenous communities have been found to be less well-connected than non-Indigenous communities (Winter & Boudreau, 2018). Those with lower income, those who speak French as their first language, immigrants, women, senior citizens, those living in rural communities, and those who have lower levels of educational attainment have been identified as groups who are likely to have less advanced digital skills than wealthier, English language speakers, non-immigrants, men, younger, and better educated Canadians (Hadziristic, 2017; Hagerman & Neisary, 2024; Haight et al., 2014; Howard et al., 2010; Wavrock et al., 2021). In general, evidence suggests that digital inequities function as

another layer of marginalization experienced by those who have traditionally been disadvantaged in Canadian society (Haight et al., 2014; Mersereau, 2020). Without proper mechanisms to integrate newcomers as one of the marginalized groups, they might be at greater risk of social and digital exclusion which can lead to fewer opportunities in the new society (Caidi & Allard, 2005).

Canadian Research on Digital Inequities. In their landmark study, Haight et al.'s (2014) findings revealed that newcomers have confronted significant digital inequities across Canada. This finding was supported by their literature review on digital inequities. Among the factors that predicted access to, and patterns of Internet use in their research study was immigration status. In their study, newcomers were found to have lower rates of Internet access, however, recent immigrants who were online had significantly higher levels of online activity than Canadian-born residents and earlier immigrants.

Chen (2015) investigated digital disparities in Ontario schools, revealing widespread access to technology but discrepancies in quality and home access. Findings revealed widespread access to technology in schools, early integration of ICT in teaching, and its frequent application across grades. Despite these positive trends, persistent challenges in building technology infrastructure, ensuring home access for disadvantaged schools, and providing teachers with necessary professional development were noted. Additionally, the study emphasized the crucial role of parent involvement in ICT use and uncovered a potential link between ICT utilization and student learning achievement. These results highlighted the complex dynamics of technology integration in education and underscore the need for targeted interventions to address existing disparities and leverage the potential of ICT for enhancing student outcomes.

Another study carried out by Gallagher et al. (2019) showed that culture, linguistic backgrounds, social class, ethnicity and race, and personal beliefs can influence individuals' access to digital resources and their digital engagement. Those who were on the margins, newcomers to Canada in this study, were more likely to experience some aspect of digital inequities. The results of this study indicated that the digital lives of newcomers/immigrants to Canada are considerably influenced by invisible factors outside of schools. As the participating families in this study struggled with parenting, employment, economic, and linguistic challenges, issues related to digital life were secondary in importance to their goal of establishing the foundations for their lives as new Canadians. However, no study, to my knowledge, has examined the nuances of access, skill/literacies learning and empowerment across both home and school contexts for newcomer youth.

A recent study by Ventrella and Cotnam-Kappel (2023) focused on teachers' perceptions of digital inequities among students, with a focus on perceptions of access, usage and skills, and empowered use of digital technologies. Findings indicated that despite some access to digital resources, disparities do exist in students' ability to utilize technologies effectively. Reported access challenges included achieving a 1:1 device ratio and differences in speed and stability of Internet connectivity. Usage and skills discrepancies were described as arising from varying levels of experience and access, which, the authors suggested may affect students' confidence and participation in digital activities. Empowerment inequities, a concept that they identified in their analyses, may impact students' willingness to engage in online learning and take action. Support and guidance from teachers are crucial in addressing these inequities, although teacher's own digital inequities may affect their ability to provide effective support. This study identified the presence and exacerbation of digital inequities among students in Ontario, and highlighted

the significance of students' digital capital in shaping their digital experiences and offline outcomes. Students' utilization of digital capital could contribute to the accumulation of offline forms of capital, potentially exacerbating existing social inequities. In their study, digital capital was employed "as a holistic amalgamation of one's digital access, experience, skills, and sense of empowerment" (p. 3).

Digital Equity for ELLs, Globally and in Canada. Research conducted by Stille and Cummins (2013) in a populated Canadian city where the majority of the students are ELLs indicated that integration of multimodal opportunities for meaning-making and expression practices assisted students in expressing their ideas better, constructing their identities, and improving their language competencies. These practices involved a range of methods such as incorporating visual aids, interactive digital platforms, audio recordings, digital storytelling, and other digital tools to facilitate students' engagement with diverse modes of communication and expression. These approaches in implementing cultural, linguistic, and representational skills and abilities of students were regarded as a foundation of learning, highlighting the importance of digital literacy in fostering students' academic and personal growth.

Burke and Hardware (2015) conducted a study in which they examined how English as a second language (ESL) learners who were new to Canada harnessed literacy in the world they live in. They found that newcomer students shared their knowledge and cultural practices through digital storytelling. Uptake of a multiliteracies pedagogy in their study honored students' different identities, histories, motivations, and socio-cultural diversities and gave them voices to express themselves through multimodal practices (The New London Group, 1996). This shows that wider use of multiliteracies can create more opportunities for diverse students, particularly

marginalized learners to improve their citizenship, work, and personal life (Burke & Hardware, 2015; Rowland et al., 2014).

Zaidi et al. (2019) delved into the language learning experiences of newly arrived students in Canada, emphasizing the transformative role of digital literacy. Their study underscored the efficacy of teachers' mini-lessons in integrating digital literacies as invaluable tools. By leveraging multilingual digital resources, such as Google Translate, Google Images, and online databases, educators could foster inquiry-based mindsets among ELLs, enhancing their ability to discern credible sources. Notably, Zaidi's research highlighted the importance of utilizing students' identity, cultural backgrounds, and linguistic repertoires to broaden language awareness among all participants.

Due to the diverse linguistic and cultural backgrounds of learners in Canada, there is no clear one-size-fits-all approach to digital literacies instruction that will meet all needs. Incorporating multiliteracies into teaching practices can foster a greater understanding and appreciation of the diverse linguistic and cultural backgrounds present in their classrooms (Burke & Hardware, 2015; Faez, 2011; Rowland et al., 2014). Digital technologies, when used with intention, may have the potential to enhance or extend learning for individuals with diverse linguistic strengths and profiles (Taber, 2017), such as newcomer ELLs.

A Japanese study demonstrated that engagement in multimodal meaning-making could encourage ELL newcomer youth to bring their knowledge and cultural practices to various literacy tasks and interactions, fostering deeper comprehension and expression of ideas (Rowland et al., 2014). Another study, conducted in the US (Yuan et al., 2019), found that technology could offer a broader range of resources and tools that enable ELLs to embrace their cultural identities. Use of these technologies can empower ELLs to become critical consumers and

producers of information in a more engaging way (Yuan et al., 2019). English Language Learners need to be nurtured equally in intellect and identity to challenge power relations (Cummins, 1996). Since ELLs are members of minority communities in Canada, researchers recognize that adopting digital literacies practices in classrooms can be a promising approach to empower them (Yuan et al., 2019). From their research conducted in Australia, Alam and Imran (2015) contended that digital literacies can lead to greater integration of immigrants into host communities. However, as mentioned earlier, marginalized students may not have adequate access to digital tools to develop their digital skills and empower themselves (Mills, 2015).

Digital Experiences Affected by the Pandemic. In the wake of the COVID-19 pandemic, digital technologies have become increasingly essential in daily life, fundamentally transforming how individuals' access and use the resources in an increasingly online world (Dow-Fleisner et al., 2022; Ragnedda et al., 2022; Sokal et al., 2020; van Deursen, 2020; Ventrella & Cotnam-Kappel, 2023). The pandemic prompted a global reassessment of schooling practices, particularly impacting immigrant populations whose digital experiences are shaped by unique socio-economic and cultural factors (De Coninck et al., 2023; Yang et al., 2021). During this period, immigrants and language learners faced unique challenges in accessing online resources for education and integration due to language barriers and limited digital literacy (De Coninck et al., 2023; Drouin et al., 2020). The shift to remote learning emphasized the importance of tailored support and resources to meet their specific needs. Addressing these challenges requires targeted interventions that consider language proficiency, cultural context, and digital skills development to ensure equitable access to digital resources and opportunities for all individuals, particularly during times of crisis like the COVID-19 pandemic (Brisson-Boivin & McAleese,

2021; Dow-Fleisner et al., 2022; Guest et al., 2021; van Deursen, 2020; Westheimer & Hagerman, 2021).

Models and Mechanisms of Digital Inequity

Several scholars have theorized and measured the relationships between digital access and digital skills. DiMaggio and colleagues (2004) proposed a theoretical framework that explained the different factors and outcomes related to digital inequity. Their approach highlighted five aspects of inequities pertaining to information and communication technologies: (1) the quality of hardware, software, and network connection; (2) autonomy of use; (3) skill; (4) availability of social support; and (5) extent and quality of use. Hohlfeld et al. (2008) proposed a framework that identified three levels of the digital divide in schools. The first level pertains to providing equitable access to ICT within schools. The second level addresses the extent to which technology is integrated into classroom teaching and learning and the third level focuses on the extent to which ICT is used to empower and enhance student learning in the school context.

van Deursen and van Dijk (2015) emphasized that the digital divide had shifted from being about physical access to being about inequities of skills and usage. They introduced a two-level dimension of digital access, encompassing both physical and material access as well as Internet skills, motivation, and usage. This shift in focus highlights the importance of not only providing access to digital technologies but also ensuring individuals have the necessary skills and motivation to effectively use them. Starkey et al.'s (2017) paper outlined three categories of digital divides. The first is access to digital devices and the Internet, which is divided between those who have access and those who don't. The second divide is between those with higher and lower levels of capability in using digital devices or software. The third divide is related to social

inclusion outcomes, and it exists between those who use technology in powerful ways and those who don't.

Hargittai and Hsieh (2010) developed three digital divide indicators: Internet access, online activity level, and SNSs (social networking sites) usage and went beyond Internet access and explored Internet users' web skills and what they do online. The digital equity remained a critical social issue of our time, and according to van Dijk (2005), the success of engaging with ICTs depends on temporal resources, material resources above and beyond ICT equipment and services, mental resources, social resources, and cultural resources.

Given the complex interactions of access and skills that have been richly documented by scholars for the past twenty years (e.g., Chang et al., 2014; Dimaggio et al., 2004; Rowsell et al., 2017; Sedivy-Benton, 2016; van Deursen & van Dijk, 2019; Yu et al., 2018), I have chosen to use the term digital (in)equity throughout this study, rather than digital divides. The term digital inequity reflects a broader set of interdependent and systemically situated considerations and complexities that go beyond the binaries of access/no access that informed early conceptions of the *digital divide*. The framework developed by Dr. Hagerman and Dr. Cotnam-Kappel provided an essential baseline concept for this study. However, I expanded each component to include broader concepts that are applicable to youth, immigrants/newcomers, and ELLs. According to Warschauer (2003), while the internet appears to be a vast source of information, it predominantly reflects a white, middle-class, and Western perspective. The internet's infrastructure is largely based on English, with content dominated by Western languages and cultures (Baasanjav, 2014). Digital inequity refers to the systemic and structural disparities that result in unequal access to and experience with technology among different groups. It is concerned with social justice and ensuring that everyone has equitable access to technology,

knowledge, and skills to use it effectively. It emphasizes equitable experiences and opportunities to enhance individuals' lives. Digital inequality can be seen as a part of digital inequity (Bartels & Bennice, 2020). Therefore, I employed equity rather than equality because ELL newcomer youth are given the same opportunities to participate in the digital world. However, their unique needs are quite different from their peers.

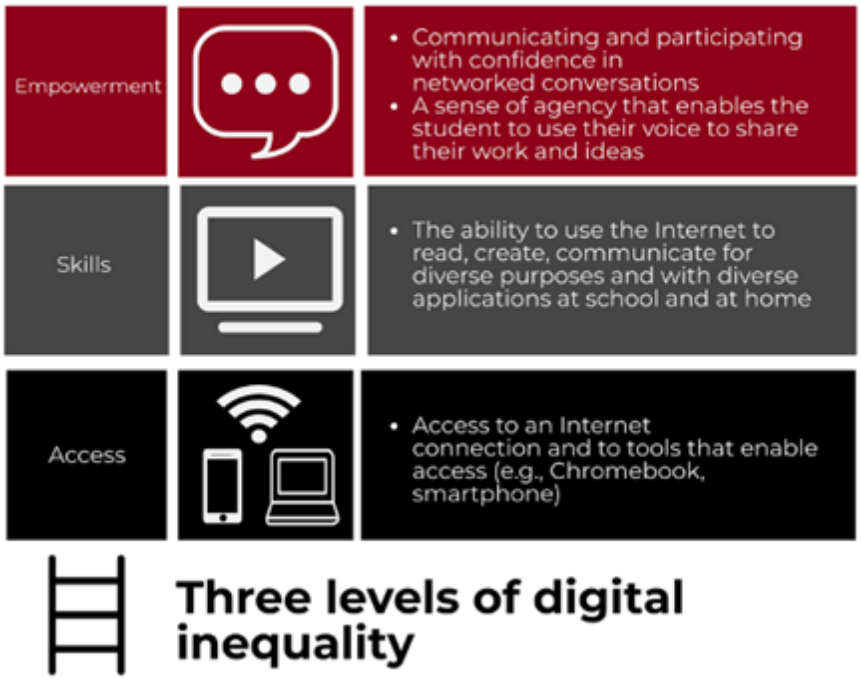
Conceptual Model of Digital Inequity for the Current Study

Building on these lines of scholarship through research with rural elementary teachers in Ontario, Hagerman and Neisary (2024) have developed a tiered visual conceptualization of digital inequities of access, skill, and empowerment for K-12 learners in their research (See Figure 1). Although I use a range of literature to elaborate on this model in subsequent sections of this review of literature, this image provides a baseline representation of the concept of central importance to this study – dimensions of digital inequity. As outlined in Figure 1, digital access means having an Internet connection and a device such as a smartphone or a laptop computer that allows a person to connect to the Internet. Digital skills are framed by and situated in the ways that people interact with digital tools and systems. In this study, digital skills are understood to be foundational knowledges and practices that young people use to navigate digital systems, including the Internet, for personal, economic, and academic purposes (Livingstone, 2010; Pangrazio, 2019; Pawluczuk et al., 2020). Examples of digital skills would be knowing how to open a web browser, or knowing how to use Internet-based applications such as online banking to manage finances. As explained below, digital skills are also foundational to digital literacies which also include strategic actions, social practices and mindsets that enable youth to use Internet texts, create Internet texts and participate on the Internet (Coiro, 2020; Hagerman, 2017; Hagerman et al., 2020). As conceptualized, digital access is understood to support the

development of foundational digital skills (Chang et al., 2014; van Deursen & van Dijk, 2015). The third level of digital inequity modelled in this figure is described as digital empowerment, which Hagerman and Neisary (2024) define as communicating and participating with confidence in networked conversations. It includes a sense of agency that enables a student to use their voice to share their work and ideas across networked spaces (Chen, 2015). I elaborate on this concept in subsequent sections by connecting it to the broader sociological concept of digital capital.

Figure 1

Three Levels of Digital Inequity (Hagerman & Neisary, 2024)



Access. Everyone needs to have physical access to digital tools and the Internet to realize their potential as participants in a digitally networked society (Sánchez & Ensor, 2020). Inadequate access to digital technologies impedes the effective social, political, and economic involvement of individuals in ways that, over time, can influence their social well-being (Cruz-

Jesus et al., 2016). Although Hagerman and Neisary (2024) have conceptualized access as being about physical access to materials and Internet infrastructure, others have shown that access includes all costs related to the use of computers, connections, peripheral equipment, software, services, and ownership (van Deursen & van Dijk, 2015).

Canada has confronted multiple challenges in establishing this first-level dimension of digital inequity, in part, because of its unique geography, demographic diversities, and population density (Haight et al., 2014). Disparate levels of access to broadband infrastructure and connectivity services exist across Canada (Hambly & Rajabiun, 2021; Rajabiun, 2020). Due to the low population density in some parts of Canada, economic incentives for high-speed Internet providers are restricted in rural and remote communities (Hambly & Rajabiun, 2021; Howard et al., 2010). Sixty-two percent of rural communities in Canada have access to broadband services that meet the minimum national standard of 50 Mbps download and 10 Mbps upload (Canadian Radio-television and Telecommunications Commission, 2023) which limits online goods and services available to the residents of those areas compared to urban residents. Rural and remote communities' challenges to access essential services such as healthcare and high-speed infrastructure have been exacerbated by the pandemic (Dow-Fleisner et al., 2022). Thus, the social and civic engagements of rural residents are not as diverse as their urban counterparts which, in turn, can lead to inequities (Collins & Wellman, 2010; Salemink et al., 2017). The digital inequities prevalent in rural Canada disproportionately affect youth and immigrant populations, exacerbating existing disparities in access to essential services and opportunities for economic, social, and political engagement (Hagerman & Neisary, 2024; Haight et al., 2014; Wavrock et al., 2021). Opportunities for economic, social, and political engagement are based on skills as well as access (Hargittai & Hinnant, 2008) and the mere

presence of high-speed Internet access does not guarantee equal inclusion, as individuals are required to develop their digital skills (Collins & Wellman, 2010).

Digital Skills and Digital Literacies. Bridging digital inequities necessarily requires a focus on digital skills and literacies and how they are learned (Rowsell et al., 2017). As noted previously, digital skills are fundamental knowledge and practices for navigating digital systems, including the Internet, for personal, economic, and academic purposes (Livingstone, 2010; Pangrazio, 2019; Pawluczuk et al., 2020). These include knowing how to type on a keyboard or open a web browser. When it comes to making meaning with and from Internet texts, however, we need digital literacies. Although there is little consensus among digital literacies researchers (in part because the Internet itself is constantly changing) digital literacies are currently understood to be all of the skills, strategies, social practices, mindsets and dispositions needed to use and make meaning from the Internet texts, to create internet texts for a range of purposes and audiences with multiple languages, and to participate in networked spaces online (Hagerman, 2017; Knobel & Lankshear, 2014; Marsh, 2019; McLean & Rowsell, 2020; The New London Group, 1996). Importantly, digital literacies are multidimensional and multimodal (Mills, 2015; The New London Group, 1996).

How Are Digital Literacies Taught in Canadian Schools? Given that the main focus of this study is on ELL newcomer youth at home and at school, it is essential to explore digital literacies in school settings as well. In Canada, education is not governed nationally and each of the ten provinces and three territories has its own educational system. Hence, digital literacies teaching and learning are distinctive in various provinces and territories and reflect each province's policies, context, and resources (Faez, 2011; Gallagher & Rowsell, 2017; McLean & Rowsell, 2020). In the Canadian systems of schooling, online learning and digital literacies have

been incorporated to educate learners to be producers as well as consumers of digital content (Haight et al., 2014). Digital literacies have no common definition among theorists, policymakers, and educators in Canada and there is no definitive policy or method of evaluating these skills among learners (Gallagher & Rowsell, 2017; Hadziristic, 2017). Therefore, the implementation and instruction of digital literacies are uneven across the country (Bennett, 2017) which may, in turn, contribute to inequities of skill. However, Canadian educational authorities and teachers are increasingly recognizing the importance of digital literacies in preparing students to fully participate in the emerging 21st century which is significantly based on technology (Chen, 2015; Chen et al, 2014). For instance, Ontario high schools introduced e-learning to provide more opportunities for student success, according to the Ontario Ministry of Education in 2006. Students currently take online courses for various reasons, such as fast-tracking their education, accessing courses that are not offered in their school, or completing their required credits (Ontario Ministry of Education, 2021).

Digital Empowerment via Capital-enhancing Activities. Digital empowerment refers to an individual's ability to effectively utilize digital technologies to enhance skills and confidence in the digital world. It enables individuals to acquire the necessary awareness and motivation to learn how to use digital technologies, and then improve their knowledge and skills. Digital empowerment enhances individuals' belief in their own competence and encourages them to participate in society fully and equitably (Kong et al., 2019, p.173; Smith, 2015; Yuan et al., 2019).

It is generally assumed that some online activities are more beneficial or capital-enhancing for Internet users (Hargittai & Hinnant, 2008; Hampton & Wellman, 2003; Rainie & Wellman, 2012; Tichavakunda & Tierney, 2018) and lead to opportunities that make users feel

empowered as digital agents to overcome inequities. Bourdieu (1986) argued that capital involves the investment of time and effort, which can lead to accumulation, conversion, and the attainment of social benefits. He identifies three key forms of capital: economic (convertible to monetary value), cultural (including expertise and skills), and social (derived from networks of relationships or group affiliations, providing access to shared resources). Capital according to Ragnedda (2017) refers to the various assets or resources that individuals can leverage to achieve certain outcomes or benefits in society. Social capital encompasses the relationships and networks that people maintain, offering support and access to resources. Economic capital pertains to financial resources and assets, providing individuals with purchasing power and economic opportunities. Personal capital focuses on an individual's skills, abilities, and personal qualities that contribute to their success. Political capital relates to an individual's influence or power within political contexts, affecting their ability to enact change or gain advantages. Cultural capital involves cultural knowledge, education, and skills that influence an individual's social mobility and success. In the digital age, digital capital has emerged as a significant form of capital, encompassing skills, knowledge, digital literacy, and access to technology. This form of capital is integral in today's society, impacting an individual's ability to navigate and benefit from digital technologies. Each type of capital interacts and influences an individual's opportunities and outcomes across various domains of life. Possible outcomes of capital-enhancing activities can be economic benefits such as increased earnings, social gains like broader networks, academic improvements including enhanced grades and engagement in online learning, and psychological boosts such as heightened happiness and self-assurance (Ragnedda, 2017; Ventrella & Cotnam-Kappel, 2023). Ragnedda (2018) further explained that digital capital transforms traditional offline endeavors influenced by the 5Cs (economic, cultural, political,

social, and personal) into digital activities, encompassing factors like online time spent, information gathered, skills acquired, and types of engagement. Consequently, these online activities contribute to tangible social assets like improved employment prospects, higher income, expanded social circles, and enhanced knowledge. Ragnedda's framework is privileged since Ragnedda and Ruiu (2020) noted the dynamic nature of digital capital and the need to continuously update it over time.

The Internet can enhance users' social relationships and engagement with the community and society and those who do not integrate the available digital resources that can elevate their social mobility and status could be socially excluded (Caidi & Allard, 2005; Hargittai & Hsieh, 2013). It is assumed that youth in more privileged families can benefit from more cultural, social, and financial capital and engage in more capital-enhancing digital practices than their less privileged peers (Tichavakunda & Tierney, 2018; van Deursen & van Dijk, 2015). Socioeconomic or sociodemographic factors, however, are not the sole reasons for differences in online activities. Motivation, online skills, and lifestyle are also pivotal factors in the types of activities people do online. Some activities offer users more opportunities and resources to improve their career, education, and societal position than other activities that are chiefly consumptive or entertaining (Zillien & Hargittai, 2009). Those who have a computer and Internet connection do not necessarily use them. Usage time and frequency, diversity of usage, broadband or narrowband use that utilize a narrower set or band of frequencies in the communication channel, and active or creative use are several ways to measure Internet use (van Deursen & van Dijk, 2015). Examining how different types of Internet use may lead to varying gains in cultural, social, and financial could be challenging due to the rapid technological innovation and changing digital trends (Tichavakunda & Tierney, 2018).

English Language Learners' Internet Use. Research has shown that language proficiency can play a crucial role in influencing the activities of Internet users, impacting their ability to navigate online content, communicate effectively, and engage in various online interactions (Darvin & Norton, 2015; Ono & Zavodny, 2008). Therefore, investigating language learners' participation in online activities is vital for comprehending the multifaceted nature of language learning investment. In their paper, Darvin and Norton (2015) introduced a model of language learning investment that considers the interplay between identity, ideology, and capital. They highlighted the dynamic nature of language learning environments, where learners navigate fluid identities across various online and offline spaces. Through case studies, they illustrated how learners interact with power structures and exercise agency in their language learning experiences. This study emphasized the importance of a nuanced understanding of language learning investment to address the evolving complexities of identity in education (Darvin & Norton, 2015).

To feel confident and become active participants in the co-creation of knowledge, ELL newcomers should be encouraged to pursue diverse digital activities with diverse purposes (Yuan et al., 2019). As noted by Haight et al. (2014), patterns of Internet usage in Canada are associated with the existing inequities in society such as income, levels of education, rural/urban status, immigration status, gender, and age. The diversity of online activities of users can augment their knowledge, experience and value which can result in users' empowerment. It should be pointed out that limited research has focused on Internet usage or online activities that result in digital empowerment in Canada compared to the United States and Europe (Haight et al., 2014).

With a focus on newcomer youth learning English as an additional language, the purpose of this study is to examine current evidence of the digital inequities that may be influencing their capacity to participate fully in the digital dimensions of their lives in Canada.

Theoretical framework

The design and methods of this study are informed by interrelated epistemological and theoretical perspectives that are described here.

Digital Inequity

As introduced in the review of literature, the current study is framed by a three-level conceptualization of digital inequities (Hagerman & Neisary, 2024; Scheerder et al., 2017). In this work, I assume that inequities of access to Internet infrastructures such as broadband, access to computers, to relevant applications, and the quality and affordability of digital tools and services, the ownership, and availability of diverse digital tools underpin what is possible in terms of opportunities to build digital skills, digital literacies, and a sense of digital empowerment (Hargittai, 2002; van Dijk, 2005). Importantly, I also understand that certain skills and digital literacies can enable young people to use the Internet in "powerful" ways that can advance their personal, academic, and professional interests (Chen, 2015; Wei et al., 2011). It is taken as given that when people have broader and more frequent opportunities to use the Internet for a range of purposes, they are more likely to develop Internet skills, digital literacies, and a sense of empowerment (Haight et al., 2014; Hargittai, 2002; van Dijk, 2005). It is not clear, however, whether or to what extent broader and more frequent opportunities to use the Internet for diverse purposes will alleviate digital inequities that derive from broader systemic inequities in Canada, particularly for newcomer youth who are also learning English.

Critical Pragmatism

This research is also informed by critical pragmatism. Pragmatists do not see the world as an absolute unity and view truth, meaning, and knowledge as tentative that can change over time. According to the pragmatist view, knowledge is always about relationships between actions and consequences, not a world out there (Biesta, 2015). Pragmatists reject the traditional subject-object dichotomy among purists who see the dualism of qualitative or quantitative research as a workable solution (Johnson & Onwuegbuzie, 2004; Ray, 2004). The pragmatic approach suggests integration is possible and qualitative and quantitative methods can contribute to one another which gives researchers the freedom to choose methods, techniques, and procedures of research that best meet their needs and purposes for collecting and analyzing the data (Creswell, 2013; Johnson et al., 2007; Rossman & Wilson, 1985; Teddlie & Tashakkori, 2012). Taking a pragmatic approach enables researchers to advance knowledge and provides an opportunity for them to mix research approaches fruitfully to answer important research questions (Rossman & Wilson, 1985). According to Dewey, an inquiry is producing factual data as well as elucidating meanings (Zimmermann, 2018).

The task of social philosophy in pragmatism and critical theories is to support processes of social transformation to improve the circumstances of social life and reduce injustices and oppression (Frega, 2014). Pragmatists recognize the existence of the physical world as well as the social world which includes language, culture, human institutions, and subjective thoughts and endorse shared values such as democracy, freedom, equality, and progress (Johnson & Onwuegbuzie, 2004). A critical pragmatist orientation calls into question the relationships of domination that impede individuals' development and social and political engagement (Midtgarden, 2012). Critical pragmatism opens various paths for relating to one’s research object

and getting involved in public debates and provides opportunities to address tensions and contradictions among myriad factors through in-depth scrutiny of the involved actors in a process of inquiry (Zimmermann, 2018).

To recognize and address the visible and invisible impacts and challenges of digital inequities on diverse communities, there is a need to develop new understandings of digital inequities (Mills, 2015). Qualitative and quantitative methods can be combined to develop a stronger understanding of the research problem or questions and overcome the limitations of each (Creswell, 2014). Patterns of inequity persist in digital domains when demands on digital skills grow and the marginalized groups, who are disproportionately subjected to digital inequities, do not have adequate access to digital (or social, economic, and educational) affordances to develop their digital skills and empower themselves.

Considering the increasing role of immigrants in Canada's labour market, economy, and society, there is a need to recognize and bridge the digital gaps to support youth to become digitally competent and confident (Caidi & Allard, 2005). The youth development field generally agrees that "agency, belonging, and competence" are assets that "youth need to acquire to be prepared to navigate both their current and future situations" (Mitra & Serriere, 2012, p. 745). Thus, there is a need to make room for the voices of individuals who do not fit within dominant systems and identify possible solutions to enhance digital equity for marginalized students, particularly newcomers who are also English language learners.

Chapter 3: Methodology

Design

Framed by the research questions and informed by the literature and theories outlined in Chapter 2 (Hagerman & Neisary, 2024; Midtgarden, 2012; Scheerder et al., 2017; Zimmermann, 2018), this study uses a sequential mixed-method design. Over two phases of research, this study examines a) whether immigrants to Canada access and use the Internet in ways that are similar or different to those who were born in the country, (b) whether youth aged 15 to 24 use digital tools and systems differently to other age groups in the nationally representative survey, and c) whether or to what extent issues of digital access, skill, and empowerment (via capital-enhancing activities) might affect the use of digital tools and systems for ELL newcomer youth aged 15 to 18 at home and at school.

In the first phase of the study, relevant items and data about respondents' digital access, skills, and capital-enhancing activities from the 2020 Canadian Internet Use survey (Statistics Canada, 2021) were identified and analyzed (see Appendices F & G). In the second phase of the study, interviews with five ELL newcomer youth (age 15-18) all of whom were attending high school were conducted. Participants also answered short surveys. Interviews were informed by findings from the first phase of the study and therefore focused on capturing nuanced insights that might inform deeper understandings of the 2020 CIUS analyses.

The Rationale for a Mixed-method Research Study

Digital (in)equity research is often either qualitative (e.g., Bracewell et al., 2021; Mitra & Serriere, 2012) or quantitative (e.g., Chen, 2015; Haight et al., 2014; Ono & Zavodny, 2008) while mixed-method research (e.g., Levin & Arafeh, 2002; Mao, 2014) can offer more promising responses to the research questions (Kim, 2016; Mills, 2015). Mixed methods research attempts

to fit together the insights provided by qualitative and quantitative research into a workable solution which can lead to a better understanding of the research purpose and minimize the drawbacks of both in single research studies (Creswell, 2014; Johnson & Onwuegbuzie, 2004; Plano Clark & Ivankova, 2016).

As noted by Greene et al. (1989), using a sequential mixed method design, where the first method is used to inform the development of the second, allows the researcher to develop more effective and refined conclusions by using the results constructed using one method to inform the data that will be gathered using another method. The sequential design enabled me to construct a more comprehensive understanding of measured differences between immigrants and Canadian-born youth in terms of access, skills and empowerment and the nuanced complexities of newcomers' digital lives, as told in their own words. The rationale for mixing methods in this research study was complementarity which enabled me to measure or explore different facets of a phenomenon (Greene et al., 1989; Creamer, 2018; Plano Clark & Ivankova, 2016). This strategy was used as a way to elaborate, enhance, and clarify the results found from one method (e.g., ANOVA), and to increase the interpretability and meaningfulness of the qualitative findings (i.e., using interviews) (Greene et al., 1989; Johnson & Onwuegbuzie, 2004).

Mixed methods may also be an especially sensitive approach to research focused on both the structural and lived experiences of inequity for particular communities. Given evidence that differences in socioeconomic, sociodemographic (Alam & Imran, 2015), and language proficiency (Ono & Zavodny, 2008) impact the digital lives of newcomers, I decided to analyze multiple sources of data so that interpretations would be designed to resist a simple view. Further, this approach can minimize confirmation bias and other sources of invalidity such as measurement error, sampling bias, and researcher bias (Creamer, 2018; Johnson & Onwuegbuzie, 2004).

This approach, furthermore, enabled me to shed light on the experiences of participants who were not fully explored in the initial phase of the study due to limitations imposed by StatsCan, which restricted analysis due to a low participant count in the national survey to protect their identities. By incorporating mixed methods, the study gains depth and allows for a nuanced exploration of the multifaceted aspects of potential digital inequities among young immigrants who are new to Canada and English learners.

Drawing on the literature reviewed in Chapter 2, language and experiences at home and at school may play important roles in shaping patterns of Internet use or digital skills development for ELL newcomer youth. Therefore, interviews invited students to report on their digital learning and experiences at home and at school, and the ways that language intersects with their digital activities (if at all). After the quantitative analyses of the CIUS data, qualitative analyses were conducted to offer plausible explanations for any between-groups differences identified via ANOVA. Qualitative research was needed not only to obtain an in-depth understanding of the mechanisms but also to understand the consequences of the observed factors and amplify the voices of those who have been overlooked (Creswell, 2014; Livingstone et al., 2008).

Instruments

National Survey

The 2020 Canadian Internet Use Survey (Statistics Canada, 2021) which was sponsored by Innovation, Science and Economic Development Canada and conducted by Statistics Canada was built on the last conducted survey in 2018. The 2020 CIUS had been updated to meet new data needs and measure new trends (e.g., the impact of COVID-19). The 2020 CIUS was designed to inform evidence-based policymaking, research and program development, and provide internationally comparable statistics on the use of digital technologies. The survey

employed a sampling frame that combined landline and cellular telephone numbers from the Census and various administrative sources with Statistics Canada's dwelling frame (Statistics Canada, 2021).

The 2020 CIUS contained a wide range of questions pertaining to respondents' Internet use, not all of which are relevant to the questions of this research study. Therefore, I engaged in a consultative process with my supervisor and with a member of my thesis committee to identify and include for analysis only those survey questions which were identified as being relevant and conceptually aligned with the three dimensions of digital equity in this study – access, skill and capital-enhancing use of the Internet (Blank & Groselj, 2014; Hagerman & Neisary, 2024; van Deursen & van Dijk, 2015; Wavrock et al., 2021). Further consideration was given to the structure of the questions. To ensure consistency in the data structure, and to enable comparisons between groups, only items that were both theoretically aligned and dichotomous in their structure (YES/NO responses) were selected. The total number of selected questions in the digital access section was nine. The next set of selected questions (a total of 30 questions) was concentrated on the participants' digital skills by asking respondents about their various online activities such as communication, accessing information, entertainment, e-commerce, software skills, Internet skills, and device skills. The selection of digital skill questions in this study was informed by a 2018 CIUS paper pertaining to the Canadian Internet-use typology (Wavrock, D. et al., 2021). Since the conceptual frame focused on empowerment, and there were no items specifically aligned with this construct, I had to select items that could be considered capital-enhancing. As defined previously, capital-enhancing activities enable people to accumulate financial, social, and digital resources or capital (e.g., academic activities, business and work-related activities) and may contribute to a feeling of empowerment while using digital technologies and systems such as online learning activities, accessing information about health,

community events, and employment (Hargittai & Shafer, 2006; Ragnedda, 2017, 2018). This approach enabled me to measure the adoption and use of digital technologies by immigrants and non-immigrants for all respondents and then to measure the adoption and use of digital technologies of the youth aged 15 to 24 and all other respondents with any immigration status. All selected variables within each category of digital access, skills, and capital-enhancing activities were subjected to a Cronbach Alpha test. The results consistently yielded values exceeding .75, indicating strong internal consistency and reliability among the items within each category. This suggests that the constructs being measured are indeed valid and reliable (Field, 2009). These survey items can be found in Table 1, while Appendix A provides a comprehensive list of the selected items analyzed in this study.

Brief Survey

In the second phase of the study, a short survey with 13 questions was designed by me to ascertain participants' digital access, the range of available devices to them, the quality of their Internet connection, and the ownership status of available digital tools at home and at school prior to the interview. The survey questions prompted participants to indicate the possible reasons that restrict them from enhancing their digital skills and also the language they used to navigate the Internet (see all short survey questions in Appendix C).

Interview

The first set of interview questions focused on participants' digital experiences at home and the next set of questions focused on their digital experiences at school. To better understand their digital skills, interview questions were designed to invite participants to describe regular digital activities that they performed three months prior to the interview at home and then at school. The next set of questions was pertinent to their purpose for using the Internet to determine if they had a sense of agency and felt empowered to communicate and participate

online confidently. Two interview questions focused mainly on their language proficiency and its impact on their digital experience. As noted by Gill et al. (2008), semi-structured interviews consist of several key questions to explore the areas of inquiry but also provide an opportunity to pursue an opinion or response in detail. The flexibility of the semi-structured interviews allows the researcher to explore for more elaboration, mitigates the challenges posed by language barriers for participants (Barriball & While, 1994) and allows the participants to propose their own ideas, perceptions, beliefs, and experiences. The nature of the semi-structured questions of this study enabled the participants to provide detailed explanations of their experiences for each question and create a context in which they described, in their own words, their digital experiences which could not be captured through surveys and explained the reasons why newcomers and immigrants might have different digital experiences (see Appendix B for all interview questions).

It's important to highlight that all interview questions were tailored to suit the age and language proficiency of all participants. To ensure plain language usage, the interview questions were simplified and expressed in clear, straightforward terms, avoiding jargon or complex terminology that might hinder comprehension. Additionally, explanations or examples were provided for any unfamiliar terms or concepts, facilitating understanding for all participants. Table 1 outlines the items (questions) employed in each instrument of the research study. The actual text of all questions is outlined in Appendices A, B, and C.

Table 1

Survey and Interview Items Used to Inform Each Theoretical Dimension of Digital Inequity

Instruments	Questions about Access	Questions about Skills	Questions about Capital-enhancing Activities	Questions about Language

2020 CIUS Survey	access to the Internet at home (AC-010A) access to the Internet through a mobile (AC-030A) Internet use from any location (AC-050A) **Regular access places** At home (AC-080F) **Internet-connected devices (DV)** A smartphone (DV-010A) Laptop or netbook (DV-010B) Tablet (DV-010C) Desktop computer (DV-010D) **Use of smartphone (SM)** have a smartphone (SM-010A)	**Communication** Sent and received emails (UI-010A) using an instant messaging app (UI-010B) social networking websites or apps (UI-010C) online voice calls or video calls (UI-010D) Uploaded self-created content (UI-010F) Booked appointments (UI-050H) Communicated with a government organization (GV-010H) **Accessing info** Accessed the news (UI-020A) Found locations and directions (UI-020B) **Entertainment** Listened to music (UI-030A) Listened to podcasts (UI-030B) Watched video (UI-040A) Watched content (UI-040B) Played video games (UI-050A) **E-commerce** online banking (UI-050D) Bought goods (UI-050K) **Training/education** Checked schedules or registered for classes (UI_050I) **Software skills** Copied or moved files (DS-020A) Used Word (DS-020B) Created presentations (DS-020C)	**Capital Enhancing Activities** Free online training or self-guided learning (DS-010A) Instruction or help from friends or family (DS-010B) Free training through community centers (DS-010C) Training paid for by yourself or employer (DS-010D) Other learning activity (DS-010E) Taken informal training or learning (UI_050F) **More advanced online activities** Researched for information on health (UI-020C) Researched for information about community events (UI-020D) Searched for employment (UI-050C)

		Used spreadsheet (DS-020D) Used software to edit (DS-020F) Written code (DS-020G) **Internet skills** Deleted your browser history (DS-030A) Blocked emails (DS-030B) Downloaded files (DS-030F) Uploaded files (DS-030G) Restricted or refused access to your geographical location (SP-010A) Changed the privacy settings (SP-010D) **Device skills** Enable automatic updates (SP-070A)		
Brief Survey Questions	Question numbers: (Home experience) 1, 2, 3, 4, 5, 6, 7, 8 (School experience) 9, 10, 11	Question numbers: 12	Question numbers: 12	Question numbers: 12, 13
Interview Questions	Question numbers: (Home experience) 6, 7, 8, 10 (School access) 11, 12, 13, 15, 16	Question numbers: (Home experience) 6, 7, 8, 9, 10 (School experience) 11, 12, 13, 14, 15, 16	Question numbers: (Home experience) 6, 7, 8, 10 (School experience) 11, 12, 13, 15, 16,	Question numbers: 16, 17

Access to 2020 CIUS Microdata with Statistics Canada Permission

Access to the 2020 CIUS data is strictly controlled. To gain access to the confidential microdata file via the Research Data Center (RDC) program, I first needed to register for an account on the Statistics Canada website via the Microdata Access Portal (MAP). Requirements for documentation were based on the origin of the project as well as the researcher's immigration status in Canada.

Several documents as well as the proposal were required when submitting an application through the MAP. The proposal was evaluated by Statistics Canada before the access was granted. In addition, because as the main applicant, I was a student, the thesis supervisor was required to write a letter in support of my RDC application and join the application as a co-investigator. The security screening certificates for the principal researcher (Sima) and the supervisor (Dr. Hagerman) were obligatory. Furthermore, as a newcomer, I had to submit a clearance certificate from my home country to be able to obtain a security clearance from Canada. Finally, similar to all other approved applicants, my supervisor and I signed a contract and became Deemed Employees of Statistics Canada to access the data through Research Data Centers (RDCs). RDCs promote and facilitate research that uses Statistics Canada microdata within secure facilities managed by Statistics Canada; there is a location hosted at the University of Ottawa Morisset Library known as the Ottawa-Outaouais Research Data Center (ORDC). After the approval, I was able to book a workstation at ORDC to have secure access to the detailed microdata from Statistics Canada's survey.

Research Ethics Board Approval

For the second phase of the study, the research ethics boards of the University of Ottawa outlined procedures required to protect human research subjects and processes to ensure voluntary participation, informed consent, and confidentiality. After demonstrating diligence in adhering to the research ethics board guidelines, ethics approval was granted by the University of Ottawa to recruit newcomer youth (Appendix H).

Participants

First Phase of the Study

The target population of the 2020 CIUS was all persons 15 years of age and older living in the 10 provinces of Canada and excluded full-time (residing for more than six months) residents of institutions. Indigenous peoples living on Reserves were not excluded from the survey population, but they were not targeted in the sample. Data for the 2020 CIUS were collected via an electronic questionnaire or computer-assisted telephone interviewing. A field sample of approximately 44,800 participants was used in this survey. Data were collected from about 32,300 participants through the invitation letters which were sent by mail to them and asked them to complete the electronic questionnaire online and the remaining 12,500 participants were contacted by telephone to complete the questionnaire with an interviewer.

The 2020 Canadian Internet Use Survey (CIUS) included 17,409 respondents. All respondents were included in my study. The finalized microdata report book of this nationally representative survey was published in June 2022. My analyses of the dataset took place over an 18-month period from the summer of 2022 until the winter of 2024. This was due, in part, to layered security measures imposed by ORDC. For example, due to ORDC restrictions on the minimum number of 15 respondents in each group for each question, a requirement that safeguards identities and responses of individual respondents, I was not permitted to compare immigrant/newcomer and non-immigrant youth. Landed immigrants are permanent residents who indicated a year of landing in Canada since 1980. Although my intention was to compare immigrant/newcomer youth with other Canadian youth, the number of young immigrant respondents to several items was fewer than 15 in the data set. When too few respondents fit into an analytical category, there is a risk that responses can be attributed to the participants. This

meant that I needed to revise my approach. After consultation with my thesis advisor, I decided to focus on the digital experience of youth, generally. The number of 2020 CIUS youth respondents aged between 15 to 24 was 828, a number that was sufficiently large to be approved for use in my analyses by Statistics Canada. This security constraint meant that I was required to look at age-based differences and immigration-based differences through separate analyses because I could not access data about the small group of young immigrants who replied to the survey. In this survey, the total numbers of immigrant and non-immigrant respondents were 1,709 and 15,700 respectively. The first round of analysis, which included Crosstabs, was conducted in 2022 to gain a general understanding of patterns and trends among immigrant and youth respondents from the 2020 CIUS. This initial analysis enabled me to develop and refine my interview and survey questions based on the broad trends identified in the quantitative phase of the study.

Second Phase of the Study

For participation in the second phase of this study, youth were required to sign a consent form (see appendix E) and their parents or guardians (if under 18) were informed via the provided email by their youth before beginning to participate in the project. Interview and survey questions focused on youth's digital experiences at home and at school and on language and its role in participants' capacity to access the Internet and use the Internet for a range of purposes with confidence. As an appreciation, participants were given a $20 Amazon gift card after completion of the online survey and interview.

To recruit youth participants, I initially designed a poster (see appendix D) that I shared with various organizations (e.g., YMCA, YWCA, Girls and Boys Clubs of Canada) that offer services to newcomer youth. The poster provided information about the research study for the

potential participants with a link to SurveyMonkey to confirm if they met inclusion criteria – that they were (a) 15 to 18 years old, (b) newcomers to Canada, and (c) English language learners. Owing to the fact that no organizations were able to respond to my request to support recruitment I submitted a modification request to the University of Ottawa Ethics Board to recruit participants through social media networks. I decided to first upload the poster on LinkedIn to reduce the number of scam emails. Immediately after posting the recruitment poster on my LinkedIn account, I received emails and responses in SurveyMonkey from potential participants who were willing to take part in the survey and interview.

I communicated with the potential participants and their parents via email to ensure they fully understood the participation criteria, the voluntary nature of my research study, and the purpose of the research. After each youth digitally signed the consent letter to participate in the survey as well as the interview and the parent replied to my email confirming their agreement, I sent the survey questions and asked the participants to indicate a few possible dates and times for the online interview. Once I received the completed survey, a date and time were set for the interview, and then I shared a link to the Zoom video conferencing platform and sent reminders prior to the interview. The interviews were recorded via the Zoom application provided by the University of Ottawa and were transferred immediately to OneDrive through my University of Ottawa account, which is a university-controlled, secure and password-protected storage environment for data. This enabled me to protect participants' confidentiality and anonymity with their informed consent for later transcription. I assured them that only my supervisor and I had access to the interviews and anonymous data and analyses would be stored for a minimum of 10 years after the completion of this research project

As suggested by Yin (2014), the number of participants included as an adequate sample size can vary, and it depends on the nature of the study, and the number of participants in this

study was attainable and feasible by a single researcher. According to ethics protocols, parents or guardians were informed prior to their youth's participation and students' participation was contingent on the voluntary consent of students. I also explained the purpose of the study to students before inviting them to provide their voluntary consent to participate.

I recruited five school-aged newcomer youth who were between 15 to 18 years old, who have been in Canada for five years or fewer from a country other than Canada and who self-identified as English language learners (ELLs) to participate. The age group of participants in interviews was selected because this is the subset of the CIUS survey population that was most likely to attend school full-time. Given my interest in understanding the digital dimensions of equity across home and school contexts, it was essential to focus this phase of recruitment on young people who were still in school.

Description of Participants in the Second Phase of the Study. All of the participants were residents of Ontario, and all were from different countries of Africa. It should be noted that this did not occur intentionally. These were the first participants who signed the consent letter, whose parents replied to my email, and who completed the survey.

Table 2

Description of Online Survey and Interview Conducted by the Researcher

Participants	Age	Sex	Place of Origin	Year of Immigration	City of Residence in Canada	School Board District
1 (Mary)	16	Female	Africa	2021	Toronto	TDSB
2 (Sofia)	16	Female	South Africa	2021	Ottawa	OCDSB
3 (David)	16	Male	West Africa	2021	Ottawa	OCDSB
4 (Paul)	17	Male	Tanzania	2019	Toronto	TCDSB
5 (Sara)	16	Female	Ghana	2022	Ottawa	OCDSB

Data Analysis

Quantitative data were analyzed using SPSS 28.0.0.0. I employed Nvivo1.7.1 software to support the analyses of qualitative data.

Canadian Internet Use Survey (2020)

1. Compared to survey respondents born in Canada, do immigrants to Canada access and use the Internet, digital tools, and systems differently?
2. Do youth aged 15 to 24 use digital tools and systems differently from other age groups in the nationally representative survey?

The first two research questions ask about differences, if any, between groups of respondents to the CIUS survey. RQ 1 focuses on differences between immigrant and non-immigrant Canadians in all age groups. RQ2 focuses on differences, if any, between youth aged 15-24 and respondents in all other age groups (aged 25 and older).

Analyses progressed through several phases. In SPSS, I first employed crosstabs analysis to help me describe the data in a meaningful way and identify patterns or trends in the data. The second phase of analysis focused on between-groups comparisons. It involved summing and then averaging the number of yes responses for all respondents on selected items to create index scores for access, skill, and capital-enhancing activities. This meant that I created new variables for access, skill and capital-enhancing activities informed by the theoretical inclusion of selected survey items. I then conducted between-groups ANOVA to determine whether the mean scores on the index variables of access, skill, and capital-enhancing activities were the same or different (Field, 2009). To run this test, I had to change the codes of variables. For instance, -99 was given as a new value for other possible answers such as don’t know, valid skip, etc. and the casewise deletion was selected for missing data.

Grouping and Comparative Analysis Strategy. To begin the analysis, data were divided into two groups of immigrants versus non-immigrants. In the next step, the whole respondents were again divided into two groups of youth (aged 15 to 24) versus all other age groups (25 and older). To do this for the first group, I had to split the dataset based on the immigration status variable to be able to compare the selected variables in access, skills, and capital-enhancing activities. The CIUS dataset included a variable called IMM-STA which provided an indicator of how each survey respondent answered the question about if they have landed as an immigrant to Canada. Respondents who had come to Canada as immigrants or those who were not immigrants to Canada were coded differently in the CIUS codebook. Using this variable, I was able to sort the data into the immigrant and non-immigrant groups. For the age group comparison, however, I had to change the age codes (values) of the respondents and gave them new values to be able to divide them into two groups of 15 to 24 and other age groups who were 25 years and older. The respondents were given codes in the CIUS code book (AGE-GRP) based on their age (15 to 24 years, 25 to 34 years, 35 to 44 years, 45 to 54 years, 55 to 64 years, and 65 years and over) from one to six. I kept the first code for the 15 to 24 years category and altered the codes of other categories to two for those aged 25 and older. This strategy enabled me to have two groups based on their ages, i.e., youth versus other age groups.

Crosstabulation. Crosstabulation is an effective way to organize categorical data so that trends can be identified. Using SPSS, I was able to create tables for each variable that showed the frequency of responses to each variable of interest in a more meaningful way and to produce observed counts and percentages (Field, 2009). The first sets of questions in the survey were pertinent to the Internet and digital tools in the access category. I picked the selected variables in access (nine items) and ran crosstabs via the descriptive statistics tab in SPSS for immigrants and

non-immigrants. I replicated the same analysis for variables in skill and capital-enhancing activities categories for immigrants and non-immigrants. In the next round of analysis, I did the exact same procedure for access, skills, and capital-enhancing activities variables for the second group of youth versus other age groups. The frequency of Internet access, skills, and capital-enhancing activities of the respondents was analyzed in distinct files. Each group's digital access, skills, and empowerment were determined through cross-tabulated descriptive statistics in SPSS and can be found in Appendices F and G (Creswell, 2014, Onwuegbuzie et al., 2009). This method also provided the percentage of responses to each item (variable).

ANOVA. The one-way analysis of variance (ANOVA) is a statistical method used to compare the means of two or more independent groups to determine if there are significant differences among them. In ANOVA, the data is divided into groups based on a single categorical independent variable, often referred to as the factor. The ANOVA test calculates an *F-statistic*, which represents the ratio of the variability between group means to the variability within the groups. If the calculated *F-value* is large enough to reject the null hypothesis, it suggests that there is a significant difference between at least two group means. Since there were two groups of respondents (immigrants vs. non-immigrants and youth vs. other age groups), ANOVA test was employed to determine the differences in each group's access, skills, and capital-enhancing index scores (Field, 2009). The data, as gathered, were categorical, which meant I could not immediately use ANOVA because it requires numeric variables. To use ANOVA, I needed to sum all of the YES answers for each participant in each group to develop index scores for each category (access, skills and capital-enhancing activities) to ascertain between-groups differences. Then, I ran ANOVA to compare whether the average number of yesses between the two groups was the same or different and to determine if there was a

significant difference between immigrants and non-immigrants and also youth and other age groups in terms of digital access, skills, and capital-enhancing activities. Each yes answer in the selected questions for the ANOVA demonstrated a higher level of access, skill, and capital-enhancing activities of the participants. When there is a statistically significant difference ($p < .05$), the null hypothesis can be rejected, and the inference can be made that the measured difference between group means is likely to exist in the population. Full details of the 2020 CIUS selected items can be found in Appendix A.

Table 3

Variables Used from the 2020 CIUS Survey for ANOVA

Access (n=9)	Skills (n=30)	Capital Enhancing Activities (n=9)
AC-010A	UI-010A	DS-010A
AC-030A	UI-010B	DS-010B
AC-050A	UI-010C	DS-010C
AC-080F	UI-010D	DS-010D
DV-010A	UI-010F	DS-010E
DV-010B	UI-050H	UI-050F
DV-010C	GV-010H	UI-020C
DV-010D	UI-020A	UI-020D
SM-G010A	UI-020B	UI-050C
	UI-030A	
	UI-030B	
	UI-040A	
	UI-040B	
	UI-050A	
	UI-050D	
	UI-050K	
	UI-050I	
	DS-020A	
	DS-020B	
	DS-020C	
	DS-020D	
	DS-020F	

DS-020G
DS-030A
DS-030B
DS-030F
DS-030G
SP-010A
SP-010D
SP-070A

Planning Quantitative Analyses. Before I began analyzing the data, I consulted several colleagues (Dr. Hagerman, Dr. Ranellucci, and Dr. Rosenberg) who had experience in quantitative analysis to verify the methods I planned to run in SPSS. It is noteworthy that the ORDC analyst also examined the data before releasing them and confirmed the approach as appropriate.

Brief Surveys

Responses to each question determined participants' digital experience at home and at school. Participants' responses ascertained newcomer youth's digital access at home and school, reasons, if any, that restricted them from developing their digital skills, and the language they used when they were online. This helped me to provide a preliminary profile of each participant before the interview.

Interviews

Interview questions were designed based on the findings of the first phase of the study, some questions pertaining to language proficiency were added to the interview questions and more time was dedicated to follow-up questions focusing on language and the challenges it may impose on participants. The semi-structured format of the interview enabled the participants to give more details about their digital experiences that could not be captured through the first phase of the study. I conducted online surveys and interviews with five ELL newcomer youth (aged 15 to 18) during January and February of 2023. A pilot interview with a prior survey was

conducted with a newcomer youth once I finished the first round of my quantitative analyses to verify the clarity of the questions and to check if the protocol would elicit the anticipated responses in a given time (45 minutes to one hour) (Hamilton & Corbett-Whittier, 2013). The interviews were recorded (by participants' consent) in Zoom and uploaded to the Otter AI application for transcription. The transcriptions required modifications and after they were scrutinized, they were uploaded to NVivo software, a tool for organizing and managing qualitative data, which was accessible to all University of Ottawa students. All data collected from the newcomer student interviews were gathered and categorized to detect patterns (Compton-Lilly, 2020; Creswell, 2014; Dyson & Genishi, 2005) using NVivo. A set of a priori codes such as digital access, skills, and empowerment informed by the theory were employed and some patterns and codes were also constructed by the researcher such as time management and cognitive dimensions. Concordant perspectives, experiences, and conditions were labelled with the same code (Dyson & Genishi, 2005). In the next phase of analysis, initial coding was reviewed and revised to cluster them into themes. The inductive or bottom-up process as well as a deductive (top-down) approach were applied in this study. I worked back and forth between the themes and database to establish a comprehensive set of themes and also to test the theory (Braun & Clarke, 2006; Creswell, 2014). The thematic analysis allowed me to identify key themes and interpret various aspects of the research topic (Braun & Clarke, 2006). The generated themes were compared to the research questions and issues acknowledged in the literature (Creswell, 2014). Intra-rater reliability was utilized in this research study. To enhance the reliability of the constructed codes, I engaged in detailed consultations with my supervisor at various stages. Initially, I familiarized myself with the data and generated preliminary codes. These codes were then grouped based on similar patterns and thematically named. This process

was repeated 3 to 5 times at different stages of the research. By repeatedly reviewing and refining the codes, I aimed to increase their reliability and ensure a robust analysis (Marks & Yardley, 2004). The generated codes and themes can be found in Appendix I.

In the next chapter, the quantitative data of the first phase of the study are statistically analyzed and reported and then the qualitative data analyses are reported in quotes, codes, and themes and the findings from each method will be equally emphasized (Creswell, 2014). Next, partial integration occurs during the interpretation of the results to compare the results and extend our understanding of the digital inequities among newcomer youth in Canada (Creamer, 2018; Creswell, 2014; Greene et al., 1989). Findings from the qualitative analysis provides richness and details and elaborates the findings of the quantitative analysis (Rossman & Wilson, 1985).

Chapter 4: Results

Findings are reported by order of research question. First, I present the between-groups comparisons of digital access, skills, and capital-enhancing activities for immigrants and non-immigrants and then for youth aged 15 to 24 and other age groups (25 and older). In each section I begin presenting the descriptive analysis of each group followed by the presentation of the ANOVA comparing group means on these same index scores. This enabled me to examine the patterns of immigrants' as well as youth's Internet access and usage and compare them to Canadian-born and older respondents and develop a general understanding of their digital experiences which assisted me in better interpretation of the nuances of ELL newcomer youth's digital lives in the second phase of the study. Finally, I share the generated themes from the survey and interview responses of a group of ELL newcomer youth to provide a detailed portrayal of their digital lives at home and school.

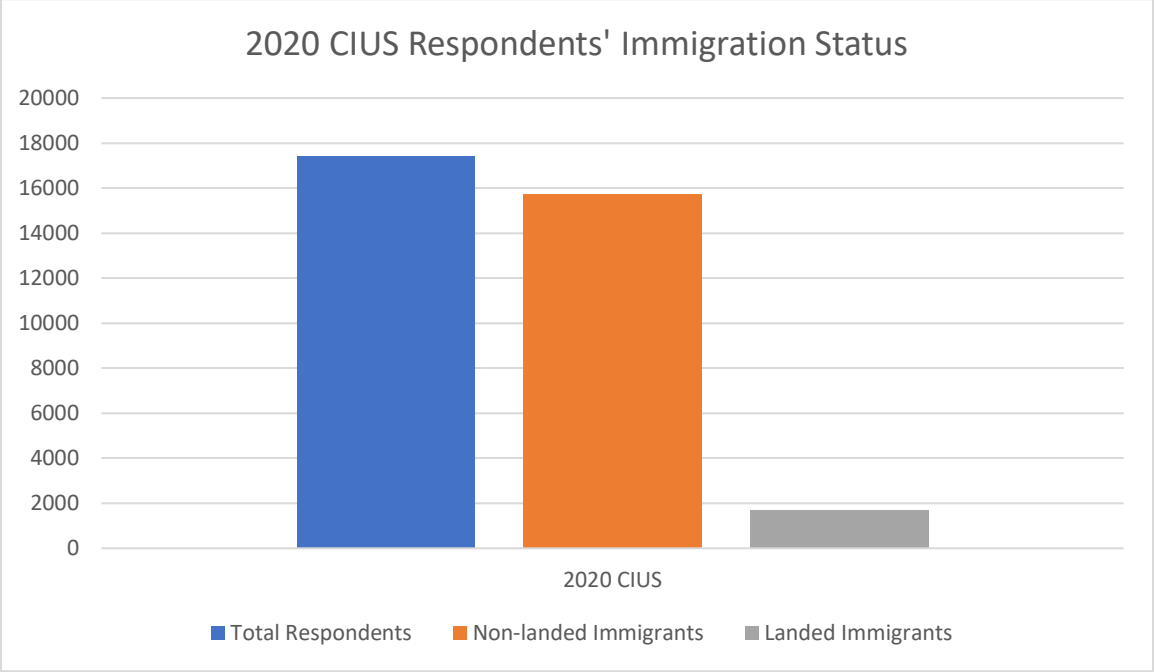
The 2020 CIUS Results

Findings Based on Immigration Status of the Participants

The total number of 2020 CIUS respondents was 17409. As shown in Figure 2, of these, 1709 respondents were landed immigrants (the label applied and used in the 2020 CIUS code book) or immigrants. The other 15700 were non-immigrants. According to the 2020 CIUS description of data sources, estimates from the survey data were adjusted through weighting to ensure they accurately represent the target population's characteristics and the estimated counts in the population were 5,206,469 (16.5%) for immigrants and 26,402,842 (83.5%) for non-immigrants (non-landed immigrants).

Figure 2

2020 CIUS Respondents' Immigration Status



Digital Access for Immigrants versus Non-immigrants. Descriptive analysis of the data indicated that approximately 98% (n = 1677) of immigrants and 89% (n = 13996) of non-immigrants had access to the Internet at home. Immigrants' and non-immigrants' access to the Internet through a mobile data plan for personal use was 84% (n = 1429) and 69% (n = 10802) respectively. Almost 95% (n = 1628) of immigrants used the Internet for personal use, from any location during the past three months prior to the survey while 87% (n = 13666) of non-immigrants used the Internet from any location. Smartphone ownership rate for personal use for immigrants was 90% (n = 1542) and 74% (n = 11566) for non-immigrants. Internet access rates via smartphones and laptops for immigrants were 87% (n = 1491) and 68% (n = 1158) while these rates for non-immigrants were 69% (n = 10886) and 54% (n = 8531) respectively. The access rate via tablets was 44% for both groups. Appendix F includes a table of the percentages of all selected digital access variables for participants of each group.

In the second round of analysis, an ANOVA was run with the constructed index score of nine selected variables for digital access. The purpose of this test was to examine differences in mean index scores of digital access between immigrants and non-immigrants. To run the ANOVA, the categorial yes and no responses were transformed into numeric (scale) variables because answering "yes" to all questions indicated better (more or higher levels of) access for each participant. Therefore, I tallied up all of the "yes" answers for the following categorical variables for each participant in each group to develop average scores for the access index category (AC-010A, AC-030A, AC-050A, AC-080F, DV-010A, DV-010B, DV-010C, DV-010D, SM-G010A)[1]. It should be noted that during the analysis, missing values were defined to be treated as missing, and statistics were computed based on cases with complete data for all variables in the analysis.

As shown in Table 4, the mean digital access index score and standard deviation for immigrants were (M = 6.93, SD = 1.81) and for non-immigrants, (M = 6.02, SD = 2.58). To conduct ANOVA, assumptions were checked. The result of the test of homogeneity of variances was violated as assessed by Levene's test for equality of variances ($p < .001$). This means a modified version of ANOVA was needed, called Welch's ANOVA. This can be found in the Robust Tests of Equality of Means table generated by SPSS when running ANOVA. This test showed that there was a statistically significant difference between the digital access of immigrant and non-immigrant respondents of the 2020 CIUS, Welch's $F(1, 2529.125) = 348.845$, $p < .001$. The effect size, eta squared (η^2), was .011, indicating a small effect. According to Cohen (1988), an eta-squared of .01 is considered small. Importantly, the digital

[1] See Appendix A for a detailed description of selected variables in digital access.

access mean score for immigrants was higher than the digital access mean for non-immigrants, indicating immigrants have higher levels of digital access than non-immigrants.

Table 4

Digital Access ANOVA For Immigrants and Non-immigrants

Variable	Immigrant (n = 1709)		Non-immigrant (n = 15700)		$F(1, 2529.125)$	η^2
	M	*SD*	*M*	*SD*		
Access_index_score	6.926	1.813	6.021	2.577	348.845***	.011

*** $p < .001$

Digital Skills for Immigrants versus Non-immigrants. Descriptive analysis showed that among all 30 selected variables as indicators of digital skills, sending and receiving emails was most highly reported by both immigrant and non-immigrant respondents among all the digital activities. For immigrants, 87% (n = 1482) of respondents said that they send and receive emails whereas 79% (n = 12432) of non-immigrants reported this activity. Communicating through instant messaging applications was reported by 81% (n = 1380) of immigrants and 66% (n = 10281) of non-immigrants. Only 13% (n = 218) of immigrants and 9% (n = 1395) of non-immigrants uploaded self-created content on sharing websites, a blog or personal website. Respondents' communication with a government organization by email or via social networking was reported by 18% (n = 299) of immigrants and 12% (n = 1843) of non-immigrants. Approximately 80% (n = 1361) of immigrants found locations and directions through the Internet and 67% (n = 10482) of non-immigrants did the same activity. Nearly 31% (n = 525) of immigrants and 26% (n = 4057) of non-immigrants have listened to podcasts during the past

three months prior to the national survey. The rate of conducting online banking was 78% (n = 1333) and 68% (n = 10704) for immigrants and non-immigrants respectively.

Rates for copying or moving files or folders, using word processing software, creating presentations, or documents with text and pictures, tables or charts, and using software to edit photos, video or audio files for immigrants were 59% (n = 1001), 62% (n = 1051), 40% (n = 684), and 35% (n = 599) respectively while these rates were lower for non-immigrants with 49% (n = 7640), 50% (n = 7839), 27% (n = 4199), and 28% (n = 4342) respectively. Respondents were also asked if they wrote codes in a programming language in the past three months prior to the survey and merely 12% (n = 201) of immigrants and 5% (n = 706) of non-immigrants performed that activity (see Appendix F).

An ANOVA was conducted to determine if there were differences in the digital skills of immigrants and non-immigrants. The mean digital skill index score (calculated by summing 30 selected variables in digital skill) for immigrants and non-immigrants were (M = 16.67, SD = 6.70) and (M = 15.03, SD = 6.91) respectively and could be concluded that the immigrants' digital skill was higher than non-immigrants (see table 5). The test indicated that there was no homogeneity of variances, as assessed by Levene's test for equality of variances (p = .015). This means the result of Welch's ANOVA should be reported. There was a statistically significant difference between the digital skills of immigrants and non-immigrants, Welch's $F(1, 2045.549) = 85.910$, $p < .001$. The effect size, eta squared (η^2), was .005, representing a small effect size.

Table 5

Digital Skills ANOVA for Immigrants and Non-immigrants

Variable	Immigrant (n = 1615)	Non-immigrant (n = 13550)	$F(1, 2045.549)$	η^2

	M	*SD*	*M*	*SD*		
Skills_index_score	16.671	6.697	15.031	6.909	85.910***	.005

*** $p < .001$

Capital-enhancing Activities for Immigrants versus Non-immigrants. Analysis of the nine selected digital activities that would enable respondents to enhance their digital experience demonstrated that merely 29% (n = 502) of immigrants and 17% (n = 2739) of non-immigrants took free online training or self-guided learning. The highest reported activity was researching for information on health which was 72% (n = 1226) and 61% (n = 9570) for immigrants and non-immigrants respectively. The next highest capital-enhancing activity was researching for information about community events with 45% (n = 775) for immigrants and 41% (n = 6403) for non-immigrants (see Appendix F for a detailed list of variables selected for digital access, skills, and capital-enhancing activities along with their percentages based on participants' immigration status).

To ascertain the differences in the digital capital-enhancing activities between immigrants and non-immigrants, an ANOVA was conducted. The mean capital-enhancing activities index score for immigrants was (M = 2.69, SD = 1.88) and for non-immigrants was (M = 2.16, SD = 1.64), showing higher means for immigrants. As assessed by Levene's test for equality of variances, there was no homogeneity of variances ($p < .001$). Welch's ANOVA demonstrated a statistically significant difference in capital-enhancing activities between groups, Welch's $F(1, 1910.020) = 118.322$, $p < .001$. The effect size of .01 was considered small.

Table 6

Digital Capital-enhancing Activities ANOVA for Immigrants and Non-immigrants

Variable	Immigrant (n = 1609)		Non-immigrant (n = 13534)		$F(1, 1910.020)$	η^2
	M	SD	M	SD		
Capital_enhancing_ Index_ score	2.689	1.877	2.158	1.637	118.322***	.010

*** $p < .001$

Findings Based on the Age of Participants

Digital Access of Youth versus Other Age Groups. The number of youth aged 15 to 24 who participated in this national survey was 828 and all other respondents in other age groups aged 25 to 34 years, 35 to 44 years, 45 to 54 years, 55 to 64 years, and 65 years and over in this survey were 16581. Approximately 98% (n = 811) of youth had access to the Internet at home compared to 90% (n = 14862) of all other respondents of this survey.

Access to the Internet through a mobile data plan for personal use was 86% (n = 710) and 70% (n = 11521) for youth and other age groups respectively. Ninety-eight percent (n = 807) of youth and 87% (n = 14487) of all other respondents have used the Internet for personal use from any location in the past three months prior to the survey. The top three digital devices youth used to connect to the Internet were smartphones, laptops or notebooks, and desktop computers with 94% (n = 779), 77% (n = 640), and 34% (n = 277) respectively. The top three digital devices used by other age groups were smartphones 70% (n = 11598), laptops 55% (n = 9049), and tablets 45% (n = 7385). Approximately 94% (n = 780) of youth owned a smartphone compared to 74% (n = 12328) of other age groups. Older respondents had more access to tablets (45%) and

desktop computers (36%) compared to the youth respondents with (32%) and (34%) respectively. Appendix G contains the entire list of variables employed to ascertain the digital access of the youth versus other age groups in the 2020 CIUS.

To determine if there were any differences in digital access between youth and other age groups, an ANOVA test was conducted with the index score of nine selected variables for digital access. Test results indicated that youth's digital access was higher (M = 7.04, SD = 1.44) than other age groups (M = 6.06, SD = 2.56). The assumption of homogeneity of variances was violated, as assessed by Levene's test for equality of variances ($p < .001$). Welch's ANOVA demonstrated that there was a statistically significant difference in the mean digital access index score between youth and other age groups, Welch's $F(1, 1109.288) = 327.557$, $p < .001$. The effect size for the access index score, as indicated by Eta-squared, was .007, suggesting a small effect size.

Table 7

Digital Access ANOVA for Youth Versus and Other Age Groups

Variable	Youth (n = 828)		Other age groups (n = 16581)		$F(1, 1109.288)$	η^2
	M	*SD*	*M*	*SD*		
Access_index_score	7.036	1.435	6.064	2.561	327.557	.007

*** $p < .001$

Digital Skills of Youth versus Other Age Groups. Among the 30 selected variables pertaining to the digital activities of respondents, the most reported activities by youth were listening to music with 91% (n = 752), sending messages using an instant messaging app with 91% (n = 749), followed by using social networking websites or apps with 88% (n = 728), and

sending and receiving emails with 88% (n = 725) while the most reported activity for other age groups was sending and receiving emails with 80% (n = 13189) and then accessing the news with 71% (n = 11803). The rate of conducting online banking for both groups was 69% (n = 575 for youth and n = 11462 for other age groups). Merely 20% (n = 165) of youth and 9% (n = 1448) of all other age groups uploaded self-created content on sharing websites, a blog or personal website during the past three months prior to the survey. Communication with a government organization by email or via social networking for both groups was similar with 11% (n = 89) and 12% (n = 2053) for youth and other age groups respectively. Approximately 62% (n = 511) of youth created presentations, or documents with text and pictures, tables or charts while 26% (n = 4372) of other age groups did the same activity in the past three months prior to the survey (see Appendix G).

The conducted ANOVA indicated that the digital skills were higher for youth (M = 18.44, SD = 5.68) than all other age groups (M = 15.03, SD = 6.92). According to Levene's test for equality of variances, the homogeneity of variances was violated ($p < .001$). Using Welch's ANOVA, there was a statistically significant difference in digital skill scores between youth and other age groups, with youth scoring higher than other age groups, Welch's $F(1, 930.899) = 265.084$, $p < .001$. Therefore, we can reject the null hypothesis and confirm that youth's digital skills were higher than other age groups. It can be concluded that there was a small effect, as the effect size, eta-squared, was .012.

Table 8

Digital Skills ANOVA Test for Youth and Other Age Groups

Variable	Youth (n = 796)	Other Age Groups (n = 14369)	$F(1, 930.899)$	η^2

	M	*SD*	*M*	*SD*		
Skills_index_score	18.437	5.680	15.027	6.923	265.084***	.012

*** $p < .001$

Digital Capital-enhancing Activities of Youth versus Other Age Groups. The highest rate of capital-enhancing activities for youth and other age groups was for researching information on health with 65% (n = 538) and 62% (n = 10258) respectively. Reported rates of researching for information about community events and searching for employment were 40% (n = 330) and 35% (n = 288) among youth. The rate of research for information about community events was 41% (n = 6848) among other age groups. For other age groups, the rate of searching for jobs was 14% (n = 2296). On the other hand, merely 3% (n = 25) of youth and 2% (n = 343) of other age groups took free training through community centers, senior centers or provided by public programs or organizations. Twelve percent (n = 95) of youth and 10% (n = 1615) of other age groups took training paid by themselves or employer during the past three months prior to the CIUS (see Appendix G for a detailed list of variables selected for access, skills, and capital-enhancing activities along with their respective percentages based on the participants' age groups).

An ANOVA was conducted to ascertain if there were differences in the digital capital-enhancing activities between youth and other age groups. The mean capital-enhancing activities index score was (M = 2.50, SD = 1.73) for youth and (M = 2.20, SD = 1.67) for the other age groups. The assumption of homogeneity of variances was violated, as assessed by Levene's test for equality of variances (p = .026). There was a statistically significant difference in digital capital-enhancing scores between youth and other age groups, with youth scoring higher than other age groups, Welch's $F(1, 876.823) = 23.152$, $p < .001$. Therefore, the null hypothesis was

rejected and it could be concluded that digital capital-enhancing activities of youth were higher than the other age groups and the effect size was small $\eta^2 = .002$.

Table 9

Digital Capital-enhancing Activities ANOVA for Youth versus Other Age Groups

Variable	Youth (n = 794)		Other Age Groups (n = 14349)		$F(1, 876.823)$	η^2
	M	*SD*	*M*	*SD*		
Capital-enhancing_index_score	2.501	1.727	2.198	1.668	23.152***	.002

*** $p < .001$

Digital Experience of the 2020 CIUS Selected Subgroups

Results of the ANOVAs indicated that immigrants to Canada and younger Canadians have more access to the Internet, report having more digital skills and participate more often in activities considered capital-enhancing. According to Cohen (1988), an eta-squared or effect size for both immigrants and youth was considered small. This means that although there was a statistically significant difference between immigrants and non-immigrants, the difference was small. However, it should be noted that although the effect is small, it may signal an important shift in digital access, skill, and capital-enhancing activities for immigrants.

It should be noted that these results did not include comparisons focused only on immigrant/newcomer youth. Although the trends from the ANOVA present a clear picture of these three dimensions of digital equity for immigrants and for young people (vs. Non-immigrant Canadians and older Canadians) analyses do not explore the digital experiences of immigrant youth, specifically. Thus, the second phase of the study reports qualitative analyses based on

interviews with five participants whose experiences can extend insights gained from the quantitative analyses.

The Online Survey and Interview Findings

The findings of the first phase of the study informed the development of the next, which involved conducting interviews and surveys with five ELL newcomer youth. This phase offered further insights into how access, skill, and empowerment influence the use of digital tools and digital systems by ELL newcomer youth both at home and school, combining quantitative data with qualitative perspectives for a comprehensive understanding.

Participants Profile from Online Surveys and Interviews Conducted by the Researcher

All participants were originally from different countries of Africa and all of them were 16 years old except for the fourth participant who was 17. All of them had lived in Canada for fewer than 5 years, and had arrived in the country between 2019 and 2021. It should be noted that all names are pseudonyms and all identifying information was omitted to protect the anonymity of the participants.

Table 10

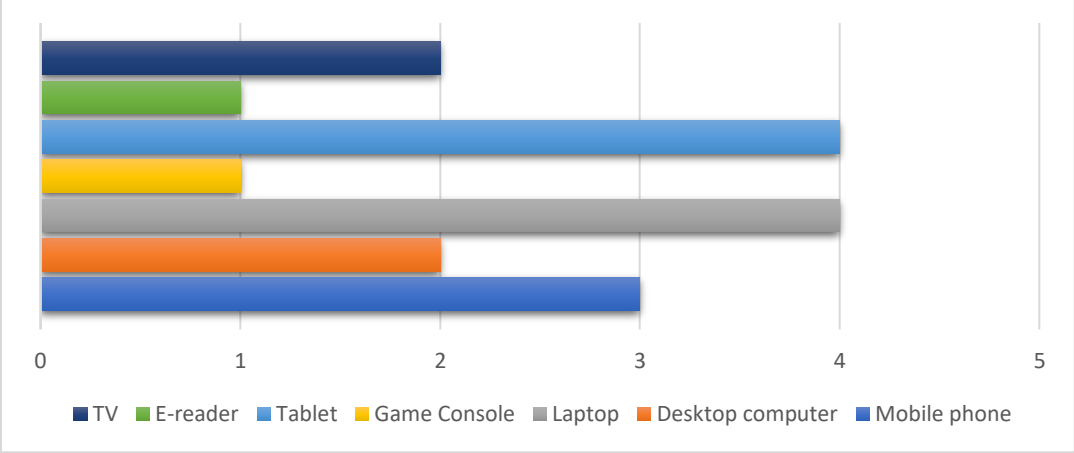
Participants' Profiles Based on the Survey

Participant	Age	Place of Origin	Year of Immigration	City of Residence in Canada	School Board District	Device Ownership Status	Language Use on the Internet	Restriction on Digital Skills Development
Mary	16	Africa	2021	Toronto	TDSB	Own a device	English	None
Sofia	16	South Africa	2021	Ottawa	OCDSB	Own a device	English	Financial restrictions
David	16	West Africa	2021	Ottawa	OCDSB	Own a device	English	Financial restrictions
Paul	17	Tanzania	2019	Toronto	TCDSB	Share a device	English	Language proficiency
Sara	16	Ghana	2022	Ottawa	OCDSB	Own a device	English	Language proficiency

Before presenting an analysis of the codes that I constructed from their interviews, I provide a description of each participant. Descriptions include selected quotes that demonstrate how students explained the digital dimensions of their lives.

Figure 3

Digital Devices Available at Home



Mary. At the time of the interview, Mary was 16. She immigrated from Africa (did not mention the name of the country) to an urban region in Toronto, Canada in 2021. She was in grade 10 and attended a public high school in the Toronto District School Board (TDSB). She had access to the Internet and always used it at home. Mary owned a laptop, and she could be online for up to 15 hours a day. Available digital devices to her at home were a laptop, tablet, TV, cellphone, and personal computer. At school she had access to tablets, desktop computers, laptops, and a smartboard, which could be used for 15 hours per week. In the short survey conducted before the interview, participants were asked to indicate reasons why they have not improved their digital skills. They could choose from options such as financial restrictions, language proficiency, lack of available resources or technical support, lack of time, or specify their own reasons. She did not mention a particular reason for not improving her digital skills. She preferred to search the Internet in English rather than any other language.

During the interview, she described how the pandemic impacted internet usage among her family members. They primarily used the Internet for entertainment purposes such as watching movies or series on Netflix, scrolling through social media platforms like TikTok and Instagram, playing video games, and engaging in video calls with friends. She noted that the prolonged time spent online led to challenges such as distractions, difficulties in time management, and a lack of physical exercise. Moreover, she highlighted strengths in her home digital experience, including the convenience of accessing various activities from the comfort of her home. She stated, “I'm able to do all these things at my comfort. Because like, I feel like, I'm not getting tired, I'm just sitting down, scrolling …”. However, she also expressed concerns about the adequacy of her digital tools, particularly when they became outdated or required maintenance. Despite these challenges, Mary sought support from her family members when facing technical issues and occasionally engaged in online courses or watched YouTube tutorials to improve her digital skills.

At school, Mary used the internet and digital devices for educational tasks, mainly in shared computer rooms. Initially hesitant, she gradually gained confidence in utilizing digital tools through practice, peer learning, and support from teachers and classmates. However, she faced challenges like working in groups, differing learning speeds among students, and language barriers affecting her ability to keep up with others. She stated, “some are learning really fast and maybe like you are maybe like left behind”. Mary offered recommendations to improve the school's digital experience, emphasizing the necessity for additional practice opportunities, equitable access to devices, and tailored support programs for English language learners. She emphasized the pivotal role of community support in addressing language and digital skill

disparities among newcomers, advocating for inclusive measures to ensure fairness and equal educational opportunities for all students.

Sofia. Sofia was 16 at the time of the interview and immigrated from South Africa to a suburban region in Ottawa, Canada in 2021. She was in grade 11 and attended a public high school in Ottawa-Carleton District School Board (OCDSB). Sofia had access to the Internet at home and often used it. She owned a digital device and also a laptop and a mobile phone were available to her at home that she could use them around 8 hours a day during a week and 15 hours on weekends. At school, Sofia often could use the Internet via laptops and digital projectors. English was the language of her preference when she was online and financial restriction was mentioned as a reason in the short survey for not improving her digital skills.

During the pandemic, her family relied heavily on the internet to stay informed about global events and for entertainment purposes. At home, Sofia primarily used her laptop for studying, completing assignments, and engaging in recreational activities like watching movies. She expressed confidence in completing about 70% of her tasks, highlighting that the guidance from her teachers played a crucial role. However, she also noted a desire to improve her skills in editing and design. She stated, “

> I can edit some of my own work, but not that perfect. Let's say doing editing I am able to edit, like 60% but not so full. So, I'm willing to know more about editing and some designing. I'm willing to know more, you know, some people are able to design games. So, I want to know more about the designing of games.

Despite facing challenges related to racial discrimination online, Sofia found support from her family members, especially her mother and siblings, who assisted her with assignments and

provided emotional support. She emphasized the importance of having a supportive environment at home.

Sofia brought her own laptop to school and appreciated the fast internet connection. She described collaborative tasks in class, where students shared their opinions and worked on assignments using their own devices. While Sofia felt confident in completing schoolwork, she highlighted the need for more guidance and advice from teachers to enhance her digital skills further and expressed, “Let's say if there is more knowledge, more advice and more information, and more guidelines. So, this will be very, very perfect”. Sofia's language proficiency as a second language learner impacted her digital experience, with language barriers posing challenges in understanding instructions and communicating effectively. She suggested that additional language classes or support services could benefit newcomers like herself in overcoming these obstacles.

David. David was 16 and immigrated from West Africa to an urban region in Ottawa, Canada in 2021. He was in grade 11 and attended a public high school in OCDSB. He had access to the Internet and often used it at home. Available devices at home were a laptop and a tablet and he owned a digital device. David could be online 17 hours a day during the week and up to 40 hours totally on weekends. He had access to the Internet at school and often used it. A laptop and interactive whiteboards were available digital devices at school for him. The reason he chose for not improving his digital skills from the options in the short survey was financial restrictions. English was his language of preference when he used the Internet.

During the pandemic, David's family found themselves increasingly reliant on the internet for various activities. They utilized platforms like Zoom for virtual meetings, stayed informed through online news sources, and entertained themselves by watching movies and

series on platforms like Netflix. David personally engaged in online gaming, using platforms like Twitter and Facebook to connect with friends. Additionally, he mentioned creating online groups to discuss topics ranging from technology to the latest trends. He said, “I tend to create groups works I've used that will dispose news. We'll discuss the latest technology and lots more.”

In the school setting, David's use of technology primarily focused on completing assignments and collaborative projects. He mentioned being assigned to groups where each member had access to a shared laptop for completing tasks. Despite this, David expressed frustrations about sharing devices and limited access to certain websites due to school restrictions. He stated, “the only challenge that we face at school is when we're online, you know, because using our... using the internet at school ... some website that are that are blocked.” However, he appreciated the support received from teachers in terms of providing instructions and deadlines for assignments.

Paul. Paul was 17 and immigrated from Tanzania to an urban region in Toronto, Canada in 2021. He was in grade 12 and attended a public high school in Toronto Catholic District School Board (TCDSB). He had access to the Internet at home and always used it. He had to share a digital device he used frequently with his parents or siblings. Mobile phone, desktop computer/personal computer (PC), laptop, game console, tablet, e-reader, and TV were the digital devices at home which could be connected to the Internet. During the weekdays, Paul could be online for around two to four hours a day and on weekends, five to six hours a day. He had access to the Internet at school and could use it for 14 to 20 hours a week. Tablets, laptops, digital projectors, and interactive whiteboards were available to him at school. He preferred to use English when he was online; however, he mentioned in the short survey that his language proficiency was the main reason for not improving his digital skills.

At home, Paul mentioned an increase in internet usage during the pandemic, spending time on social media, educational websites, and staying informed about global events. He also highlighted challenges like getting distracted from other tasks while online. Despite this, he emphasized his ability to independently navigate the internet. He replied to a question pertaining his digital skill as, "[…] Maybe enjoying the part of internet also being able to access the internet without any help from another person".

Regarding school experiences, Paul explained that each student had their own tablet provided by the school, eliminating the need to share devices in class. However, access to computers for more intensive tasks like coding was limited to computers in a lab. He described the basic skills required for schoolwork, including reading and typing, along with some basic coding skills. Paul acknowledged that he felt less than fully proficient, particularly in coding, but expressed plans to improve through practice and consulting with teachers and classmates. Challenges at school included occasional device malfunctions and time-consuming tasks due to skill limitations, especially in coding. Despite this, Paul demonstrated strength in research and seeking assistance when needed. He identified both device quality and lack of confidence in coding as primary challenges affecting his digital experience at school. He expressed,

> […] challenges not being able to complete my task the given task on time. Maybe because maybe being maybe for example maybe the task requires some coding knowledge in coding and I'm not confident on coding so I have to take much time to get to understand maybe yeah, that's a challenge I usually have.

Paul emphasized the importance of language proficiency, noting that his initial language barrier impacted his confidence and ability to participate fully in digital activities. He suggested that schools create supportive environments and provide targeted learning opportunities to enhance

language and digital skills for new learners. Paul acknowledged efforts made by his school to improve language proficiency through dedicated English classes but expressed a need for additional resources and opportunities for language learners.

Sara. Sara was 16 and immigrated from Ghana to an urban region in Ottawa, Canada in 2022. She was in grade 12 and attended high school in OCDSB. She had access to the Internet at home and often used it. The tablet is the only available digital device to Sara at home and she owned her digital device. She could be online six hours a day during the weekdays and a total of 27 hours on weekends. The Internet was available at her school and she could often use it. Tablets and a smartboard were digital devices available at her school. She selected language proficiency as the main reason for not improving her digital skills in the short survey and she preferred English while she was online.

During the pandemic, her family used the Internet more to read the news. She described utilizing the internet for various activities such as reading books, meeting new people online, and learning about different cultures and languages. She emphasized the reliability and speed of the internet connection at home, facilitated by each family member owning their own device. Sara expressed confidence in her ability to complete schoolwork, attributing her proficiency to support from family members and the accessibility of information online. She highlighted using online resources like Google and YouTube to enhance her skills, particularly in areas like coding and editing. She also encountered cyberbullying while she was online. She stated,

> […] because of being black or you know, if you comment that sometimes, someone will just bully you online. But there was a time where I was able to just go to my friend, and my friend said you don't need to worry. Just keep doing what you want to do. Nobody cares about them.

In the school environment, Sara noted the prevalence of laptops among students and the availability of computers in school labs. She appreciated the fast and reliable school Wi-Fi, although she identified internet traffic as a potential challenge during peak usage times. Sara expressed a desire for even better internet connectivity at school to minimize such disruptions. Regarding language proficiency, Sara acknowledged that language barriers could pose challenges, especially in assignments not in her native language. She said, “Let's say it's language {the most challenging}. Language when you don't know what other people are saying. Your language is different from their language. The language just caused the difficulty”. She suggested additional resources and language support for newcomers to Canada to improve their English proficiency and digital skills.

Findings from Online Interviews Conducted by the Researcher

First, the participants' home experience is described, followed by an exploration of their school experience. This sequential approach allows for a comprehensive view of their digital engagement across different contexts. Examining home experience provides valuable insights into individuals' digital interactions within the domestic sphere, offering a nuanced understanding of how technology integrates into daily routines and familial dynamics. Exploring school experience shed light on the role of digital technology in educational settings, providing essential context for understanding individuals' digital literacy development and challenges across different domains of life. Interviews invited students to provide insights on a range of topics that included the digital challenges they have faced, their digital strengths, their identified digital needs and their experiences of using digital resources (such as computers and the Internet) at home and at school. The semi-structured nature of the interview questions allowed me to uncover deeper insights via follow-up questions into the participants' digital lives and better

understand the nuances that could act as barriers to digital engagement and the socio-cultural contexts that shape their digital practices. For example, participants mentioned challenges such as cyberbullying due to their skin color. They further highlighted that their language proficiency often made it difficult to effectively participate in digital environments.

Definitions of Concepts. The digital challenges are the obstacles and difficulties participants encounter when navigating the digital landscape. Digital strength delineates the proficiency, competencies, and capabilities participants possess in utilizing digital tools and resources. Digital needs, on the other hand, are the specific requirements and necessities individuals have concerning digital access, skills, and resources to meet their goals. Additionally, By clarifying these foundational concepts, the upcoming sections will be easier for readers to follow and understand how these themes were constructed.

Home Experience with Digital Technologies. The regular digital activities the participants performed at home during the past three months prior to the interview were watching movies on their devices (n = 1), using various social media platforms (n = 4), chatting or making video calls with friends through instant messaging apps (n = 3), searching or accessing the intended information and news (n = 4), reading books or blogs (n = 2), ordering and purchasing from online websites (n = 1), downloading content from the Internet (n = 1), doing tasks and assignment for school (n = 2) and playing video games (n = 2). David reported his regular digital activities as follows:

> I talk with my friends. I'm on Twitter, sometimes Facebook. I play a little on the Internet, I chat with my friends. I tend to create groups […] that will dispose news. We'll discuss the latest technology and lots more. So, we do that a lot…

All of the participants (n = 5) acknowledged the pandemic influenced their online activities and made them spend more time on the Internet. Most of the reported activities were using the Internet for entertainment purposes (n = 5) and checking the news (n = 4) during the pandemic. Mary described her online activities during the pandemic as "spending more time online by scrolling through social media on the phone, watching various shows on television, and sometimes on computers doing tasks".

Digital Challenges at Home. As noted above, digital challenges include the existing problems or shortcomings that can impact the digital experience of the participants. To gain deeper insights into their experiences at home, participants were invited to elaborate on the challenges they experience while online or while using digital platforms and systems. Online safety (n = 4) (e.g., being bullied online), time management (n = 2), cognitive (n = 1) (e.g., distraction), and financial (n = 1) (e.g., equipment maintenance) challenges were reported by the participants. Sofia stated that just because of her skin color, others bullied her even in the comments on online platforms. She explained, "You know, I'm being black… bullied sometimes even online by comments ... you know due to my color, there is some bullying on the Internet, racism ... being black...". Paul described his discomfort with encountering inappropriate or pornographic content online as,

> I feel I'm not safe... let's say... give us a scenario. Let's say for example I find it awkward watching like some scene or some pictures that are pornographic or sites. so sometimes I find myself... those pictures pop up on my screen so I find it uncomfortable for me.

His experience underscores the prevalence of cyberbullying, which extends beyond direct harassment to include exposure to harmful or disturbing material that can cause emotional distress.

Mary described her digital challenges as,

> Some of the challenges of being online at home I think is you get easily distracted. For me, I felt like I was easily distracted. Because like, we are doing a lot of things. The other thing I can say is then the equipment that you are using, like you have to be working. Sometimes you have to be paying for the bills like if your parent has not paid enough to be able to access the services. And also you have to ensure the maintenance like maybe like your laptops needs to be maintained and they have not. Also the other challenge, I think is time management. I find myself like sometimes you can do one activity and not be doing the other activity so the imbalance of time with how I'm doing my activities […] I have been having issues with balancing and also spending a lot of time in terms with no physical exercises.

Participants, furthermore, stated that their principal goal at home was to improve their digital skills (n = 5) via capital-enhancing activities and the primary requirement to enhance their digital experience was to have access to more resources (n = 4) and have better access (n = 1). Sara explained,

> I know sometimes there are some difficult assignments, you need to have someone to talk to. But when I have my brother and my dad, I'll be... I have more chances to have more information than I needed. […] So, they're able to have access to what you need.

In addition, another participant (Paul) expressed his concerns about his digital access as,

> [...] maybe proper connectivity without Internet connection interruptions... the Internet connection should be strong, should be stable [...] Also, the use of a laptop… I can say I should improve or advance from the one I'm using right now maybe to get an... get

> another laptop that's more advanced than this one, I would get another generation than this one I have.

To tackle their digital challenges, their parents, siblings, and friends supported them (n = 5) and some also watched YouTube videos to enhance their online experience at home (n = 2).

Digital Strengths at Home. They also elaborated on their digital strengths and competencies at home, highlighting their proficiency with various digital tools and demonstrating their skill sets in navigating digital platforms. Digital skills (n = 4) and cognitive dimension (n =1) were mentioned as participants' strengths. Productivity at comfort (cognitive dimension) was Mary's digital strength at home. Sofia described her strength as "When I'm online, I can get the necessary information, I need. So, information and guidelines for my assignments were given to me. I am able to apply it and get some reliable information to help me to study." Being tech-savvy helped David to keep himself updated about new trends in the digital world. Four out of five participants believed they had the skills to locate the necessary information for their assignments.

Digital Needs at Home. Digital needs highlight the actionable steps or interventions necessary to overcome the challenges identified and fulfill the requirements for effective digital integration, utilization, or advancement. Four out of five participants believed more training would enable them to improve their digital skills and merely one reported his access as his main need at home. David stated his needs at home as,

> I wanna say if there are platforms like, like videos to watch that find ourselves as a guideline, if there are videos that made available, teach basic instructions, and a platform that you can learn from easily. You can do that. And also, because my dad is not always around, so most of the times I, I try to watch some videos on YouTube to check to check

if I'm actually doing work. Actually, it's not a thing. If you can get an instructor to help you is more efficient.

Paul that “having a device that can support multiple tasks that there's no limit while doing a task.” And believed the quality of his access should be enhanced.

Table 11 provides a structured overview of digital challenges, strengths, and needs at home identified by participants in the study. Each category represents key aspects of the digital experiences of the participants, shedding light on areas requiring attention and improvement within the context of their educational journey.

Table 11

Digital Experience of Participants at Home

Digital Challenges	Digital Strength	Digital Needs
Online safety (n = 4) (Sofia, David, Paul, Sara)	Digital Skills (n = 4) (Sofia, David, Paul, Sara)	Training (n = 4) (Mary, Sofia, David, Sara)
Time management (n = 2) (Mary, Paul)	Cognitive Dimensions (n = 1) (Mary)	Digital Access (n = 1) (Paul)
Cognitive Dimensions (n = 1) (Mary)		
Digital Access (Due to Financial Restrictions) (n = 1) (Mary)		

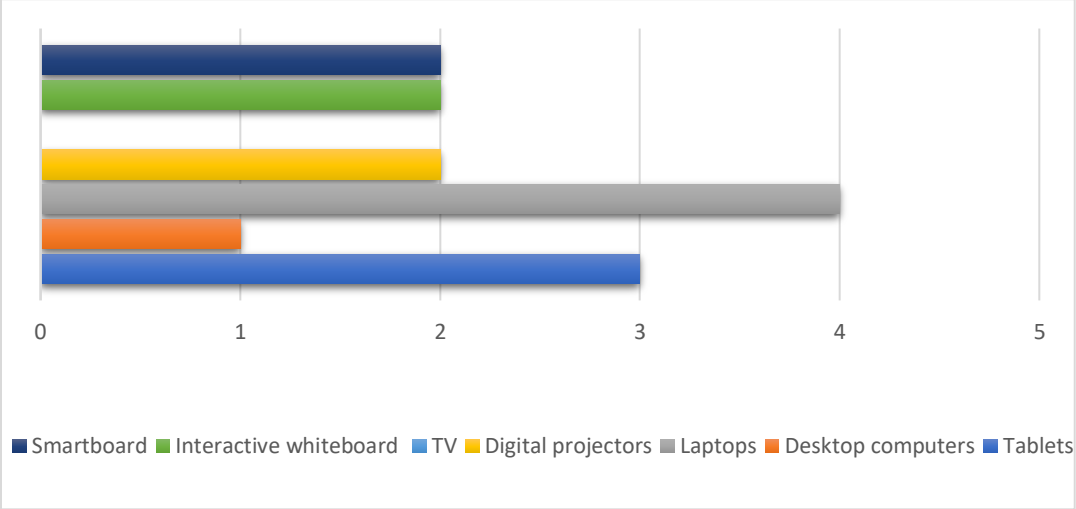
The online interviews conducted as part of the research provided valuable insights into various aspects of participants' digital experiences at home. Participants reported spending more time online during the pandemic, primarily engaging in entertainment activities and accessing

news. However, they faced challenges such as cyberbullying, distraction, and financial constraints related to digital access. Despite these challenges, participants demonstrated their strengths in their digital activities and proficiency in navigating digital platforms. They expressed a need for more training to enhance their digital skills and improve access to resources.

School Experience with Digital Technologies. In the second part of the interview questions, participants shared their digital experiences in school. Mary and Sofia could access the devices, but they had to share the available digital devices in the lab computers with their classmates. When the assignments were given, David, Paul, and Sara could access a device without sharing it with other classmates. Paul added, “Before the pandemic, we used to do that [share the devices] but after the pandemic, everyone should use a computer alone.” In order to be able to do the assignments, teachers gave the students guidelines and afterwards gave them their assignments to work in groups (n = 4). Teachers, peers, and technicians supported them to ameliorate their digital experience (n = 5). They reported their regular digital activities at school as coding (n = 2), editing (n = 3), designing (n = 2), and publishing (n = 1).

Figure 4

Digital Devices Available at School



Digital Challenges at School. Digital challenges at school refer to obstacles and difficulties encountered in integrating technology effectively into educational practices. Digital skills (n = 4), confidence (n = 3), and digital access (n = 4) were the challenges the participants faced at school. At the beginning of the school year, Mary was shy and did not have the confidence to contribute actively to her group and it was challenging for her to learn at the same pace as her group members. She also mentioned that the high ratio of students to computers at school labs limited her access to a device to practice. Sara explained,

> The challenge is the coding, because it is very hard to know about the coding, in fact be able to know about the coding, it's very, very long, the ... I have to put more effort and more work on how to know about, that was a very, very big challenge for me. And I was able to overcome it. […] I'd say sometimes, you know, it's the causes of traffic. Everybody's using the same internet at the time so in school, many people I know said it's slow, slow. Let's say if people... when in school there are more users there, there are always traffic when using the school Internet... when I'm at home there is no traffic we

> are just three or four our home by the TV and my parents are not home, in my class, so there's traffic.

The abovementioned digital challenges at school encompass various obstacles which can impede effective integration of technology into educational practices.

Digital Strengths at School. Participants mentioned digital skills (n = 3), access (n = 2), and confidence (n = 1) as digital strengths they can demonstrate or feel they can leverage to be successful at school. Interestingly, Mary cited her confidence as her strength since she improved her skills through regular practice and tried to learn from her peers and eventually, she felt she could participate with more confidence. Sara expressed her strength in accessing reliable information while at school. Paul recognized his digital skills as his strengths and stated, "[…] Despite not being confident in coding but I feel that I have strength in researching and getting more information to make sure that I get to understand anything that I don't get it well in the classroom."

Digital Needs at School. Digital needs encompass the specific requirements and resources necessary to overcome participants' challenges and enhance their digital literacy and learning outcomes. To enhance their digital experience at school, participants mentioned digital access (n = 4) and availability of digital support (n = 2) as their needs. Sara commented on the Internet speed and number of users using the same Internet connection and stated,

> If we're able to get a very strong and faster Internet connection at school, there will be no traffic there. Everybody will be able to do their work. I think everything will be perfect. Okay. I'll be able to accomplish our work.

Paul also mentioned that having suitable devices that facilitate learning and streamline the learning process, along with supportive educators and technicians who encourage students, guide

them effectively, and furnish all necessary information for their learning could enhance their digital experience better. Additionally, ensuring students have access to ample learning materials necessary for their education could be beneficial. Exploration of digital needs at school uncovers the specific requirements and resources necessary to address challenges encountered by newcomer youth in educational settings.

Table 12 serves as a concise yet comprehensive tool for delineating the digital challenges, strengths, and needs encountered by participants in their school experiences. It provides a structured overview of key aspects of their digital journey, facilitating analysis and identification of areas requiring attention and support.

Table 12

Digital Experience of Participants at School

Digital Challenges	Digital Strength	Digital Needs
Digital Skills (n = 4) (Mary, Sofia, Paul, Sara)	Digital Skills (n = 3) (Sofia, David, Paul)	Digital Access (n = 4) (Mary, David, Paul, Sara)
Confidence (n = 3) (Mary, Sofia, Paul)	Confidence (n = 1) (Mary)	Availability of Digital Support (n = 2) (Sofia, Paul)
Digital Access (n = 4) (Mary, David, Paul, Sara)	Digital Access (n = 2) (Sara, David)	

The interviews conducted with participants provided valuable insights into their digital experiences within the school environment. Participants shared their access to digital devices and

the challenges they faced in integrating technology into their educational practices. While some reported difficulties with digital skills, confidence, and access, others highlighted their strengths in these areas. Additionally, participants identified specific needs, such as improved internet connectivity and access to digital support, to enhance their digital learning experience. Overall, these findings raised questions about how the digital challenges reported by these ELL newcomer students might be addressed at school and through supports to families. Finding suggested that additional supports to facilitate students' digital literacy development and educational success in school may be needed.

Language. Most participants (n = 4) believed their language proficiency had influenced their digital experience. Paul explained,

> I can say proficiency in language can impact your digital experience. [...] In the beginning, it was not that easy for me. Just because I was mainly used to my first language Swahili and Swahili is not that mostly used in the digital world. So, mostly on the Internet, you find the language used is English. So, it really impacted my desire to know to explore digital ... being a digital person, so I feel like English... language proficiency matters a lot.

He also added language proficiency impacted his confidence in learning new skills in the classroom.

> Because once in that situation, you feel uncomfortable, mainly because of the language barrier, you're not confident Maybe you feel like if you say some the others will find it, they'll see like, maybe you [often think it is bad] how the school view you will giving out your opinion, maybe will not say it well. Yeah. So, you sometimes even fail to ask a question just because you don't want to… you don't want them to know what you're

> going through, or maybe about your situation. So, just keep quiet and just assume that you understand everything.

During the interview, participants were asked to reflect on whether their level of language proficiency, their digital skills, or their confidence presented greater challenges to their digital experiences as newcomers. Mary believed her digital skill (n = 1) was challenging while the other four participants considered language proficiency as a challenge in the digital lives of newcomers including themselves. Mary's level of language acted as a barrier to keeping up with her classmates at the beginning.

> I think it affected me like […] because you're learning and others are at the far end. You really have to go slow on yourself, to reflect, to go step by step and maybe I was not able to catch up with others at first. Because I feel like, for them it was so easy, maybe even like maybe during a classroom, so easy for them to grab and move on. So, for me, you are struggling with the language. So, I think that can be a challenge to keep up with them.

More resources (n = 5) such as online courses, teachers, institutions, and community support (n = 1) were mentioned by participants that could assist to improve the language proficiency of newcomers. Participants also thought using some translation (n = 2) could assist the newcomers in developing their skills faster. Sofia explained, "Sometimes you don't understand the teacher, so translating for the students enables them to understand the language."

In Table 13, I present a summary of participants' insights about the way that their language proficiency interacts with their digital experience, along with students' own insights about what they need, to improve language skills.

Table 13

Participants' Language Proficiency and Digital Inequities Based on Interviews

Participants	Most influential Factor on Participant Digital Experience	Identified Needs by Participants to Support Newcomers
Mary	Digital skills	More teachers, Community support
Sofia	Language Proficiency	Language institutions that cost less, Online courses, Use of Translation
David	Language Proficiency	Video clips, More resources
Paul	Language Proficiency	Language Institutions, Teachers
Sara	Language Proficiency	More courses, Use of Translation

Collectively, participants' responses pointed to a need for providing more opportunities for ELL newcomer youth to enhance their digital experience at home and at school. The majority of participants (n = 4) expressed considerable concerns about their online safety and being bullied. Four participants indicated their digital skills as their strength at home and three mentioned it as a strength at school during the interviews. However, they acknowledged that more training is required to advance their digital competence. One participant mentioned financial restriction as an obstacle to not improving her digital skills at home. Most participants denoted language proficiency as a high priority in their digital experience. Four out of five participants mentioned their language proficiency negatively impacted the development of their digital skills and they did not feel confident to inquire for more clarification and information in their classroom (see Appendix I for a summary of all codes and themes constructed during this phase of analysis).

Integrated Findings: Quantitative and Qualitative Analyses

To integrate the quantitative and qualitative results effectively, the study employed a sequential mixed-methods approach. Initially, quantitative data from the 2020 Canadian Internet Use Survey (CIUS) provided a broad, national perspective on digital access, skills, and capital-enhancing activities among immigrants and non-immigrants as well as youth aged 15 to 24 and other age groups aged 25 and older. This data was analyzed to identify patterns and trends, such as differences in digital access between age groups and between immigrant and non-immigrant populations. Following this, qualitative data were collected through surveys and interviews with 5 ELL newcomer youths to gain deeper insights into their personal digital experiences and challenges. The qualitative analysis focused on themes related to digital skills, empowerment, and barriers to advanced digital activities. The integration of these results involved comparing and contrasting quantitative trends with qualitative findings to identify correlations and discrepancies. This mixed-methods approach allowed for a more comprehensive understanding of digital equity by combining numerical data with nuanced personal narratives, ultimately providing a richer and more detailed picture of the digital experiences of ELL newcomer youths.

The results of the interviews and surveys were consistent with the findings from the first phase of the research. ELL newcomer youth, similar to immigrant and youth respondents of the 2020 CIUS, had access to a variety of digital resources and performed various digital activities. The five ELL newcomer youth in this study predominantly reported engaging in activities that required basic digital knowledge at home. This aligns with the 2020 CIUS findings, which indicated that a low percentage of national survey respondents engaged in activities demanding advanced digital skills, such as coding or using spreadsheets.

This could show the importance of the underlying issues that impacted the experience of Internet users in the digital realm. Youth who participated in the second phase of this research study affirmed that other aspects such as their language proficiency were closely linked to their digital experiences. The detailed descriptions of their digital experiences at home and at school enabled me to explore the critical issues that ELL newcomer youth encounter that could not emerge through surveys. The mixed-method design of this study allowed for the integration of quantitative data from the CIUS with qualitative insights from the interviews and surveys. This integration was essential to validate and deepen the understanding of patterns and trends observed in the initial phase, providing a more holistic view of digital equity among ELL newcomer youth. In the discussion chapter, I provide detailed descriptions of the trends that I discovered in my research and situate these findings in relation to the scholarship on digital equity in Canada.

Chapter 5: Discussion

This study was framed by three research questions: 1) Do immigrants to Canada use digital tools and systems differently compared to survey respondents born in Canada? 2) Do youth aged 15 to 24 use digital tools and systems differently in comparison to other age groups? 3) Through brief surveys and interviews with ELL newcomer youth, what can be learned about the ways that access, skill, and empowerment (via capital-enhancing activities) affect their use of digital tools and systems at home and at school? Together, results from the CIUS survey data analyses, coupled with interview and survey data by five newcomer youth who are learning English as an additional language, provide a nuanced picture of the digital access and digital activities of adolescent and young adult immigrants to Canada. As a mixed-methods research study, I conducted the CIUS analyses first and used those insights to inform the surveys and interviews that I then conducted with five ELL newcomer youth. In the discussion, I integrate qualitative insights from survey data and interviews with five ELL newcomer youth with the CIUS analyses to provide insights on immigrants' experiences, and youth experiences. Finally, and holding the larger trends about immigrants and youth in mind, I focus on the unique insights derived from qualitative analyses of the digital experiences of ELL newcomer youth experiences in Canada.

Immigrants' Use of Digital Technologies

In this study, the use of digital technologies and systems was informed by the conceptual framing of digital equity. In the quantitative analyses of the CIUS data, index scores were created based on items that aligned with the three conceptual dimensions of equity: access, skill and empowerment (through capital-enhancing activities). As reported in Chapter 4, between-groups ANOVA comparing immigrants to Canada with non-immigrants showed that there is a

statistically significant difference ($p < .001$, $\eta^2 = .011$) with immigrants reporting more access to the Internet and digital systems than survey respondents born in Canada. Similarly, immigrants to Canada reported more skilled use of the Internet. When compared with non-immigrants on the skills index score, ANOVA also revealed statistically significant differences ($p < .001$, $\eta^2 = .005$). On the measure of empowered use through capital-enhancing activities, immigrants also had higher scores ($p < .001$, $\eta^2 = .010$). Although effect sizes were small in each case of comparison, the measured differences in favor of immigrants are an important development in our collective understanding of immigration as a predictor of digital (in)equity.

Previous research has shown that immigrants/newcomers to Canada have had less access and have been less digitally skilled than non-immigrant Canadians (Haight et al., 2014; Robison & Crenshaw, 2010). Access to technology and digital resources can be a determining factor in a person's ability to succeed in today's society (Sedivy-Benton, 2016; Soomro et al., 2020). In the US context, Ono and Zavodny's (2008) study of the Current Population Survey and the 2000 US Census revealed that immigrants had lower rates of computer ownership and Internet access compared to those born there. In Canada, research by Haight and coauthors (2014) based on the 2010 CIUS examined disparities in Internet access and online engagement among individuals. Their findings revealed that recent immigrants to Canada experience lower rates of Internet access. Importantly, the findings of my research study align with a recent study by Jasiak et al. (2023), which also utilized the 2020 CIUS dataset. Their team found that, on an index measure of digital literacy that they composed from 10 items on the survey, landed immigrants have slightly higher digital literacy scores than non-landed immigrants. Although their index and my index scores differed and our studies had different purposes, our findings about immigrants being advantaged are similar.

Access to digital tools and the Internet is crucial for everyone to realize their full potential and participate in society. However, it's not enough to simply have access to high-speed Internet (Makinen, 2006). Being digitally literate is a valuable asset and indeed essential for individuals to develop their relevant skills, strategies, social practices, and mindsets and take advantage of economic, social, and political opportunities (Hagerman, 2017; Hartman et al., 2018; Leu et al., 2017; Marsh, 2019; Sánchez & Ensor, 2020; The New London Group, 1996). Due to these reasons, digital literacies should be considered a fundamental right for all technology users (Brisson-Boivin & McAleese, 2021). Some online activities can make users feel empowered as digital agents who can change or reform economic, political, social, and cultural challenges, make informed decisions, and provide solutions that can bridge the gaps (Garcia et al., 2015; Selwyn & Facer, 2010). Findings from multiple studies conducted in countries such as the US and Canada have shown that individuals from less privileged backgrounds are less likely to use the Internet and even when they do go online, they tend to engage in fewer capital-enhancing activities compared to their more privileged counterparts (Haight et al., 2014; Hargittai & Hinnant, 2008; Hassani, 2006; Ono & Zavodny, 2008; Zillien & Hargittai, 2009). For immigrants who face barriers to digital access such as language barriers (Idris, 2016; Mensah et al., 2018; Ono & Zavodny, 2008), lack of familiarity with technology (Alam & Imran, 2015; Choi et al., 2014; Haight et al., 2014), and financial constraints (Alam & Imran, 2015; Yu et al., 2018), opportunities to access and use the Internet can be limited (De Coninck et al., 2023). In turn, they may also struggle to find employment, access healthcare, or participate fully in the new society (Haight et al., 2014; Howard et al., 2010; Mersereau, 2020). In developed global economies, immigration has been a predictor of digital access and use inequities (Bracewell et al., 2021; Haight et al., 2014).

Quantitative results from the current study show that the story of Internet use, of digital skills and the capacity to use the Internet for capital-enhancing purposes by immigrants to Canada may be changing. Qualitative analyses also show that immigrants are actively involved in a range of digital activities while also seeking to develop multiple forms of capital, such as economic, cultural, social, and digital, resulting in positive outcomes. All participants mentioned that they have been actively working to enhance their skills. For instance, initially, Mary felt hesitant and shy about her Internet skills, fearing she might appear inexperienced to others. She often attended group sessions without actively participating. Over time, however, she gained confidence and gradually improved her skills. Capital-enhancing activities entail dedicating time and effort to acquiring knowledge and skills that foster individuals' growth and achievement (Ragnedda, 2017, 2018; Ventrella & Cotnam-Kappel, 2023). These findings align with findings reported in Australia by Chiswick and Miller (2007). Their study demonstrated that immigrants were more inclined to use computers than native-born individuals. This alignment may be attributed to the similarity in immigration admission criteria between Canada and Australia, where immigrants are ranked for eligibility based on the skills they bring, including technical skills (Caidi & Allard, 2005; Ono & Zavodny, 2008). From 2016 to 2021, just over 1.3 million new immigrants settled permanently in Canada and the economic immigration class (e.g., skilled workers, people in the business sector) accounted for about 62% of all admissions in 2021 (Immigration, Refugees and Citizenship Canada, 2022). Haight and colleagues (2014) argue that the level of online activities by recent immigrants who are online is significantly higher. These authors added this could be a result of Canada's official criteria for entering the country and the immigrants'/newcomers' need to stay connected with their families in their home countries. Given the continued recruitment of highly-skilled immigrants to Canada since the publication of

Haight et al.'s 2014 paper, the current analysis may reflect a broadening set of reasons for Internet use among immigrants to Canada. More research to explain the underlying mechanisms for these observed differences is needed.

Although there is a broad trend of higher levels of access, skill and empowered use (through capital enhancing activities) among immigrants to Canada, qualitative analyses of surveys and interviews conducted with five ELL newcomers aged 16-17 indicate that language of Internet use presents unique challenges for bi/multilingual immigrant youth in terms of their capacity to access and use digital information. Given that the Internet is mostly in English, students reported trying to use English to navigate the Internet. As ELLs, however, English poses a challenge as they navigate digital environments. So, although the trend of more empowered use may be true for Immigrants to Canada, the CIUS-based results do not capture the unique and nuanced experiences of ELL newcomers, who may not yet be able to access, use and leverage digital tools to their full advantage. Further exploration is needed to understand the unique challenges and needs of recently arrived newcomers who are also learning English.

Youth Use of Digital Technologies

This research study also considered the age of the participants as a factor that can impact the digital experience of Internet users (Haight et al., 2014). Youth are growing up in a world that is increasingly digital and studies have indicated that younger people are significantly more likely to be online more often than older people (Haight et al., 2014; Hale et al., 2010; Hargittai & Hinnant, 2008; Wavrock et al., 2021). The findings of this study were consistent with the data gathered from previous research. ANOVA of the digital access index score indicated a statistically significant difference between youth (aged 15 to 24) and older age groups (25 and above), with youth demonstrating higher rates ($p < .001$, $\eta^2 = .007$). When assessing digital

skills, youth outperformed other age groups, as evidenced by a significant difference in skills index scores ($p < .001$, $\eta^2 = .012$). Additionally, youth exhibited greater engagement in capital-enhancing activities, reflecting a more empowered use of the Internet compared to their older counterparts ($p < .001$, $\eta^2 = .002$). Although the effect sizes are small, these results suggest that youth are actively online and engaging in a broader range of digital activities compared to older participants to advance the social, educational, and financial dimensions of their lives (Livingstone, 2010; Pangrazio, 2019; Pawluczuk et al., 2020).

More opportunities to be online may increase opportunities to practice information-seeking skills, or to gain new knowledge that may lead to success at school and beyond (De Coninck et al., 2023; Warschauer et al., 2004; Wavrock et al., 2021). Based on the CIUS data, youth had access to multiple digital devices and were able to be online from various locations. According to Donner and colleagues (2011), the availability and usage of multiple devices could enhance and diversify one's Internet experience. Improved access to digital resources could provide young people with increased learning opportunities, enabling them to become more confident and proficient in using technology. However, increased connectivity and access come with potential drawbacks, especially when it leads to excessive use of social media. As we continue to think about what empowered use means for all youth, more research is needed to understand the intersectional dimensions of empowerment for non-white racialized youth in Canada. Recent findings by MediaSmarts (2023) have shown that non-white racialized youth do experience online meanness more often. In the qualitative interviews with ELL newcomer youth aged 16-17, several concerns related to online safety and cyberbullying were raised. Participants expressed concerns about discrimination or biases they encountered while they were navigating online spaces because of their skin color. These insights shed light on the additional layers of

complexity these youth face when considering online safety, intertwining it with issues of racial and ethnic identity. Research suggests that social media provide broader opportunities for social interaction but also introduce challenges such as cyberbullying and identity issues (Pawluczuk et al., 2020). Excessive social media use could be associated with higher rates of depression and anxiety in young adults (Smith et al., 2021). Therefore, while social media has its advantages, thoughtful and intentional use is crucial to minimize its negative effects (Livingstone et al., 2023; Pawluczuk et al., 2020; Smith et al., 2021).

Given the nuanced landscape of digital engagement among youth and immigrants, the following sections delve deeper into the specific experiences and challenges faced by ELL newcomer youth, shedding light on their digital experiences.

ELL Newcomer Youth Use of Digital Technologies

Findings captured from the 2020 CIUS suggested that immigrants and youth had more access to the Internet and digital tools and used it for a diverse array of purposes requiring advanced digital skills compared to non-immigrants and older respondents. Immigrants in this survey include anyone who has ever had the status of “landed immigrant” but of course, this means there were likely people who had lived in Canada for many years and some who had been in Canada for a short time. The immigrant/non-immigrant division provides us with an understanding of broad trends, but within the immigrant group, there is a great deal of variability not captured. Newcomer youth are a subgroup of immigrants whose experiences are not sufficiently documented. Although there was a small group of immigrant youth identified during my analyses of the dataset, it was impossible to report my analyses due to ORDC restrictions. These restrictions are based on the requirement to minimize the risk of identification when the number of participants was below the threshold of 15.

Through a qualitative lens, the conversations with five ELL newcomer youth illuminated nuanced insights into their digital engagement. For instance, participants' descriptions of their regular digital activities at home and schools shed light on their access to digital devices and internet connectivity. ELL newcomer youth stated that they all had access to stable and high-speed Internet at home. A wide range of digital tools were available to participants at home and at school, although there were reported differences. Four Participants (Sofia, David, Sara, and Paul) highlighted challenges such as limited access to devices and websites or slower internet speeds at schools. This highlights the importance of considering not only access to digital tools but also the quality of that access, echoing the multifaceted nature of digital inequities outlined in the theoretical framework (DiMaggio et al., 2004). The diverse experiences of ELL newcomers at schools suggest that there may not be resources or programs specifically tailored to ELLs in their schools. Although the CIUS survey indicated that immigrants and young people have access to digital resources, the interviews provide a more nuanced portrait of what access looks like for newcomer youth. The experiences of these ELL newcomers who all attend urban schools echo concerns reported by elementary teachers working in rural contexts in Ontario (Hagerman & Neisary, 2024). Issues of access related to the provision of devices, and stability of Internet use seem to occur in urban schools as well. The lack of access or guidance on tool usage underscores challenges faced by digitally marginalized students across different educational settings (Hagerman & Neisary, 2024), and raises important questions about how resources are being invested to support those who are transitioning to life in Canada, learning a new language and who might benefit from targeted digital supports in school. More research focused on the scope and the systemic response to the issue of digital marginalization of urban, newcomer ELL youth in schools is needed.

Interview data corroborated the findings of the 2020 CIUS demonstrating that ELL newcomer youth performed a wide range of activities using various digital technologies for various purposes at home and schools. This highlights their active participation in digitally mediated spaces for varied purposes and demonstrates their proficiency in navigating digital platforms and tools (Marsh, 2019). These findings signal a departure from previous notions of youth as passive consumers of digital technology, instead positioning them as key agents of digital change (Pawluczuk et al., 2020). However, interviews revealed that these participants were mainly engaged in more advanced digital activities at school (e.g., editing, coding) and when they were invited to describe their regular digital activities at home, most participants engaged in basic digital activities such as searching and accessing information, watching online content, and scrolling through social media. Only one participant (David) engaged in activities that required more advanced digital knowledge such as creating and sharing self-created content online at home. Previous research suggests that youth primarily use technology for social and entertainment purposes outside of school (Becker, 2000; Dolan, 2016; Roberts & Foehr, 2008; Smahel et al., 2020) and the results of the second phase of this study align with these findings. Noguerón-Liu (2017) argued that the pattern of home-school Internet use and access of immigrant/newcomer youth could vary depending on their prior technology exposure and instructions in their home countries as well as their family's digital literacy, beliefs, and engagement.

Digital confidence was mentioned as a challenge for Mary, Sofia, and Paul, which seemed to limit their engagement in digital capital-enhancing activities. A number of studies (Carrington et al., 2007; Kim & Searle, 2017; Mitra & Serriere, 2012) have demonstrated that digital capital-enhancing activities could contribute to students' more active engagement in

productive educational experiences and school improvement. A closer examination of the 2020 CIUS results also revealed that despite the high rate of access to diverse digital resources among youth and immigrants which could offer new opportunities to advance their skills and become co-creators of information, relatively few survey respondents in these two groups have been taking advantage of these opportunities to engage in capital-enhancing activities. The rates of all capital-enhancing activities for both youth and immigrants were higher than other age groups and non-immigrants, however, the digital capital-enhancing activities chiefly had low rates among all activities that were performed online by all respondents of the 2020 CIUS even for immigrants and youth. Although some activities such as checking emails are prevalent, some activities such as seeking political or government information online, e-learning, exploring job opportunities, or consulting information about financial and health services that can lead to more social connectivity and civic participation are less widespread (Hargittai & Hsieh, 2013; Hargittai & Hinnant, 2008; Zillian & Hargittai, 2009; Wavrock et al., 2021). Participating in capital-enhancing activities can raise individuals' confidence to participate, express their voice, and continuously learn, create, and grow (Cook-Sather, 2014; Hargittai, 2010; Hargittai & Hinnant, 2008, Smith, 2015; Yuan et al., 2019; Wavrock et al., 2021).

The subsequent section focuses on revealing the unique factors influencing ELL newcomer youth's digital lives. Building on the foundation of evidence discussed to this point, the distinct challenges and opportunities that shape their digital experiences are examined next.

Underlying Dynamics in ELL Newcomer Youth Digital Experiences

In addition to the frameworks of digital inequities and access, skills, and capital-enhancing activities, this study incorporates the perspective of critical pragmatism. Critical pragmatism offers a nuanced understanding of digital inequities and their impact on marginalized

groups, such as newcomer youth. Rooted in pragmatism and critical theory, this approach recognizes the interconnectedness of social, cultural, and technological factors, enabling a holistic examination of power dynamics and social transformation in digital contexts (Frega, 2014; Johnson & Onwuegbuzie, 2004). Through this lens, the study moves beyond surface-level observations of digital disparities to uncover underlying social structures perpetuating inequity (Frega, 2014; Zimmermann, 2018). It highlights how factors like socioeconomic status, linguistic background, and systemic discrimination shape digital access, skills, and capital-enhancing activities for newcomer youth (De Coninck et al., 2023; Gallagher et al., 2019). This approach deepens our understanding of the potential challenges and underlying dynamics shaping the digital experiences of ELL newcomer youth, revealing how their language proficiency and online safety issues are deeply intertwined with broader structural barriers, such as socioeconomic disparities and systemic discrimination.

Online Safety. Only through the interviews was it revealed that one factor limiting the online activities of the participants was their concern for online safety. During their online activities, Sofia, David, Paul, and Sara expressed concerns about their online safety. It should be noted that despite being randomly selected, all interview participants have black or brown skin. Their non-white racialization posed a serious risk for them while online. The participants were concerned about cyberbullying and they mentioned they needed to be cautious while using the Internet. They were skilled and had supports (e.g. friends, teachers, family members), therefore they knew how to get out of sticky situations. For instance, during the interviews, Sara described facing online bullying due to her race. However, she also mentioned receiving support from a friend who encouraged her to continue without worrying about negative comments. This aligns with findings by Livingstone and colleagues (2023) who described the paradox of being online.

More participation online does mean that students are exposed to more risk. However, this online activity also seems predictive of chances to become more digitally skilled. These skills may serve as a protective factor against online harms. In 2019, 25% of youth (1 in 4) aged 12 to 17 reported experiencing cyberbullying in the prior year of the study (Statistics Canada, 2023b). Findings of a study conducted by MediaSmarts (2023) on online meanness and cruelty revealed that 46% of racialized youth experienced cruelty compared to 35% of white youth. It is essential to recognize that the online experiences of Black youth, particularly those from immigrant backgrounds, can be further complicated by systemic inequities and racial discrimination (Mills & Godley, 2018). In the study conducted by Okwumabua and colleagues (2011), it was found that Black students exhibited positive attitudes towards utilizing computers, yet demonstrated low self-confidence and anxiety when engaging with online educational platforms. Research indicates that Black youth are disproportionately targeted for online harassment and face unique challenges related to identity-based discrimination in digital spaces (Hurley, 2016). Therefore, empowering these youth with comprehensive digital literacy skills should also include strategies to navigate and resist racial bias and discrimination online (Tichavakunda & Tierney, 2018). Concerns about online safety could be a critical reason why youth are not engaging with their full capacity on the Internet, particularly immigrant youth.

Digital tools have great potential to support immigrants/newcomers when adopted in more inclusive approaches and incorporate the perspectives and experiences of marginalized families (Noguerón-Liu, 2017). Studies (Edwards et al., 2017; Lee & Soep, 2016) have shown that equity-oriented integration of technology into family programs could help young people immigrants/newcomers develop skills in design and programming. Moreover, it empowers them to put these skills into action to achieve social justice goals. Thus, it is crucial to incorporate

digital literacies into the lives of immigrant/newcomer youth via multiple modes and channels that reflect their identities, cultures, and languages (Knobel & Lankshear, 2014; Marsh, 2019; The New London Group, 1996; Yuan et al., 2019).

To empower immigrant and newcomer youth through digital literacy, the significance of language proficiency surfaces as a pivotal factor in shaping their digital experiences. In the next section, the nuances of language proficiency that might limit the ELL newcomer youth from becoming active participants in the co-creation of knowledge alongside their native English speaker peers are examined.

Language Proficiency and Digital Equity. Language of Internet use matters. Language is "a complex and multifaceted system" that forms an integral part of people's lives (Yaman, 2015, p. 768). Language proficiency influences users' ability to navigate digital content, communicate effectively, and engage in diverse online activities (Darvin & Norton, 2015; Ono & Zavodny, 2008), particularly English which has become the most prevalent language on the Internet (Orlikowski, 2000; Yaman, 2015). According to several studies (Mensah et al., 2018; Idris, 2016; Mikal & Woodfield, 2015; Chen, 2010; Heisler, 2008; Yuan et al., 2019), an immigrant's ability to speak their host country's language impacts their likelihood of accessing and using online services. To better understand the Internet usage of ELL immigrant/newcomer youth, an analysis of language proficiency as a critical contributing factor to digital inequities is required (Alam & Imran, 2015).

The analysis of findings of the 2020 CIUS showed that immigrants and youth had better digital access, skills, and capital-enhancing activities than their counterparts. ELL newcomer youth's digital activities showed that they are connected and competent, but they do not feel secure and empowered to actively continue to develop their skills and confidence via capital-

enhancing activities. The low rates of advanced digital activities of the second-phase participants and their emphasis on the impact of their English language levels (n = 4) suggested that participants' language proficiency could be a critical implicit factor in widening the gap. Darvin and Norton's (2015) paper demonstrated how language proficiency shapes the digital engagement of language learners, revealing the influence of language on their ability to navigate various online and offline environments. Their framework sheds light on learners' interactions with power dynamics and their exercise of agency within language learning experiences. During the interviews, Sofia, David, Paul, and Sara confirmed that their language skills had affected their confidence in completing digital assignments compared to their Canadian classmates and hindered their competence to confidently participate in the digital space. David, the only participant who took part in any kind of digital capital-enhancing activity, and who had a blog, noted that language proficiency was the most challenging aspect for him and his primary goal was to improve his language proficiency so that he could better understand his teachers' instructions and operate digital devices and applications more efficiently.

For language learners, the Internet can be a source of access to knowledge in the target language. Online interactions can also enable language learners to develop digital skills situated in a linguistic environment they are working to understand (Godwin-Jones, 2015; Gonzalez-Acevedo, 2016; Kim & Searle, 2017). To become digitally literate, English language learners are required to develop a high level of digital skills, allowing them to use technology as a tool for "creative, productive, and lifelong learning, rather than just passive consumption" (Thomas, 2016, p. 18). At school, the integration of digital modes of representation, expression, and action can disrupt the power dynamics of mainstream language-speaking classrooms and enable language learners to take ownership of their learning by connecting their identities, cultures, and

language repertoires to the work they produce (Burke & Hardware, 2015; Faez, 2011; Rowland et al., 2014; The New London Group, 1996; Yuan et al., 2019). This approach empowers students to become both media producers and critical viewers, while also creating opportunities for them to improve their English proficiency and self-identity in a collaborative, culturally inclusive learning environment (McClanahan, 2014; Omerbašić, 2015; Yuan et al., 2019). Communication and participation with confidence provide opportunities for ELL newcomer youth to express their voice and share their work and ideas across networked spaces. Student voice involves incorporating youth perspectives into digital technology spaces and to make educational experiences more equitable for diverse learners (Caidi & Allard, 2005; Kim & Searle, 2017; Rowland et al., 2014; Yuan et al., 2019). The inclusion of students' voices can expand their "presence, participation, and power" (Cook-Sather, 2014, p. 132) and lead to feelings of "agency, belonging, and competence" (Mitra & Serriere, 2012, p. 745).

To address the unique needs of ELL students, tailored programs are essential. These programs should integrate language pedagogy and multiliteracies to foster an understanding of diversity and sensitivity to ELLs' learning experiences (Taber, 2017). Through the intentional use of digital tools, educators can create inclusive learning environments that cater to the linguistic strengths and profiles of newcomer ELLs, facilitating their academic success and integration into Canadian society. There is a need for more research and action to narrow the digital inequities between ELLs and their native English-speaking peers.

Digital Literacies for All

Approximately all 2020 CIUS respondents had access to the Internet and a wide range of digital tools from various locations. However, the overall rates of selected digital activities which required more advanced digital activities were low for all groups, indicating that individuals are

online, but are not necessarily engaged in activities that can enhance their digital competence and confidence. For instance, the analysis of the results of the 2020 CIUS showed that a relatively small percentage of respondents engaged in activities such as uploading self-created content on sharing websites, blogs, or personal websites. A low percentage of participants used software to edit photos, video or audio files, and created presentations or documents with text, pictures, tables, or charts. The highest reported activities were entertainment-related activities such as instant messaging, social networking, and listening to music. Additionally, a small percentage of participants communicated with government organizations through email or social networking, and the rate of informal learning or training was low. This was also evident in the interviews and surveys with ELL newcomer youth in the second phase of the study. Most of the activities reported during the interviews also required basic digital knowledge such as using social media, messaging apps, and making video calls.

Adults who find it challenging to adopt new technologies in their literacy, numeracy, and problem-solving skills are at a greater risk of being left behind (OECD, 2019). This highlights that having a limited range of digital skills can lead to significant repercussions for individuals and society at large and can hinder individuals' ability to fully participate in today's increasingly digital society. People who lack digital skills may struggle to find employment and access critical information and services online as well as government resources. Limited knowledge of capital-enhancing activities may hinder one’s ability to fully use the Internet (Hargittai, 2010; Hargittai & Hinnant, 2008, Yuan et al., 2019). Relatively infrequent engagement in capital-enhancing activities by all participants of the first and second phases of the study, despite high rates of access, suggests a potential gap in utilizing digital resources effectively for skill and capital-enhancing activities (Hadziristic, 2017; OECD, 2019; MediaSmarts, 2023). This

discrepancy warrants closer examination to understand the underlying factors influencing this trend.

Advancing Digital Equity in Canada: Implications of This Study

The CIUS was developed for a range of reasons by Statistics Canada and was not designed specifically to align with a theoretical framing of digital equity. Although the data generated by the CIUS program at Statistics Canada does provide for an extremely important and useful nationally representative portrait of Internet Use, a new and validated instrumentation that centers on dimensions of digital equity, and includes items that would permit measurement of access, skill and empowered use of digital systems through capital enhancing activities would enable those interested in digital equity research in Canada to operationalize concepts and to advance research grounded in data that captures the constructs of interest to the field.

As noted above, there is a need to develop more inclusive resources, provide safe spaces for all young Canadians to participate in the creation of knowledge, and empower them as active and informed digital citizens (MediaSmarts, 2023). This involves the implementation of comprehensive digital literacy programs that consider the diverse linguistic and cultural backgrounds of all Canadians including immigrants/newcomers and youth (Knobel & Lankshear, 2014; Marsh, 2019; The New London Group, 1996). Teacher training and supports are also necessary for students because educators play a key role in effectively integrating technology into educational programs and fostering the digital literacy skills that go beyond the social and entertainment purposes that are common outside of school (Blackwell et al., 2014; Leu et al., 2015; Ritzhaupt et al., 2013). Furthermore, equity-oriented integration of technology is necessary to support the development of digital skills among immigrant and newcomer youth (Noguerón-Liu, 2017; Edwards et al., 2017; Lee & Soep, 2016). This can empower them to engage in more

enhanced activities such as designing, programming, and social justice advocacy through digital platforms (Mills, 2015; Yuan et al., 2019), allowing ELL newcomers in particular, to express their perspectives on important issues. Additionally, efforts should be made to increase access to multilingual digital resources and create inclusive learning environments that cater to the linguistic strengths and profiles of ELLs (Taber, 2017).

Findings also suggest that there is a need for policy at the provincial and federal levels that will specifically address dimensions of digital inequity for those who are most at risk of digital marginalization, and that would promote digital inclusion among immigrant and newcomer youth. Policy initiatives could include increased funding for digital literacy programs, improvement of access to technology infrastructure, and support for language acquisition programs for ELLs (Mitra & Serriere, 2012). Advocating for policy changes requires collaboration across sectors, including policymakers, educators, community organizations, and researchers (Cummins, 1996; Kim & Searle, 2017).

Limitations and Future Research

As a novice researcher, I encountered several challenges in my research study. In particular, this study focused on ELL newcomer youth, but ORDC did not allow the publication of data pertinent to this population due to the low number of immigrant/newcomer youth participants in the 2020 CIUS. Given that it was impossible to run Confirmatory Factor Analysis (CFA) in SPSS with dichotomous variables, access to another application was required, which was not available to me through ORDC at the time. It is recommended to conduct CFA in future research. In my next step to recruit participants, organizations that served newcomers did not reply to my emails, so I had to recruit all of the participants via social media which restricted the potential participants who had no access to social media, particularly LinkedIn, the platform on

which I disseminated my recruitment poster. Furthermore, it is essential to acknowledge constraints encountered during the analysis phase. The ORDC imposed restrictions on the release of results for the ANOVA test with and without outliers. This limitation stemmed from the low number of participants identified as outliers, thereby rendering it impossible to disclose these specific results. I worked closely with my advisor to identify alternative methods and approaches that could still yield meaningful results within the constraints. I tried to be creative and adaptable to overcome these obstacles and produce research that contributes to the academic community. The pandemic significantly impacted my research study and my data collection. Although this study shed light on the various aspects of immigrant/newcomer youth's digital access, skills, and empowerment, there were several limitations and areas for future research.

In future research, expanding the sample size for national interviews would enhance the robustness of the findings. Additionally, further investigation is necessary to explore additional factors influencing digital inequities among language learners, newcomers, and youth, including aspects of their socioeconomic status, gender, ethnicity, and geographic location. Future research could benefit from incorporating longitudinal studies to track the digital experiences of immigrant/newcomer youth over time, providing valuable insights into the long-term effects of digital inequity and allowing for a deeper understanding of how these factors evolve over time.

Chapter 6: Conclusion

With the increasing integration of technology in almost every aspect of life, being connected and being proficient in digital spaces are valuable assets for accessing new opportunities (van Laar et al., 2017). To become digitally competent, individuals must have ample exposure and practice with the latest technological advancements (Rowsell et al., 2017). Being digitally savvy not only helps in personal growth but also in career development and staying ahead of the curve in this fast-paced digital age (Sedivy-Benton, 2016). As noted by Smith (2015), the digital inequities that exist worldwide impact numerous communities and hinder their opportunities for education, employment, and social inclusion.

The purpose of this study was to explore immigration and youth as predictors of digital access, skill, and empowerment and to describe dimensions of the digital life as experienced by young individuals who are new to Canada and are learning English as a second or additional language. Given Canada's current and historic reception of immigrants (Immigration, Refugees and Citizenship Canada, 2023), it also bears some responsibility for ensuring that immigrants/newcomers are effectively supported to become a part of Canadian society. Immigrants bring with them diverse experiences, skills, and knowledge, which can greatly benefit Canada's digital workforce. As a result, immigrants' inclusion can contribute to the growth and development of the country's digital economy (Alam & Imran, 2015; Caidi & Allard, 2005). However, immigrants/newcomers can also face language barriers and cultural differences which make it difficult for them to acquire digital skills or realize their full potential. These barriers can limit their opportunities and integration into society (Haight et al., 2014; Howard et al., 2010; Mersereau, 2020). As the future of Canadian society, the digital access, skills and empowered use of the Internet by young people were also considered in this study. With a dual

focus on immigrants and youth, the study adds depth to our understanding of digital equity in Canada.

As a newcomer myself, I understand the importance of digital access and skills in today's world. From language barriers to cultural differences, it can be difficult to feel fully at home in a new place. For newcomers, having access to digital resources and systems can be a crucial factor in their ability to succeed in their new home country. Whether it's finding job opportunities, connecting with others in their local community, or accessing important services, having reliable digital access can make all the difference (DiMaggio et al., 2004; van Deursen & van Dijk, 2015). Being proficient in technology not only helps ELL newcomer youth connect with loved ones back home but also opens up new opportunities for them to adapt to a new language and feel empowered and become confident members of the new society, particularly in the digital world (Burke & Hardware, 2015; Yuan et al., 2019).

Findings of this research contribute important new insights on national trends of Internet access, skill and empowered use for immigrants and young people, while also adding to our collective understandings of the complexities of digital life for newly arrived young people who are learning English. The mixed methodological design provides both macro and micro-level perspectives that when taken together tell a story of important progress nuanced with the need for a critical focus on those who may be most digitally marginalized.

Findings from the first phase of the study revealed immigrant respondents of the 2020 CIUS had higher rates of digital access, skills, and capital-enhancing activities compared to their non-immigrant counterparts. This marks a significant advancement in Internet access and usage among immigrants to Canada when compared to the findings of Haight et al. (2014) based on the 2010 CIUS, where immigration was considered a predictor of digital inequity. Unlike the

previous study, which highlighted immigration as a factor contributing to digital disparities, my research suggests notable progress in digital access and utilization among immigrants. In response to the second research question, the study examined inequities in the utilization of digital tools and systems between youth aged 15 to 24 and other age groups within the nationally representative survey. The analysis incorporated relevant variables from the 2020 CIUS concerning digital access, skills, and capital-enhancing activities. Findings indicated that youth aged 15 to 24 demonstrated higher rates of digital access, skills, and engagement in capital-enhancing activities compared to older age groups (aged 25 and older). The Internet and digital tools were available to immigrants and youth with high quality which resulted in more opportunities to enhance their digital competencies and feel more confident to perform diverse digital activities. That said, the low rates of capital-enhancing activities and items focused on advances digital activities suggested that Canadians, including those who identify as immigrants and who are younger, may not feel empowered to engage in advanced digital activities.

The second phase of the study also drew on unique data about ELL newcomer youth in Canada who are attending high schools (aged 15 to 18) to ascertain nuances in their digital access, skills, and empowerment. Results suggested that they all had access to the Internet and digital tools and performed diverse activities. However, the findings of this phase indicated that despite the abundance of opportunities to improve their digital skills via capital-enhancing activities, participants tend to limit their Internet usage to activities that require basic digital knowledge at home. The low rates of advanced digital activities, coupled with the second phase participants' emphasis on language proficiency, highlight the presence of underlying factors that shape their digital experience. The analysis of the interviews revealed that newcomer youth participants did not engage in more advanced digital activities due to the level of their language

proficiency and lack of online safety which impact their digital confidence and empowerment. Previous scholarship indicates that engaging in capital-enhancing activities could empower ELL newcomer youth to feel confident as learners, to contribute more to their classrooms, and to feel like digital agents capable of co-creation of knowledge (Kim & Searle, 2017; Yuan et al., 2019). Findings from the qualitative analyses suggest that schools in Ontario (the provincial context of all five participants' lives in Canada) may not yet be providing targeted supports for ELL newcomer youth that align with their digital needs. More research that examines the realities of digital access, skill development and the kinds of capital-enhancing activities encouraged or supported at school for newly arrived young people who are learning English as a second or additional language is urgently needed so that evidence-informed programs might be developed and implemented. The timing of these findings is well aligned with the recent release of a new Language curriculum in Ontario for Grades 1-8 (Ontario Ministry of Education, 2023) which will certainly be extended to the high-school grades. For the first time, this curriculum includes expectations for digital literacies instruction. As resources are invested in the provision of digital literacies instruction in Ontario, the findings from my study suggest that particular care should be given to the unique needs of ELL newcomers.

Policymakers play a crucial role in addressing digital inequities by crafting policies and initiatives that prioritize digital inclusion for immigrant and newcomer youth. Insights from this research can inform the development of targeted interventions aimed at reducing digital disparities and enhancing digital literacy among these populations. Policymakers can allocate resources to support access to digital infrastructure, provide funding for digital skills training programs, and implement policies that promote digital inclusion in educational settings and communities.

Educators also have a vital role in supporting immigrant and newcomer youth in their digital integration journey. They can leverage the findings of this study – including awareness of the ways that ELL newcomers with non-white racialized bodies experience risk and concerns for their safety – to design inclusive curricula that incorporate digital literacy skills development and provide tailored support to meet the unique needs of these students. Educators can integrate culturally responsive teaching practices, offer language support programs, and provide access to technology resources to ensure that immigrant and newcomer youth have equitable opportunities to succeed in the digital era, and also avoid harms while online.

Community leaders can collaborate with educational institutions and policymakers to create supportive environments that empower immigrant and newcomer youth to thrive in the digital spaces. They can establish mentorship programs, community centers, and outreach initiatives that provide additional support and resources for digital access and skill development. By fostering partnerships and grassroots initiatives, community leaders can amplify the voices of immigrant and newcomer youth and advocate for systemic changes that promote digital inclusion and social equity. Although the between-groups comparisons show that immigrants and young people do use the Internet in more skilled and empowering ways than non-immigrants and older Canadians, newcomer ELL youth are a special subset of these populations who are deserving of special focus, policy supports and opportunity.

Ultimately, addressing digital inequities among immigrant and newcomer youth is essential for promoting social equity and fostering their meaningful participation in Canadian society. It requires a concerted effort from policymakers, educators, community leaders, and advocacy groups to create an inclusive digital ecosystem that empowers all individuals to thrive in the digital age.

Notably, no similar research study has been undertaken in Canada in almost a decade, highlighting a substantial gap in the literature. This study, drawing from the 2020 CIUS data, stands as a critical contribution that provides an updated reference on the topics of Internet use by immigrants and youth. Contrary to Haight et al.'s 2014 paper, which relied on the 2010 CIUS data that found immigration to be a predictor of less access and lower skill, my study shows that immigration is a predictor of more digital access and more skilled use. This disparity underscores the evolving nature of Internet use in Canada, and the need for contemporary research to capture current realities accurately. This study provides fresh and nuanced insights of the gaps that are closing, and also those that remain.

To advance practices and policy, my study suggests several key areas of focus for actionable changes. Firstly, teacher training programs should incorporate modules on digital equity and culturally responsive pedagogy, enabling educators to better support ELL newcomer youth in navigating digital spaces. Curriculum development should prioritize digital literacy skills, ensuring that all students, regardless of their background, have the necessary competencies to thrive in a digital world. Additionally, schools should implement comprehensive anti-cyberbullying policies and provide resources for students facing online harassment, particularly those targeted due to their race or language proficiency. Policymakers should advocate for equitable access to digital resources in underserved communities, bridging the digital inequities and fostering an inclusive digital landscape. By addressing these areas, we can create a more equitable and supportive educational environment that empowers all students to succeed.

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Appendix A

Selected Questions from the 2020 CIUS

Digital Access

(1) AC_010A Do you have access to the Internet at home?
1: Yes
2: No

(2) AC_030 A Do you have access to the Internet through a mobile data plan for personal use?
1: Yes
2: No

(3) AC_050A During the past three months, have you used the Internet for personal use, from any location?
1: Yes
2: No

(4) AC_080F Did you access the Internet:
At home
1: Yes
2: No

Internet-connected devices (DV)
During the past three months, what devices did you use to access the Internet?
(5) DV_010A Did you use:
A smartphone
1: Yes
2: No

(6) DV_010B Did you use:
Laptop or netbook
1: Yes
2: No

(7) DV_010C Did you use:
Tablet
1: Yes
2: No

(8) DV_010D Did you use:
Desktop computer
1: Yes
2: No

Use of smartphone (SM)
(9) SM_010A Do you have a smartphone that you use for personal use?
1: Yes
2: No
9: DK

Digital Skills

Communication
During the past three months, which of the following activities, related to communication, have you done over the Internet?
(1) UI_010A Have you:
Sent and received emails
1: Yes
2: No

(2) UI_010B Have you:
Sent messages using an instant messaging app
1: Yes
2: No

(3) UI_010C Have you:
Used social networking websites or apps
1: Yes
2: No

(4) UI_010D Have you:
Made online voice calls or video calls
1: Yes
2: No

(5) UI_010F Have you:
Uploaded self-created content on sharing websites, a blog or a personal website
1: Yes
2: No

(6) UI_050H Have you:
Booked appointments
1: Yes
2: No

(7) GV_010H During the past 12 months, what activities did you perform on the Internet to interact with the government in Canada? Was it:
Communicated with a government organization by email or via social networking

1: Yes
2: No

Accessing information
During the past three months, which of the following activities, related to accessing information, have you done over the Internet?
(8) UI_020A Have you:
Accessed the news
1: Yes
2: No

(9) UI_020B Have you:
Found locations and directions
1: Yes
2: No

Entertainment
During the past three months, which of the following activities, related to entertaining activities, have you done over the Internet?
(10) UI_030A Have you:
Listened to music
1: Yes
2: No

(11) UI_030B Have you:
Listened to podcasts
1: Yes
2: No

(12) UI_040A Have you:
Watched video streaming services, excluding live television
1: Yes
2: No

(13) UI_040B Have you:
Watched content on video-sharing websites
1: Yes
2: No

(14) UI_050A Have you:
Played video games
1: Yes
2: No

E-commerce
(15) UI_050D Have you:

Conducted online banking
1: Yes
2: No

(16) UI_050K Have you:
Bought new or used goods on online bulletin boards
1: Yes
2: No

Training/education
(17) UI_050I Have you:
Checked schedules or registered for classes
1: Yes
2: No

Software skills
(18) DS_020A Have you:
Copied or moved files or folders
1: Yes
2: No

(19) DS_020B Have you:
Used word processing software
1: Yes
2: No

(20) DS_020C Have you:
Created presentations, or documents with text and pictures, tables or charts
1: Yes
2: No

(21) DS_020D Have you:
Used spreadsheet software basic functions
1: Yes
2: No

(22) DS_020F Have you:
Used software to edit photos, video or audio files
1: Yes
2: No

(23) DS_020G Have you:
Written code in a programming language
1: Yes
2: No

Internet skills
(24) DS_030A Have you:
Deleted your browser history
1: Yes
2: No

(25) DS_030B Have you:
Blocked emails, including junk mail and spam
1: Yes
2: No

(26) DS_030F Have you:
Downloaded files from the Internet to your computer or other devices
1: Yes
2: No

(27) DS_030G Have you:
Uploaded files or photos to an online data storage space
1: Yes
2: No

(28) SP_010A Have you:
Restricted or refused access to your geographical location
1: Yes
2: No

(29) SP_010D Have you:
Changed the privacy settings on accounts or apps to limit your profile or personal information
1: Yes
2: No

Device skills
(30) SP_070A Did you:
Enable automatic updates on your operating systems
1: Yes
2: No

Empowerment

Capital Enhancing Activities
During the past 12 months, which of the following learning activities have you taken to improve your skills relating to the use of computers, devices, software or applications? Select all that apply.
(1) DS_010A Have you taken:
Free online training or self-guided learning
1: Yes

2: No

(2) DS_010B Have you taken:
Instruction or help from friends or family
1: Yes
2: No

(3) DS_010C Have you taken:
Free training through community centers, senior centers or provided by public programs or organizations
1: Yes
2: No

(4) DS_010D Have you taken:
Training paid for by yourself or employer
1: Yes
2: No

(5) DS_010E Have you taken:
Other learning activity
1: Yes
2: No

(6) UI_050F Have you:
Taken informal training or learning
1: Yes
2: No

More advanced online activities

(7) UI_020C Have you:
Researched for information on health
1: Yes
2: No

(8) UI_020D Have you:
Researched for information about community events
1: Yes
2: No

(9) UI_050C Have you:
Searched for employment
1: Yes
2: No

Appendix B

Interview Questions

Thank you for agreeing to participate in this interview as part of my doctoral research study. First, you need to know that your participation in this research study is entirely voluntary. You can stop at any time for any reason. You can also ask me to skip questions that you would prefer not to answer, for any reason.

Second, in this research, I would like to focus on the English Language Learner (which I call ELLs for short) students who are new to Canada and have a full picture of the digital experiences they have, in part, because it can help schools to ensure that all students – including newcomer ELL students – receive the supports they need in learning to use the Internet and other digital tools for many different purposes, including school work and also advancement in the new country.

Approximate time: The interview should take between 45 minutes to one hour.

Just to remind you, these data are confidential. I will safeguard the digital files by storing them in my University of Ottawa One Drive. Neither your name nor the name of your school will ever be shared publicly.

You can select a pseudonym for yourself, or I will pick one for you later.

Do you have any questions about the study before we begin the interview?

Before I begin recording, I need to ask whether you agree to allow me to record this conversation. You can respond by saying yes or no.

Thank you.

1. To get started, could you tell me a little bit about yourself? Which city/town and province do you live in?

   City/Town —---------- Province —----------

2. Is your home location considered a rural, urban, or suburban region?
   - Rural
   - Urban
   - Suburb
3. Could you remind me how long you have been living in Canada?
   - Less than a year
   - 1 to 3 years
   - 3 to 5 years
4. What is the name of your school or school board? —----------
5. Which grade are you in?

   Grade —------ Age --------

Home Experience

6. Did the pandemic change the ways your family used the Internet? If so, could you tell me how? If not, can you explain how their family uses the Internet in general?

   —----------

7. Can you describe a digital activity that you have performed at home during the last 3 months for any reason? (e.g. to find information, to connect with friends, to buy things, to scroll through social media feeds, to be entertained…) Can you tell me about your obstacles and challenges or/and about your strengths when you are online at home?

   —----------

8. I'm wondering about the kinds of activities that you are able to do online at home.
   a. Are you able to access the Internet and a device at home?
   b. Are you able to generally do the things you need to do online?
   c. Do you ever feel like you don't quite have the skills or the tools you need to accomplish the things you want to accomplish?
   d. Are there ever moments when you worry about your safety online, or aren't sure how to handle things?

9. Is there anyone that can digitally support you at home? If yes, who supports your digital needs at home? How?

—----------

10. What do you suggest to enhance your online experience at home?

—----------

School Experience

Thanks for telling me about how you use the Internet at home. Now, I would like to learn about how you use the Internet and computers at school.

11. I'm wondering about how things go when you use the Internet at school. So first,
    a. Do you use the Internet at school? What does that usually involve?
    b. Can you describe what tech use looks like in a couple of your classes? Do you have your assigned sets of devices or share the devices with other classmates or even other classes or are you asked to bring your own devices?
    c. Tell me about the kinds of skills you need to use at school – do you feel skilled enough to complete your schoolwork? Are there skills you feel you need? What are they? How are you developing these skills at school?
    d. How about your confidence in using the Internet and computers at school – do you feel confident? Are there ever times at school when you're not sure how to use the Internet or computers safely? Or you're not sure what to do?
12. Can you describe a regular digital activity that you have performed at school since the beginning of this school year? Can you tell me about your obstacles and challenges or about your strength when you are online at school?

—----------

13. What are the most frequent problems you have confronted during an online activity at school? Is it related to the device, connection, the application, or the number of students using the same device, lack of skills, or lack of confidence? Please explain the situation.

—----------

14. Who supports your digital needs at school? How?

—----------

15. In your opinion, what would make your online experiences at school better?

—----------

16. Based on your own experience, do you think your level of language proficiency or bi/multilingualism can impact your digital experience? (such as not having the same skills as classmates or preferring not to search/read, write, or collaborate due to language barriers)

    —----------

17. Which one is more challenging for you, or you think has impacted your digital experiences more? Your level of language proficiency or your digital skills or confidence.
18. In your opinion, what could schools and teachers do to make sure that students who are new to Canada and learning English have the best possible opportunities to learn digital skills? Are there gaps in terms of the supports provided that need to be addressed?

    —----------

19. Is there anything else you would like to add?

Once again, I would like to thank you for your time and participation in this study and for sharing your insights with me.

Appendix C

Survey Questionnaire

This is to remind you that you have consented to complete this survey.

Home Experience

1. Do you have access to the internet at home?
   - ☐ Yes
   - ☐ No

2. How often do you use the Internet at home? (never, rarely, usually, always)
   ---

3. What is your home internet connection type?
   - ☐ Dial-up (a form of Internet access that uses the facilities of the public switched telephone network to establish a connection to an Internet service provider by dialing a telephone number on a conventional telephone line)
   - ☐ DSL (digital subscriber line exclusively uses your local phone line to transfer data and connect you to the internet)
   - ☐ Cable (a form of broadband Internet access which uses the same infrastructure as cable television)
   - ☐ Fiber (makes use of fibre-optic cables to send data at incredible speeds)
   - ☐ Satellite (Internet access provided through communication satellites)
   - ☐ Cell phone internet
   - ☐ Other, please specify ---
   - ☐ I don't know

4. What is your home internet connection speed (upload and download)?
   --- upload --- download
   - ☐ I don't know

5. What digital devices are available to you at home that can be connected to the internet?
   - ☐ Mobile phone
   - ☐ Desktop computer/Personal computer (PC)
   - ☐ Laptop (Chromebook)
   - ☐ Game Console
   - ☐ Tablet
   - ☐ E-reader
   - ☐ TV
   - ☐ Other, please specify ---

6. What is your digital device ownership status? (the one you use more frequently)
   - ☐ Own a device
   - ☐ Share a device with parents or siblings

- ☐ Use a public device owned by the school or library, …
- ☐ Other, please specify ----------

7. How many hours a day do you have access to a digital device on weekdays?
   ---

8. How many hours a day do you have access to a digital device on weekends?

School Experience

9. Do you have access to the internet in the classrooms of your school?
   - ☐ Yes
   - ☐ No

10. How often do use the Internet in the classroom every week?
    ---

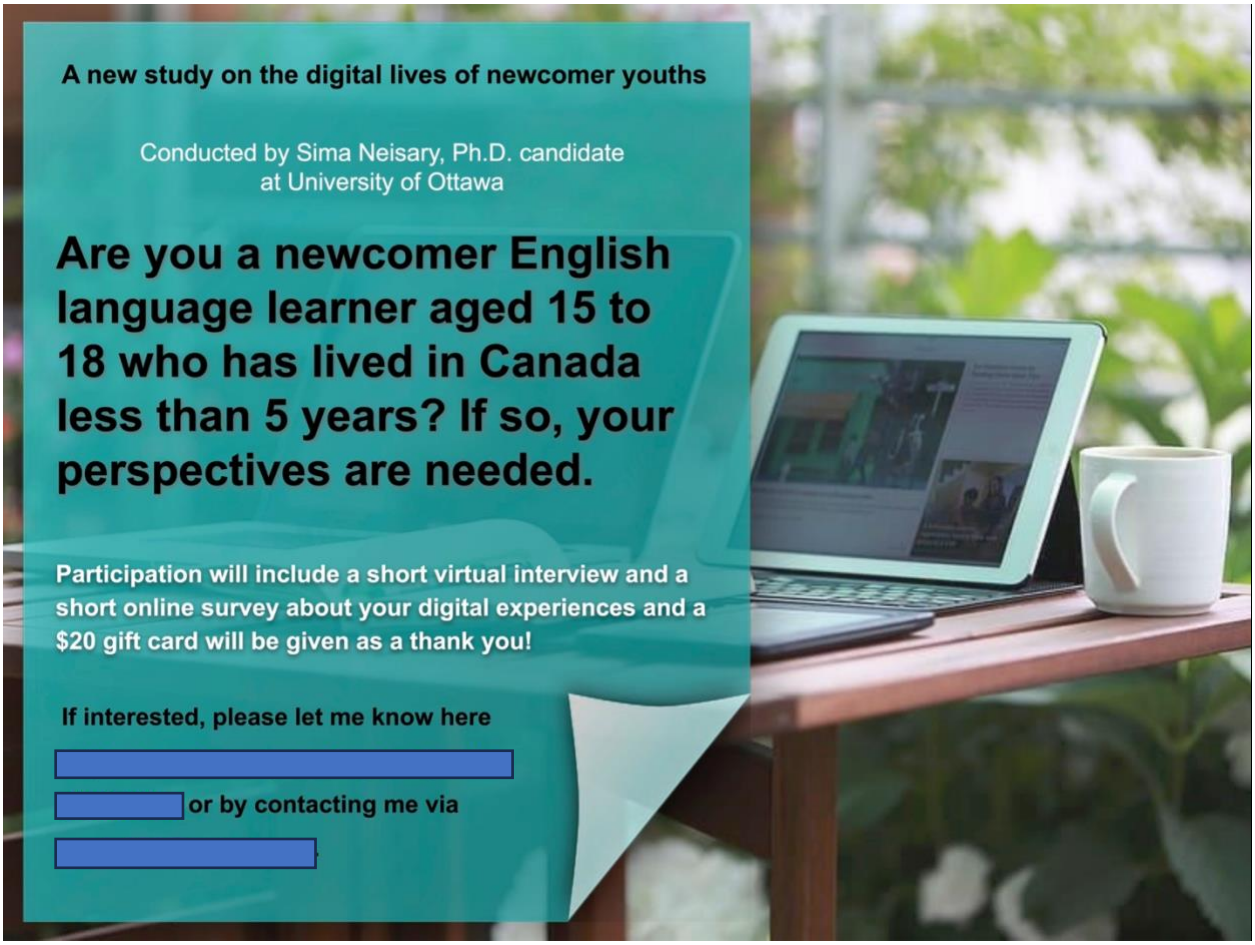
11. What digital devices are available in your class that can be connected to the internet?
    - ☐ Tablets
    - ☐ Desktop computers
    - ☐ Laptops
    - ☐ Digital projectors
    - ☐ TV
    - ☐ Interactive whiteboard
    - ☐ Smartboard
    - ☐ Other, please specify -------

12. Do any of these following reasons make you not improve your digital skills?
    - ☐ Financial restrictions
    - ☐ Language proficiency
    - ☐ Lack of available resources or technical support
    - ☐ Lack of time
    - ☐ Other issues, please specify ----------

13. Which language do you prefer to use when you are online?
    - ☐ English
    - ☐ French
    - ☐ Other language(s), please specify ----------

Appendix D

Recruitment Poster



Appendix E

Information for Prospective Participants

Researcher:
Sima Neisary, Ph.D. candidate
Faculty of Education
University of Ottawa

Supervisor:
Michelle Schira Hagerman, Ph.D.
Faculty of Education
University of Ottawa

Invitation to Participate: You are invited to participate in a research study conducted by Sima Neisary, who is a Ph.D. candidate in the Faculty of Education of the University of Ottawa. This research is part of her doctoral thesis project. This letter provides you information about the research study, its objectives and what participation will involve.

Purpose of the Study: This research study focuses on the digital lives of young people aged 15-18 who are newcomers to Canada and who speak English as their second (or an additional) language. The purpose of the study is to develop a better understanding of young people's experiences of digital access, their opportunities to build digital skills, and their feelings of empowerment at home and at school when using technology.

Participation: You are invited to participate in this study. I will use the first come, first served criterion. Participation in this study is voluntary and your consent is required. This means that I am asking for your permission to talk to you and to analyze the information you share. You may take back (withdraw) your consent to participate at any time and for any reason, and without any negative consequences. If you withdraw your consent, your participation in the study will end and anything you have shared with the researcher will be destroyed and your data will not be analyzed.

To participate in the study, you will be asked to complete a short survey before the online interview and then participate in an individual virtual interview that lasts approximately 45 minutes and will be recorded through the Zoom application. The purpose of the recording of the interview is to allow the researcher to go back to what was discussed as she works to understand your experiences. All questions in the survey and in the interview are about your digital access, your digital skills and how confident you feel while using technology at home and at school.

Compensation: Participants who take part in this study will be provided a $20 gift card at the end of the study.

Use of data: Your participation in this study will allow Sima to better understand the online experiences of newcomer students in Canada who are also learning English. It is expected that listening to the voices and experiences of newcomer teens will provide important evidence that can inform deeper understandings of what newcomer teens do online, but also what they might need to become confident users of digital tools for various purposes. What you share with Sima will help her to describe the digital lives of newcomer students and amplify their voices. The responses to the questions of those who do not volunteer for the interview will not be analyzed.

Anticipated Impacts: With these data, Sima intends to publish a study that can be used to inform policy and the design of appropriate teaching interventions in schools that address the needs of newcomer teens. These data will also inform future research projects on this subject.

Confidentiality and anonymity: The information you share during this project will remain partially confidential; that means that only my supervisor and I will have access to identifiable data. No personal information will be shared.

When Sima shares the results in research articles or at conferences, she may quote you without mentioning your name. Please be aware that real names will never be shared when ideas are quoted. You will have the opportunity to provide a pseudonym that Sima will use when referring to your ideas publicly. If no pseudonym is provided by you, Sima will choose one to protect your identity.

A link to the short survey questions along with interview questions will be sent to the email address you shared with Sima in advance. You need to complete the survey before the interview. Please note that participation in the virtual meeting will be done online, and therefore, a private connection cannot be guaranteed since the data is transmitted over the Internet. To minimize the risk of security breaches and ensure your privacy, we recommend that you use standard security measures, such as logging out of your account, closing your browser and locking your screen or device when you no longer use them or when you have completed the study. Sima will create a private meeting room on Zoom to conduct the interview and I ask you not to share it. Be sure to log out and close your browser window after using this web conference meeting space. If you agree to participate in a virtual meeting for the research interview conducted through the Zoom Web Conferencing Software, you understand that your responses will be subject to the Zoom Video Communications, Inc. privacy policy. You can consult Zoom's privacy policy at https://zoom.us/privacy.

Benefits related to participation: Participation in the study will offer you an opportunity to reflect on your digital experiences and needs. By contributing to the study, your expertise will help Sima to answer research questions regarding young people's online lives. These insights will inform recommendations that will promote and support digital equity in Canada. Your participation in this study will also provide valuable information in terms of the digital lives of newcomer communities in order to provide more digital support for them, according to your expressed needs, and in ways that will ideally reduce digital divides.

Risks related to participation. While we do not anticipate any risks or discomfort associated with participating in this study, we understand that some participants may feel uncomfortable if

things do not go as well as expected. It is also important to reiterate that your participation is entirely on a voluntary basis. You may choose not to answer some questions. You may choose to withdraw from participation at any time verbally or in writing. You may also choose to request the removal of your data from the study at any time. To request a withdrawal of your participation or data from the study, simply send an email.

Conservation of data. All identifiable data will be stored on a secure and encrypted drive and Sima will safeguard all the digital files by storing them in my University of Ottawa One Drive. Additionally, any paper copies of the data will be securely stored in a locked office at the University of Ottawa. Anonymous data and analyses will be stored for a minimum of 10 years after the completion of this research project. It should be noted that when a participant withdraws, their data will be destroyed.

Along with this letter, you will find 2 consent forms. If you are willing to give consent, we ask you to please read, complete, and sign the consent forms. By signing the consent form you are allowing Sima to write and talk about what you say in the survey and interview.

Contact information:
If you have any questions regarding this study, do not hesitate to contact Sima Neisary.

If you have any questions regarding the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5
Tel.: (613) 562-5387
Email: ethics@uottawa.ca

This research has been reviewed by the Research Ethics Board of the University of Ottawa (Certificate # S-05-22-8041).

Participant Consent for the survey:

I have read the information about the study and understand what participation involves. I also understand that my participation is voluntary. I agree to participate.
There are two copies of the consent form, one for the researcher and one is mine to keep.

First name and surname: _____

Signature: _____

Date: _____

Date:

Researcher name: Sima Neisary
Signatures:

Please check the next page.

This research has been reviewed by the Research Ethics Board of the University of Ottawa (Certificate # S-05-22-8041).

Participant Consent for the interview:

I have read the information about the study and understand what participation involves. I also understand that my participation is voluntary. I agree to participate.
There are two copies of the consent form, one for the researcher and one is mine to keep.

First name and surname: _____

Signature: _____

Date: _____

Date:

Researcher name: Sima Neisary
Signatures:

Appendix F

Immigration Result Tables

Table F. 1

Digital Access of Respondents Based on Their Immigration Status

No.	Survey Questions		Immigrants		Non-immigrants		Total		χ^2
			Yes	No	Yes	No	Yes	No	
1	Access to Internet at home (AC_010A)	n	1677	31	13996	1691	15673	1722	138.92***
		%	98%	2%	89%	11%	90%	10%	
		standardized residuals	(3.5)	(-10.6)	(-1.2)	(3.5)			
2	Access to the Internet through a mobile data plan (AC_030A)	n	1429	256	10802	4504	12231	4760	175.09***
		%	84%	15%	69%	29%	70%	27%	
		standardized residuals	(6.6)	(-9.8)	(-2.2)	(3.2)			
3	Use of Internet (have used the Internet for personal use from any location) (AC_050A)	n	1628	81	13666	2034	15294	2115	97.47***
		%	95%	5%	87%	13.0%	88%	12%	
		standardized residuals	(3.3)	(-8.8)	(-1.1)	(2.9)			
4	Location of use -- At home (AC_080F)	n	1464	160	12575	1040	14039	1200	108.72***
		%	86%	9%	80%	7%	81%	7%	
		standardized residuals	(2.3)	(3.9)	(-.8)	(-1.3)			
5	Devices used (smartphone) (DV_010A)	n	1491	127	10886	2706	12377	2833	246.59***
		%	87%	7%	69%	17%	71%	16%	
		standardized residuals	(7.9)	(-9.1)	(-2.6)	(3.0)			
6	Devices used (laptop or notebook) (DV_010B)	n	1158	460	8531	5061	9689	5521	149.67***
		%	68%	27%	54%	32%	56%	32%	
		standardized residuals	(6.7)	(-3.5)	(-2.2)	(1.2)			
7	Devices used (tablet) (DV_010C)	n	753	865	6896	6696	7649	7561	108.56***
		%	44%	51%	44%	43%	44%	43%	
		standardized residuals	(.1)	(4.5)	(.0)	(-1.5)			
8	Devices used (desktop computer) (DV_010D)	n	695	923	5619	7973	6314	8896	99.29***
		%	41%	54%	36%	51%	36%	51%	
		standardized residuals	(3.0)	(1.7)	(-1.0)	(-.6)			
9		n	1542	78	11566	2016	13108	2094	229.75***
		%	90%	5%	74%	13%	75%	12%	

	Have a smartphone (SM_G010A)	standardized residuals	(7.1)	(-8.9)	(-2.3)	(2.9)

***$p < .001$.

Note. There are some other responses to some questions (e.g., don't know, refusal, not stated, valid skip) and calculations have been rounded to the nearest whole number and may not amount to 100% in displays of disaggregated categories.

Table F. 2

Digital Skills of Respondents Based on Their Immigration Status

No.	Survey Questions		Immigrants		Non-immigrants		Total		χ^2
			Yes	No	Yes	No	Yes	No	
1	Activities related to communication (sent and received emails) (UI_010A)	n	1482	131	12432	1108	13914	1239	97.48***
		%	87%	8%	79%	7%	80%	7%	
		standardized residuals	(3.1)	(.8)	(-1.0)	(-.3)			
2	Activities related to communication (sent messages using an instant messaging app) (UI_010B)	n	1380	233	10281	3259	11661	3492	178.35***
		%	81%	14%	66%	21%	67%	20%	
		standardized residuals	(7.0)	(-5.9)	(-2.3)	(2.0)			
3	Activities related to communication (using social networking websites or apps) (UI_010C)	n	1207	406	9607	3933	10814	4339	108.86***
		%	71%	24%	61%	25%	62%	25%	
		standardized residuals	(4.5)	(-1.0)	(-1.5)	(.3)			
4	Activities related to communication (made online voice calls or video calls) (UI_010D)	n	1180	433	8252	5288	9432	5721	195.71***
		%	69%	25%	53%	34%	54%	33%	
		standardized residuals	(8.4)	(-5.4)	(-2.8)	(1.8)			
5	Activities related to communication (upload self-created content on	n	218	1395	1395	12145	1613	13540	114.27***
		%	13%	82%	9%	77%	9%	78%	

	sharing websites, a blog or personal website) (UI_010F)	standardized residuals	(4.7)	(1.8)	(-1.6)	(-.6)			
6	Activities related to other online activities (booked appointments) (UI_050H)	n	887	719	6062	7355	6949	8071	162.12***
		%	52%	42%	39%	47%	40%	46%	
		standardized residuals	(7.8)	(-2.7)	(-2.6)	(.9)			
7	Use of government online services (communicated with a government organization by email or via social networking) (GV_010H)	n	299	1286	1843	11488	2142	12774	129.08***
		%	18%	75%	12%	73%	12%	73%	
		standardized residuals	(6.1)	(.9)	(-2.0)	(-.3)			
8	Activities related to accessing information (accessed the news) (UI_020A)	n	1437	169	10984	2517	12421	2686	167.21***
		%	84%	10%	70%	16%	71%	15%	
		standardized residuals	(6.2)	(-5.8)	(-2.1)	(1.9)			
9	Activities related to accessing information (found locations and directions) (UI_020B)	n	1361	245	10482	3019	11843	3264	143.66***
		%	80%	14%	67%	19%	68%	19%	
		standardized residuals	(5.8)	(-4.2)	(-1.9)	(1.4)			
10	Activities related to listening to content (listened to music) (UI_030A)	n	1280	315	9482	3932	10762	4247	166.69***
		%	75%	18%	60%	25%	62%	24%	
		standardized residuals	(6.9)	(-5.0)	(-2.3)	(1.6)			
11	Activities related to listening to content (listened to podcasts) (UI_030B	n	525	1070	4057	9357	4582	10427	10290***
		%	31%	63%	26%	60%	26%	60%	
		standardized residuals	(3.5)	(1.5)	(-1.2)	(-.5)			
12	Activities related to watching content (watched video streaming services, excluding live	n	1102	496	8666	4760	9768	5256	110.67***
		%	65%	29%	55%	30%	56%	30%	
		standardized residuals	(4.6)	(-.9)	(-1.5)	(.3)			

	television) (UI_040A)								
13	Activities related to watching content (watched content on video sharing websites) (UI_040B)	n	1349	249	9436	3990	10785	4239	248.81***
		%	79%	15%	60%	25%	62%	24%	
		standardized residuals	(8.9)	(-8.2)	(-2.9)	(2.7)			
14	Activities related to other online activities (played video games) (UI_050A)	n	402	1201	4169	9248	4571	10449	124.37***
		%	24%	70%	27%	59%	26%	60%	
		standardized residuals	(-2.2)	(5.5)	(.7)	(-1.8)			
15	Activities related to other online activities (conducted online banking) (UI_050D)	n	1333	270	10704	2713	12037	2983	109.25***
		%	78%	16%	68%	17%	69%	17%	
		standardized residuals	(4.4)	(-1.3)	(-1.5)	(.4)			
16	Activities related to other online activities (bought new or used goods on online bulletin boards) (UI_050K)	n	649	954	4756	8661	5405	9615	115.19***
		%	38%	56%	30%	55%	31%	55%	
		standardized residuals	(5.1)	(.3)	(-1.7)	(-.1)			
17	Activities related to other online activities (checked schedules or registered for classes) (UI_050I)	n	486	1117	3044	10373	3530	11490	148.13***
		%	28%	65%	19%	66%	20%	66%	
		standardized residuals	(7.5)	(-.3)	(-2.5)	(.1)			
18	Software related activities (copied or moved files or folders) (DS_020A)	n	1001	527	7640	5364	8641	5891	130.58***
		%	59%	31%	49%	34%	50%	34%	
		standardized residuals	(5.2)	(-2.1)	(-1.7)	(.7)			
19	Software related activities (used word processing software) (DS_020B)	n	1051	477	7839	5165	8890	5642	147.25***
		%	62%	28%	50%	33%	51%	32%	
		standardized residuals	(6.0)	(-3.3)	(-2.0)	(1.1)			
20	Software related activities (created presentations, or	n	684	844	4199	8805	4883	9649	204.39***
		%	40%	49%	27%	56%	28%	55%	

	documents with text and pictures, table or charts) (DS_020C)	standardized residuals	(9.3)	(-3.4)	(-3.1)	(1.1)			
21	Software related activities (used spreadsheet software basic functions) (DS_020D)	n	809	719	5530	7474	6339	8193	167.19***
		%	47%	42%	35%	48%	36%	47%	
		standardized residuals	(7.5)	(-3.0)	(-2.5)	(1.0)			
22	Software related activities (used software to edit photos, video or audio files) (DS_020F)	n	599	929	4342	8662	4941	9591	124.91***
		%	35%	54%	28%	55%	28%	55%	
		standardized residuals	(5.2)	(-.4)	(-1.7)	(.1)			
23	Software related activities (written codes in a programming language) (DS_020G)	n	201	1327	706	12298	907	13625	251.24***
		%	12%	78%	5%	78%	5%	78%	
		standardized residuals	(11.9)	(-.3)	(-3.9)	(.1)			
24	Internet-related activities (deleted your browser history) (DS_030A)	n	901	635	7286	5728	8187	6363	104.34***
		%	53%	37%	46%	37%	47%	37%	
		standardized residuals	(3.4)	(.4)	(-1.1)	(-.1)			
25	Internet-related activities (blocked emails, including junk mail and spam) (DS_030B)	n	964	572	7185	5829	8149	6401	133.99***
		%	56%	34%	46%	37%	47%	37%	
		standardized residuals	(5.8)	(-2.2)	(-1.9)	(.7)			
26	Internet-related activities (downloaded files from the Internet to your computer or other devices) (DS_030F)	n	936	600	6667	6347	7603	6947	155.44***
		%	55%	35%	43%	40%	44%	40%	
		standardized residuals	(6.9)	(-3.1)	(-2.3)	(1.0)			
27	Internet-related activities (uploaded files or photos to an online data storage space) (DS_030G)	n	747	789	5228	7786	5975	8575	143.42***
		%	44%	46%	33%	50%	34%	49%	
		standardized residuals	(6.6)	(-1.8)	(-2.2)	(.6)			

28	Activities carried out to manage access to personal data (restricted or refused access to your geographical location) (SP_010A)	n	858	669	7940	5023	8798	5692	116.63***
		%	50%	39%	51%	32%	51%	33%	
		standardized residuals	(-.2)	(4.7)	(.1)	(-1.5)			
29	Activities carried out to manage access to personal data (changed the privacy settings on accounts or apps to limit your profile or personal information) (SP_010D)	n	779	748	6137	6826	6916	7574	108.86***
		%	46%	44%	39%	44%	40%	44%	
		standardized residuals	(3.8)	(.2)	(-1.3)	(-.1)			
30	Protection from cyber security incidents (enabled automatic updates on your operating systems) (SP_070A)	n	817	703	7325	5485	8142	6188	104.82***
		%	48%	41%	47%	35%	47%	36%	
		standardized residuals	(.6)	(3.9)	(-.2)	(-1.3)			

***$p < .001$.

Note. There are some other responses to some questions (e.g. don't know, refusal, not stated, valid skip) and calculations have been rounded to the nearest whole number and may not amount to 100% in displays of disaggregated categories.

Table F. 3

Digital Capital-enhancing Activities of Respondents Based on Their Immigration Status

No.	Survey Questions		Immigrants		Non-immigrants		Total		χ^2
			Yes	No	Yes	No	Yes	No	
1	Online learning activities (taken free	n	502	1026	2739	10231	3241	11257	216.47***
		%	29%	60%	17%	65%	19%	65%	

	online training or self-guided learning) (DS_010A)	standardized residuals	(10.3)	(-2.4)	(-3.4)	(.8)			
2	Online learning activities (taken instruction or help from friends or family) (DS_010B)	n	355	1173	3219	9751	3574	10924	102.93***
		%	21%	69%	21%	62%	21%	63%	
		standardized residuals	(.2)	(3.1)	(-.1)	(-1.0)			
3	Online learning activities (taken free training through community centers, senior centers or provided by public programs or organizations) (DS_010C)	n	71	1457	297	12673	368	14130	133.64***
		%	4%	85%	2%	81%	2%	81%	
		standardized residuals	(5.8)	(1.9)	(-1.9)	(-.6)			
4	Online learning activities (taken training paid by yourself or employer) (DS_010D)	n	241	1287	1469	11501	1710	12788	128.62***
		%	14%	75%	9%	73%	10%	74%	
		standardized residuals	(5.6)	(.9)	(-1.9)	(-.3)			
5	Online learning activities (other learning activities) (DS_010E)	n	133	1395	616	12354	749	13749	147.43***
		%	8%	82%	4%	79%	4%	79%	
		standardized residuals	(6.9)	(1.2)	(-2.3)	(-.4)			
6	Activities related to other online activities (taken informal training or learning) (UI_050F)	n	530	1073	2806	10611	3336	11684***	
		%	31%	63%	18%	68%	19%	67%	
		standardized residuals	(11.2)	(-2.2)	(-3.7)	(.7)			

7	Activities related to accessing information (researched for information on health) (UI_020C)	n	1226	380	9570	3931	10796	4311	120.21***
		%	72%	22%	61%	25%	62%	25%	
		standardized residuals	(5.1)	(-2.1)	(-1.7)	(.7)			
8	Activities related to accessing information (researched for information about community events) (UI_020D)	n	775	831	6403	7098	7178	7929	98.16***
		%	45%	49%	41%	45%	41%	46%	
		standardized residuals	(2.7)	(1.9)	(-.9)	(-.6)			
9	Activities related to other online activities (searched for employment) (UI_050C)	n	495	1108	2089	11328	2584	12436	351.93***
		%	29%	65%	13%	72%	15%	71%	
		standardized residuals	(15.2)	(-3.2)	(-5.0)	(1.1)			

***$p < .001$.

Note. There are some other responses to some questions (e.g. don't know, refusal, not stated, valid skip) and calculations have been rounded to the nearest whole number and may not amount to 100% in displays of disaggregated categories.

Appendix G

Age-group Result Tables

Table G. 1

Youth Versus Other Age Group Digital Access

No.	Survey Questions		Youth		Other age groups		Total		χ^2
			Yes	No	Yes	No	Yes	No	
1	Access to Internet at home (AC_010A)	n	811	17	14862	1705	15673	1722	60.75***
		%	98%	2%	90%	10%	90%	10%	
		standardized residuals	(2.4)	(-7.2)	(-.5)	(1.6)			
2	Access to the Internet through a mobile data plan (AC_030A)	n	710	107	11521	4653	12231	4760	100.00***
		%	86%	13%	70%	28%	70%	27%	
		standardized residuals	(5.3)	(-7.9)	(-1.2)	(1.8)			
3	Use of Internet (have used the Internet for personal use from any location) (AC_050A)	n	807	21	14487	2094	15294	2115	75.26***
		%	97.5%	2.5%	87%	13%	88%	12%	
		standardized residuals	(3.0)	(-7.9)	(-.7)	(1.8)			
4	Location of use -- At home (AC_080F)	n	758	45	13281	1155	14039	1200	82.38***
		%	92%	5%	80%	7%	81%	7%	
		standardized residuals	(3.5)	(-1.6)	(-.8)	(.4)			
5	Devices used (smartphone) (DV_010A)	n	779	21	11598	2812	12377	2833	233.91***
		%	94%	3%	70%	17%	71%	16%	
		standardized residuals	(7.8)	(-9.8)	(-1.8)	(2.2)			
6	Devices used (laptop or notebook) (DV_010B)	n	640	160	9049	5361	9689	5521	183.72***
		%	77%	19%	55%	32%	56%	32%	
		standardized residuals	(8.3)	(-6.3)	(-1.9)	(1.4)			
7	Devices used (tablet) (DV_010C)	n	264	536	7385	7025	7649	7561	188.07***
		%	32%	65%	45%	42%	44%	43%	
		standardized residuals	(-5.2)	(9.3)	(1.2)	(-2.1)			

8	Devices used (desktop computer) (DV_010D)	n % standardized residuals	277 34% (-1.3)	523 63% (4.9)	6037 36% (.3)	8373 51% (-1.1)	6314 36%	8896 51%	95.15***
9	Have a smartphone (SM_010A)	n % standardized residuals	780 94% (6.3)	19 2% (-8.1)	12328 74% (-1.4)	2075 13% (1.8)	13108 75%	2094 12%	179.19***

***$p < .001$.

Note. There are some other responses to some questions (e.g., don't know, refusal, not stated, valid skip) and calculations have been rounded to the nearest whole number and may not amount to 100% in displays of disaggregated categories.

Table G. 2

Youth versus Other Age Groups Digital Skills

No.	Survey Questions		Youth		Other age groups		Total		χ^2
			Yes	No	Yes	No	Yes	No	
1	Activities related to communication (sent and received emails) (UI_010A)	n % standardized residuals	725 88% (2.5)	70 9% (1.4)	13189 80% (-.5)	1169 7% (-.3)	13914 80%	1239 7%	79.03***
2	Activities related to communication (sent messages using an instant messaging app) (UI_010B)	n % standardized residuals	749 91% (8.3)	46 6% (-9.3)	10912 66% (-1.8)	3446 21% (2.1)	11661 67%	3492 20%	233.20***
3	Activities related to	n %	728 88% (9.4)	67 8% (-9.7)	10086 61% (-2.1)	4272 26% (2.2)	10814 62%	4339 25%	262.52***

	communication (using social networking websites or apps) (UI_010C)	standardized residuals							
4	Activities related to communication (made online voice calls or video calls) (UI_010D)	n	633	162	8799	5559	9432	5721	196.86***
		%	76%	20%	53%	34%	54%	33%	
		standardized residuals	(8.7)	(-6.7)	(-1.9)	(1.5)			
5	Activities related to communication (upload self-created content on sharing websites, a blog or personal website) (UI_010F)	n	165	630	1448	12910	1613	13540	177.49***
		%	20%	76%	9%	78%	9%	78%	
		standardized residuals	(10.1)	(-.6)	(-2.3)	(.1)			
6	Activities related to other online activities (booked appointments) (UI_050H)	n	322	462	6627	7609	6949	8071	91.05***
		%	39%	56%	40%	46%	40%	46%	
		standardized residuals	(-.5)	(4.0)	(.1)	(-.9)			
7	Use of government online services (communicated with a government organization by email or via social networking) (GV_010H)	n	89	686	2053	12088	2142	12774	89.94***
		%	11%	83%	12%	73%	12%	73%	
		standardized residuals	(-1.3)	(3.2)	(.3)	(-.7)			

8	Activities related to accessing information (accessed the news) (UI_020A)	n % standardized residuals	618 75% (1.1)	175 21% (4.2)	11803 71% (-.3)	2511 15% (-.9)	12421 71%	2686 15%	88.86***
9	Activities related to accessing information (found locations and directions) (UI_020B)	n % standardized residuals	650 79% (3.7)	143 17% (-1.0)	11193 68% (-.8)	3121 19% (.2)	11843 68%	3264 19%	84.23***
10	Activities related to listening to content (listened to music) (UI_030A)	n % standardized residuals	752 91% (10.6)	33 4% (-11.9)	10010 60% (-2.4)	4214 25% (2.7)	10762 62%	4247 24%	338.38***
11	Activities related to listening to content (listened to podcasts) (UI_030B	n % standardized residuals	382 46% (11.1)	403 49% (-4.2)	4200 25% (-2.5)	10024 61% (.9)	4582 26%	10427 60%	219.62***
12	Activities related to watching content (watched video streaming services, excluding live television) (UI_040A)	n % standardized residuals	694 84% (10.6)	94 11% (-9.9)	9074 55% (-2.4)	5162 31% (2.2)	9768 56%	5256 30%	290.36***
13	Activities related to watching content (watched	n %	723 87% (9.3)	65 8% (-9.6)	10062 61% (-2.1)	4174 25% (2.2)	10785 62%	4239 24%	256.72***

	content on video sharing websites) (UI_040B)	standardized residuals							
14	Activities related to other online activities (played video games) (UI_050A)	n % standardized residuals	519 63% (20.5)	265 32% (-10.4)	4052 24% (-4.6)	10184 61% (2.3)	4571 26%	10449 60%	627.09***
15	Activities related to other online activities (conducted online banking) (UI_050D)	n % standardized residuals	575 69% (.1)	209 25% (5.6)	11462 69% (.0)	2774 17% (-1.3)	12037 69%	2983 17%	107.48***
16	Activities related to other online activities (bought new or used goods on online bulletin boards) (UI_050K)	n % standardized residuals	285 34% (1.7)	499 60% (1.9)	5120 31% (-.4)	9116 55% (-.4)	5405 31%	9615 55%	81.30***
17	Activities related to other online activities (checked schedules or registered for classes) (UI_050I)	n % standardized residuals	363 44% (15.1)	421 51% (-5.4)	3167 19% (-3.4)	11069 67% (1.2)	3530 20%	11490 66%	342.43***
18	Software related activities (copied or moved files or folders) (DS_020A)	n % standardized residuals	532 64% (6.0)	215 26% (-3.9)	8109 49% (-1.3)	5676 34% (.9)	8641 50%	5891 34%	135.81***

19	Software related activities (used word processing software) (DS_020B)	n % standardized residuals	606 73% (8.9)	141 17% (-7.8)	8284 50% (-2.0)	5501 33% (1.7)	8890 51%	5642 32%	229.24***
20	Software related activities (created presentations, or documents with text and pictures, table or charts) (DS_020C)	n % standardized residuals	511 62% (18.3)	236 29% (-10.4)	4372 28% (-4.1)	9413 57% (2.3)	4883 28%	9649 55%	547.46***
21	Software related activities (used spreadsheet software basic functions) (DS_020D)	n % standardized residuals	378 46% (4.4)	369 45% (-1.0)	5961 36% (-1.0)	7824 47% (.2)	6339 36%	8193 47%	104.00***
22	Software related activities (used software to edit photos, video or audio files) (DS_020F)	n % standardized residuals	376 45% (9.2)	371 45% (-4.0)	4565 28% (-2.1)	9220 56% (.9)	4941 28%	9591 55%	187.98***
23	Software related activities (written codes in a programming language) (DS_020G)	n % standardized residuals	114 14% (10.8)	633 76% (-.6)	793 5% (-2.4)	12992 78% (.1)	907 5%	13625 78%	205.05***
24	Internet-related activities (deleted your browser	n % standardized residuals	460 56% (3.6)	287 35% (-.9)	7727 47% (-.8)	6076 37% (.2)	8187 47%	6363 37%	98.39***

	history) (DS_030A)								
25	Internet-related activities (blocked emails, including junk mail and spam) (DS_030B)	n % standardized residuals	458 55% (3.6)	289 35% (-.9)	7691 46% (-.8)	6112 37% (.2)	8149 47%	6401 37%	98.35***
26	Internet-related activities (downloaded files from the Internet to your computer or other devices) (DS_030F)	n % standardized residuals	499 60% (7.2)	248 30% (-4.5)	7104 43% (-1.6)	6699 40% (1.0)	7603 44%	6947 40%	160.48***
27	Internet-related activities (uploaded files or photos to an online data storage space) (DS_030G)	n % standardized residuals	431 52% (8.7)	316 38% (-4.5)	5544 33% (-1.9)	8259 50% (1.0)	5975 34%	8575 49%	185.45***
28	Activities carried out to manage access to personal data (restricted or refused access to your geographical location) (SP_010A)	n % standardized residuals	505 61% (4.2)	240 29% (-1.9)	8293 50% (-.9)	5452 33% (.4)	8798 51%	5692 33%	104.08***
29	Activities carried out to manage access to personal data	n	469 57%	276 33%	6447 39%	7298 44%	6916 40%	7574 44%	164.92***

	(changed the privacy settings on accounts or apps to limit your profile or personal information) (SP_010D)	%	(7.7)	(-4.4)	(-1.7)	(1.0)			
		standardized residuals							
30	Protection from cyber security incidents (enabled automatic updates on your operating systems) (SP_070A)	n	365	367	7777	5821	8142	6188	105.77***
		%	44%	44%	47%	35%	47%	36%	
		standardized residuals	(-1.1)	(4.2)	(.3)	(-.9)			

*** $p < .001$.

Note. There are some other responses to some questions (e.g. don't know, refusal, not stated, valid skip) and calculations have been rounded to the nearest whole number and may not amount to 100% in displays of disaggregated categories.

Table G. 3

Youth vs. Other Age Groups Digital Capital-enhancing Activities

No.	Survey Questions		Youth		Other Age Groups		Total		χ^2
			Yes	No	Yes	No	Yes	No	
1	Online learning activities (taken free online training or self-guided learning) (DS_010A)	n	247	500	2994	10757	3241	11257	140.89***
		%	30%	60%	18%	65%	19%	65%	
		standardized residuals	(7.5)	(-1.5)	(-1.7)	(.3)			
2		n							92.54***

	Online learning activities (taken instruction or help from friends or family) (DS_010B)	% standardized residuals	215 26% (3.5)	532 64% (.5)	3359 20% (-.8)	10392 63% (-.1)	3574 21%	10924 63%	
3	Online learning activities (taken free training through community centers, senior centers or provided by public programs or organizations) (DS_010C)	n % standardized residuals	25 3% (1.8)	722 87% (1.9)	343 2% (-.4)	13408 81% (-.4)	368 2%	14130 81%	86.98***
4	Online learning activities (taken training paid by yourself or employer) (DS_010D)	n % standardized residuals	95 12% (1.5)	652 79% (1.8)	1615 10% (-.3)	12136 73% (-.4)	1710 10%	12788 74%	85.43***
5	Online learning activities (other learning activities) (DS_010E)	n % standardized residuals	53 6% (2.9)	694 84% (1.6)	696 4% (-.7)	13055 79% (-.4)	794 4%	13749 79%	91.19***
6	Activities related to other online activities (taken informal training or learning) (UI_050F)	n % standardized residuals	195 24% (2.9)	589 71% (1.4)	3141 19% (-.6)	11095 67% (-.3)	3336 19%	11684 67%	84.95***
7	Activities related to accessing information (researched for information on health) (UI_020C)	n % standardized residuals	538 65% (1.1)	255 31% (3.5)	10258 62% (-.2)	4056 25% (-.8)	10796 62%	4311 25%	83.21***

8	Activities related to accessing information (researched for information about community events) (UI_020D)	n	330	463	6848	7466	7178	7929	90.13***
		%	40%	56%	41%	45%	41%	46%	
		standardized residuals	(-.6)	(4.4)	(.1)	(-1.0)			
9	Activities related to other online activities (searched for employment) (UI_050C)	n	288	496	2296	11940	2584	12436	323.17***
		%	35%	60%	14%	72%	15%	71%	
		standardized residuals	(14.9)	(-3.9)	(-3.3)	(.9)			

***$p < .001$.

Note. There are some other responses to some questions (e.g., don't know, refusal, not stated, valid skip) and calculations have been rounded to the nearest whole number and may not amount to 100% in displays of disaggregated categories.

Appendix H

Certificate of Ethics Approval

24/11/2022

Université d'Ottawa
Bureau d'éthique et d'intégrité de la recherche

University of Ottawa
Office of Research Ethics and Integrity

CERTIFICAT D'APPROBATION ÉTHIQUE | CERTIFICATE OF ETHICS APPROVAL

Numéro du dossier / Ethics File Number	S-05-22-8041
Titre du projet / Project Title	Exploring the Digital Lives of Newcomer Youths to Canada
Type de projet / Project Type	Thèse de doctorat / Doctoral thesis
Statut du projet / Project Status	Approuvé / Approved
Date d'approbation (jj/mm/aaaa) / Approval Date (dd/mm/yyyy)	24/11/2022
Date d'expiration (jj/mm/aaaa) / Expiry Date (dd/mm/yyyy)	23/11/2023

Équipe de recherche / Research Team

Chercheur / Researcher	Affiliation	Role
Sima NEISARY	Faculté d'éducation / Faculty of Education	Chercheur Principal / Principal Investigator
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Conditions spéciales ou commentaires / Special conditions or comments

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Appendix I

Qualitative Tables

Digital Challenges: refer to any obstacles, difficulties, or issues related to the use, access, or navigation of digital technologies and platforms. It encompasses a broad range of challenges that individuals may encounter in their digital experiences, including but not limited to issues with technology proficiency, online safety concerns, barriers to access, digital inequity, privacy issues, cybersecurity threats, and challenges related to digital literacy and skill development. Identifying and understanding digital challenges is crucial for developing strategies and interventions to address them effectively and promote more equitable and inclusive digital environments.

Digital Strengths: refers to an individual's capacity to effectively and competently navigate, utilize, and leverage digital technologies, platforms, and resources to achieve desired goals, outcomes, or objectives. It encompasses a range of abilities, including digital literacy, proficiency, adaptability, and strategic use of digital tools and systems.

Digital Needs: refer to the requirements, demands, or necessities related to digital technologies, tools, and resources that individuals rely on to fulfill specific tasks, objectives, or functions. These needs may encompass various aspects, including access to digital devices and infrastructure, digital literacy and skills development, cybersecurity measures, software applications, and technical support. Understanding and addressing digital needs are essential for effectively leveraging digital technologies to meet personal, professional, educational, or societal goals.

Mary = P1

Sofia = P2

David = P3

Paul = P4

Sara = P5

Table 1

Digital Experience of Participants at Home

Digital Challenges	Participants' Quotes

Online safety	**Sofia**: Oh, sometimes I do worry because when I'm online being black, there are some bullies. because some people just talk to you {about these things} and I just checked when I'm online. There are people looks up to me. Anyhow. I sometimes I feel bad sometimes I feel this way. **David**: “Oh, yeah, more than so I'm always trying to get because of most of the time... to be... I experienced trolling online, or cyberbullying and like. So I'm always I'm always trying to trying to stay protected, and trying to hold to be confidential." **Paul:** "When I feel okay, my safety feel when I feel I'm not safe safe is... let's say... give us a scenario. Let's say for example I find it awkward watching like some scene or some pictures that are pornographic or sites. so sometimes I find myself... those pictures pop up on my screen so I find it uncomfortable for me." **Sara:** "As you know, as to everything that we asked is, just generally about schoolwork. So whenever I use the internet, as we all is focusing on schoolwork, nothing {else but} to just schoolwork assignments. For information you need to know about the schoolwork. And how supposed to do, you know that sometimes, they just let me just try to watch. Let me do some comments. Now that I've been mainly because being black or you know, if you comment that sometimes, someone that will just bully you online. But there was a time where I was able to just go to my friend, and my friend said you don't need to worry. Just keep doing what you want to do. Nobody cares about them... fine. I was able to just overcome some fears to what's the word of encouragement for my parents. And that's all."

	Time management	**Mary:** "I find myself like sometimes you can do one activity and not be doing the other activity so the imbalance of time with how I'm doing my activities for me has been... I have been having issues with balancing and also spending a lot of time..." **Paul:** " "The challenge I can say about the internet is that... maybe spending more of my time in the internet while I'm supposed to be doing something else. Yeah. So that takes as in the challenge that comes as a result of being on the internet that much."
	Cognitive Dimensions	**Mary**: I mean sometimes, like you might be scrolling, like, aimlessly, and you feel like maybe like I'm wasting my time I should be doing something. Maybe like better maybe like helping with the chores at home. So you can feel maybe like it's like a distraction for you at some point with anything at home.
	Digital Access (Due to Financial Restrictions)	**Mary**: Sometimes you have to be paying for the bills... if your parent has not paid enough to be able to access the services. And also you have to ensure the maintenance... your laptop needs to be maintained...
Digital Strength		
	Digital Skills	**Sofia:** "When I'm online, I can get the necessary information, I need it. So information and guidelines for my assignments given to me. I do use it to... able to apply it and get some reliable information to help me to study." "I can use different software, browse the web, and do my assignments online without any issues." "I feel confident in using technology. It's become a part of my daily life."

		David: "Yeah. Mostly... um. Sometimes, I can come up with a content that I can just put it on the internet, just to engage people just to engage blogs and like so." **Paul: "**Maybe enjoying the part of internet also being able to access the internet without any help from... that help from another person." **Sara:** "I say yes. I know how to complete my schoolwork. And also even if, after my {school}, I was able to push it in my dream education and also, maybe in the future, I was able to do some designing, others and design...". "I have the internet, and I have people that are able to support me, even when I'm in need of some information. In the internet, you'll be able to search and look for more information, even if you're able to have people to talk to, but the internet is more fast. And even if you're looking for more information Internet is able to give you more information you need it."
	Cognitive Dimensions	**Mary:** "I'm able to do all these things at my comfort. Because like, I feel like, I'm not getting tired, I'm just sitting down, scrolling, doing so. So I'm even at peace, I don't have to go maybe outside. So you just feel like very much relaxed, and very comfortable. And also you are able to ... , you can be very productive, if you know how to balance your time well with the various tasks. And it offers a good balance of maybe like, convenience, or maybe being able to do things at your home."
Digital Needs		
	Training	**Mary**: "I believe what can enhance my experiences at home is having like maybe like prior training, maybe like, people can be taught maybe on how to use the various gadgets at home their laptops. Maybe they can online course. It can really help."

Sofia: “there are some things that are unable to do or say or able to do ... I'm not good enough in designing. I'm like, What is he saying? I'm willing to know more about designing aspects. So, more in editing, I can edit some of my own work, but not that perfect. Let's say doing editing I am able to edit, like 60% but not so full. So I'm willing to know more in editing and some designing. I'm willing to know more, you know, some people are able to design games. So I want to know more about the designing of games.”

“when I'm at home whenever I want to do something in ... , I don't understand. I, I ask my, my mom and my brother. So they do put me through... I'd say, I'm okay at home because they do have time for me at home. So we do master me together, we also work together at a home.”

David: “I wanna say if there are platforms like, like videos to watch that find ourself as a guideline, if there are videos that made available, teach basic instructions, and a platform that you can learn from easily. You can do that. And also, because my dad is not always around, so most of the times I, I try to watch some videos on YouTube to check to check if I'm actually doing work. Actually, it's not a thing. If you can get an instructor to help you is more efficient.”

“Okay, what I'm trying to say is the only way I can... I'm thinking is getting someone that I can meet to teach me the basics, and the basic instruction on how to function. So no bad experiences in getting the if device working... functioning. That I just think I can I can do.”

Sara: “I said the more you have a lot of people, your other brother, your dad, you'll be able to have access to what you need to do. We will talk to your dad dad, will l able to use

		the internet? Yes, you can go and sometimes if you need he's also connected to check what you need to check. Even if you don't want to use your phone or your laptop or any other, you can use your parents also have more websites to what you need.
	Digital Access	**Paul**: "maybe proper connectivity without ... the internet connection should be should be {...} base, strong throughout should be stable, I can say stability of internet should be maintained to be stable. Also, the use of laptop I can say I should improve or advance from the one I'm using right now maybe to get an... get another laptop that's more advanced than this one, would get another generation than this one I have.

Table 2

Digital Activities at Home

Activities at Home	Participants
Watching movies	P1
Using various social media platforms	P1, P3, P4, P5
Chatting or video calling with friends through instant messaging apps	P1, P3, P5
Searching or accessing the intended information and news	P1, P3, P4, P5
Reading books or blogs	P4, P5
Ordering and purchasing from online websites	P5
Downloading content from the Internet	P2
Doing tasks and assignments from school	P1, P2
Playing video games	P1, P3
Coding	P3

Table 3

Digital Experience of Participants at School

Digital Challenges	
Digital Skills	**Mary:** "The major challenges I usually like working in groups sometimes I feel like you can be left behind because

	we are in a group settings. And also some are learning really fast and maybe like you are maybe like left behind. And also you also have to consider the issue maybe like some students, they they are maybe like slow learners require extra practice. And also you have to have that extra time for extra time for practice."
	Sofia: "sometimes in the assignments... let's say sometimes I do think a lot on the I don't get the assignments I have to try, try, try to be able to get what I supposed to get. I have to work, read, come back to the assignment. work and read it untill I get the necessary information I needed."
	Paul: "[…] challenges not being able to complete my task the given task on time. Maybe because maybe being maybe for example maybe the task requires some coding knowledge in coding and I'm not confident on coding so I have to take much time to get to understand maybe yeah, that's a challenge I usually have."
	Sara: "The challenge is the coding, because it is very hard to know about the coding, in fact be able to know about the coding, it's very, very long, the ... I have to put more effort and more work on how to know about, that was a very, very big challenge for me. And I was able to overcome it."
Confidence	**Mary:** "Um, I'd say at first I was a bit shy because you don't want to show everyone how dumb you are with the Internet. You don't even want other... so I would just like be in a group session and maybe like sitting somewhere not contributing anything, when the pros are doing their work so.. but in time I think it took me time and even confidence like you scale up slowly. You also you learn this know next time you have something to do not just sit there."

	Sofia: “I'd say lack of confident and application. You know some application we are able to get the application ... by the application will give the student to remove a problem and some does not have the confident in their... my teacher who do advise they say keep trying, Keep trying. A day you'll be a perfect {...}.”
	Paul: “I can say I can pick 2. I find it because one is related to device and lack of confidence.”
Digital Access	**Mary:** “I'd say lack of confident and application. You know some application we are not able to get the application [...] the application will give the student to remove a problem and some does not have the confident in their... my teacher who do advise they say keep trying, Keep trying. A day you'll be a perfect {...}.”
	David: “Okay, oh, the the only challenge that we face at school is we when we're online, we, you know, because using our, our... using the internet at school ... some website that the are that are blocked. but if you try to go to to the website, it will, it will display like you did not have access to it... we didn't have enough... you can't access it. So that's what the school do, do some time, it's the laptop, the laptop is only make for students for assignment, submission, checking, checking your grades, and you can't really do much on the on the internet while in school. Because most of the time, a lot of websites are being blocked we can't have access to it. For example, Facebook, you can't have access to Facebook in school, Twitter, you can't have access to Twitter in school, they have blocked the website. So there's only... sometime like you're not up to 10 years old that you cannot access this website.”

		Paul: “The challenge Maybe at times some computers might not be not working well, so you have to share with another person or you share with a neighbor who is with next to if you're if the computer that you're assigned to is not working you share with your friend who is nearby you.”
		Sara: “I'd say sometimes, you know, it's the causes of traffic. Everybody's using the same internet at the time so in school, many people I know said it's slow, slow. Let's say if people... when in school there are more users there, there are always traffic when using the school Internet... when I'm at home there is no traffic we are just three or four our home by the TV and my parents are not home, in my class, so there's traffic.”
Digital Strength		
	Digital Skills	**Sofia:** “at School's activities, education, just like about was supposed to give you the necessary information in the internet.”
		“[…] if I want to learn cooking or baking, I have to go to the Youtube to learn what I want to do. And sometimes, I want to learn about the language I just go to my YouTube to learn what I want to learn there I try, try what' I need to do.”
		David: “I love I love visiting somewhere on website. Sometimes I ... I love being tech savvy as I go into the new trend, or new fashion online. So I'm always keeping... trying to keep up to date of what is actually happening around me. So sometimes I... most time I love paying watch online because I love watching movies, movies, I love watching movies. I love engaging in social network. I love sharing my experience information. I love new things

		online. I love new things. Sometimes I do work, the {constraints} are what I watch. I also want to try to perform it."
		Paul: "despite having not enough not not being confident in coding but what I feel that I have strength in researching and getting more information to make sure that I get to understand anything that I don't get it well in classroom."
	Confidence	**Mary: "**My strength I think right now is I believe in myself and my skills. And I'm really confident I don't shy away from maybe like trying, I'm open to learning from others, even like being challenged."
	Digital Access	**Sara:** "I am in school to learn and to give more information and have access to more reliable information. When I'm in school, I'm only focusing on what I'm in school to do. I'm in school to learn. So also give more information."
		David: "my strength in school is like on... the internet we have this[..] some online resources, such as downloading some maybe books, you can download some books in school, you can share. And the school also through our portal we do you can also check our friends. Because on our student portal, we also had some... you can chat while in class. You can chat you can chat to your lecture, you can chat with your teacher. And that's just what we do. But in school I do have access to unlimited music. I can listen to music when I have some time, and watch some video clips... that's what I do in the screen time ... most of the time.
Digital Needs	Digital Access	**Mary:** "I'd say like, students like doing extra practices of the work, I'd say, the experience can also be better if we have many gadgets because I feel like sometimes maybe you need to do that something new to learn […] they need

	to be enough for maybe like, if it's a class that goes to the lab, they can all the every student can access or maybe like two students one gadgets, that ratio is equal." **David:** "number of students using the same device because I love I love using it I love having access to my device anytime on the end of week, anytime, on the week. So most of the time... and I want to use it my ... you say, I also have something that I have to I want to do something different on the system. So most of the time in school that's the challenge." **Paul:** "May be having proper devices that will enhance learning and make our learning ease, also having being being having friendly teachers and technicians who advise students not to give up... direct them well, give all the required information for them to learn. Yeah. Also providing students with enough materials that's required for learning." **Sara:** "I'd say sometimes, you know, it's the causes of traffic. Everybody's using the same internet at the time so in school, many people I know said it's slow, slow. Let's say if people... when in school there are more users there, there are always traffic when using the school Internet... when I'm at home there is no traffic we are just three or four our home by the TV and my parents are not home, in my class, so there's traffic."
Availability of Digital Support	**Sofia:** "Let's say if there is more knowledge, more advice and more information, and more guidelines. So this will be very, very perfect." "[…] if there's more like two or three teachers to give us a guideline on the test it would be very okay."

	Paul: "May be having proper devices that will enhance learning and make our learning ease, also having friendly teachers and technicians who advise students not to give up... direct them well, give all the required information for them to learn. Yeah. Also providing students with enough materials that's required for learning."

Table 4

Digital Activities of Participants at Schools

Digital Activity	**Participants**
Coding	P4, P5
Editing	P2, P3, P5
Designing	P2, P5
Publishing	P3