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# Internet and Smartphone Use, Internet-Related Risks, and Satisfaction with Life Among University Students During the COVID-19 Pandemic: A Cross-Sectional Study

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A thesis submitted in partial fulfillment of the requirements for the Master of Science degree in Health and Rehabilitation Sciences

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## Abstract

The purpose of this cross-sectional, survey-based study was to examine university students' internet and smartphone use (including smartphone habits), internet- and social media-related risks, and satisfaction with life during the early stages of the COVID-19 pandemic in Ontario, Canada. Four objectives were examined, including associations among the study variables, including demographic factors. Results revealed a significant increase in university students' ( $N = 1,625$ ;  $M_{\text{age}} = 22.4$ ,  $SD = 5.1$ ; 78.8% female) internet use from pre- to early-pandemic ( $p < .001$ ). Approximately one in ten students reported experiencing internet-related incidents (e.g., bullying, harassment, etc.) during the pandemic. Smartphone use and habits were significantly ( $p < .001$ ) positively correlated with social media risks, while smartphone use and social media risks were significantly ( $p < .001$ ) negatively related to students' satisfaction with life. Results are discussed in the context of existing literature in this area, and potential implications and future directions are presented.

## Keywords

internet use, social media, university students, COVID-19 pandemic, satisfaction with life, smartphone use, internet-related risks

## Summary for Lay Audience

For many, the COVID-19 pandemic has resulted in an increased reliance on technology for school, work, communication, information, and social connection purposes. This has been particularly true for young people. Thus, the purpose of the present study was to examine, via a one-time online survey, university students' self-reported internet use, internet-related incidents, smartphone use and habits, social media risks, and satisfaction with life during the early stages of the COVID-19 pandemic in Ontario, Canada. Four specific research objectives were advanced, which included an examination of demographic factors (i.e., gender, ethnicity, education level, and age) and associations among the study variables. Undergraduate and graduate students from Ontario universities were recruited via social media and mass e-mails, and were invited to complete an online survey in March/April 2020. A total of 1,625 students ( $M_{\text{age}} = 22.4$ ,  $SD = 5.1$ ; 78.8% female) from 21 universities provided data for this study. Results revealed a significant increase in students' internet use from pre- to early-pandemic, and that approximately one in ten students reported experiencing at least one online incident (e.g., bullying, harassment, etc.). With regard to smartphone habits, over 90% of students reported *checking their smartphones right before going to bed and as soon as waking up*. Results also showed that in comparison to male students, significantly more female students reported experiencing moderate/high social media risks (e.g., losing sleep, feeling anxious, etc.). Further, students classified as 'high' smartphone users and those who reported *often* or *always* engaging in specific smartphone habits were significantly more likely than those with lower use/habits to experience social media risks. Lastly, students who reported high smartphone use and experiencing more social media risks had significantly lower satisfaction with life scores than those who reported lower smartphone use and fewer social-media risks. Findings from this study contribute to the growing understanding of internet use and online experiences (including potential risks) among university students, both pre- and early-pandemic. Understanding university students' online experiences has important health and safety implications, and is also important for educators, administrators, policymakers, and other stakeholders with an interest in students' technology use, university experiences, and overall wellbeing.

## Acknowledgments

First of all, I would like to express my sincere gratitude to my supervisor, Dr. Shauna Burke, for her endless patience and thoughtful feedback and recommendations on this thesis project. Her continuous support and encouragement throughout this journey have enriched my Master's studies in more ways than I can explain, thank you.

Second, I would like to extend my thanks to my advisory committee, Dr. Jen Irwin and Dr. Trish Tucker. I am grateful for your ongoing support and feedback throughout my research. I would also like to thank Dr. Jamie Seabrook for providing advice regarding analysis.

To my fellow research mates, old and new, I appreciate your support throughout all the ups and downs of this journey. Your willingness and openness to listen and provide constructive and critical feedback is greatly appreciated. Nerida, your authentic mentorship is clear in the support and all that you've taught me through your candour.

Last but certainly not least, to my family and my greatest support system, your love and encouragement has helped me succeed in the past two years of my studies. Thank you for continually supporting all my endeavours.

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## Chapter 1

### 1 Introduction and Literature Review

The general aim of this study was to examine the internet (including smartphone) use, internet-related incidents, social media risks, and satisfaction with life reported by university students at the beginning of the COVID-19 pandemic in Ontario, Canada. This chapter contains an overview of the currently available literature pertaining to internet and smartphone use among university students both pre- and during the early stages of the pandemic, as well as potential risks associated with their use. More specifically, literature concerning negative outcomes associated with smartphone use (e.g., loss of sleep, feelings of depression or anxiety), online incidents (e.g., cyberbullying, online harassment), and university students' satisfaction with life, as well as potential relationships among these variables, is explored. Finally, this chapter begins with an overview of the COVID-19 pandemic and the associated public health measures that were in place during the time of data collection in an effort to provide contextual and background information and as part of the rationale for this study.

#### 1.1 Background

Since this Masters project represents a portion of a larger research project (*iBelong – Phase 1*) which was conducted during March and April 2020, this section includes some important background information pertaining to the project as a whole, including events that occurred and public health measures that were in place during this time period in Ontario. This is followed by a brief introduction to and overview of the variables explored in this study (i.e., internet and smartphone use, online risks, and satisfaction with life), as they pertain to university students specifically.

An outbreak of the SARS-CoV-2 virus, resulting in coronavirus disease (COVID-19), was first reported in Wuhan, China in December of 2019 (World Health Organization [WHO], 2020a). By end of January of 2020, the virus had spread to thousands of people in and beyond China, prompting the WHO to declare a public health emergency of international concern (Mahase, 2020; WHO, 2020b). Due to the high transmission rate

observed worldwide in early 2020, the WHO declared the COVID-19 outbreak a global pandemic on March 11, 2020 (WHO, 2020c). In an effort to control the spread of the virus and protect the public, the WHO and public health officials/organizations around the world recommended and/or implemented various public health measures such as physical distancing and social gathering restrictions (e.g., Government of Canada, 2020a; Government of Canada, 2021a; Tabari et al., 2020; World Health Organization, 2020d).

In Canada, all provincial and territorial governments declared a COVID-19-related public health emergency and discouraged the public from international travel in March, 2020 (Cyr et al., 2021). In parallel with these and other Federal-level decisions related to the pandemic, each provincial and territorial government developed their own public health and safety measures to monitor and slow the transmission of the COVID-19 virus. For example, in March 2020, the Ontario government announced the closure of all publicly funded schools (i.e., elementary and high schools) and the temporary closure of various public settings and businesses (e.g., libraries, private schools, churches and other faith settings, bars, and restaurants; Government of Ontario, 2020a). Further, the majority of Ontario universities announced that classes would be moved online for the remainder of the term (i.e., from mid-March 2020 until end of April 2020) including most examinations (Ontario Universities Council, 2020).

Along with the closure of businesses and schools, the Ontario government recommended a variety of public health measures including physical distancing (i.e., maintaining at least a two-meter distance from others); frequent hand hygiene and respiratory etiquette (i.e., washing hands with soap and water for 20 seconds or more and covering one's mouth and nose when coughing and sneezing); and wearing a non-medical mask or face covering when in public settings, specifically indoors (Government of Ontario, 2020b). The provincial government also mandated some public health measures such as prohibiting social gatherings in March, 2020 (i.e., prohibitions of outdoor gatherings larger than 250 people and social gatherings of more than 5 people indoors; Government of Ontario, 2020b). On March 24th, 2020, the Federal government announced an Emergency Order under the Quarantine Act requiring people entering Canada to quarantine (i.e., anyone who had travelled outside of Canada were ordered to quarantine

for 14 days upon returning; Government of Canada, 2020b) and isolation (i.e., individuals who had tested positive for or had symptoms of COVID-19 were required to isolate from others in the same household; Government of Canada, 2021a; World Health Organization, 2021).

The COVID-19 pandemic is the first to have occurred in the digital era (Shepherd, 2004); as such, the rapid shift to online learning and work for most schools and workplaces led to an increased reliance on the use of technology to operate and communicate (De et al., 2020). The World Economic Forum COVID Action Platform (2020) presented an overview of ten technological trends that increased during 2020, including: online shopping; digital and contactless payments; distance learning; remote work; telehealth; online entertainment; Supply Chain 4.0 (a new supply chain technology built to counter disruptions caused by the pandemic); 3D printing, robotics and drones; 5G; and information and communication technology. Certainly, a shift towards greater internet use was in motion prior to the COVID-19 pandemic for many Canadians (e.g., Statistics Canada, 2018); and, given the impact of various public health restrictions on work, learning, and in-person social interactions, the dependence on technology was expected to surge throughout the course of the pandemic (De et al., 2020; Statistics Canada, 2020). Indeed, research conducted throughout the pandemic has shown that individuals have been using technology to mitigate reduced social interactions, feelings of loneliness, and to fulfill the need for social connectedness during such uncertain times (Fitzgerald et al., 2021; Haddad et al., 2021; Wang et al., 2020).

Globally, youth and young adults (aged 13-30 years) have been labelled “digital natives” as they were born during the peak of digital technology advancement and development (Bittman et al., 2010; McMullen, 2012; Moreno et al., 2013; Shepherd, 2004). Young people, including post-secondary students, have faced significant disruptions to their everyday lives throughout the pandemic, due in large part to the lack of (or limited) in-person interaction (Zimmermann et al., 2020). As such, it is perhaps unsurprising that university students have been identified globally as one of the primary user groups of digital technology (e.g., smartphones, computers, web and video browsing tools and platforms) during the pandemic (Vargo et al., 2020). Even pre-pandemic, data from

Statistics Canada (2018) showed that Canadians aged 15 to 24 years with a post-secondary education were among the highest internet users in Canada (with 98.6% reporting active internet use; Statistics Canada, 2018). More recently, Statistics Canada data from late 2020 showed that 99.4% young adults (aged 15 to 24 years) were using the internet. These data also indicated that internet use among young adults had increased during the COVID-19 pandemic (Statistics Canada, 2020).

In addition to facilitating online learning during the pandemic, research conducted pre-pandemic has shown that there are numerous positive outcomes associated with information and communication technology engagement among university students (e.g., Boyd & Ellison, 2007; Ellison et al., 2007; Jones, 2009; Rayan et al., 2017; Smock et al., 2011). With the increased access and use of the internet and social media by post-secondary students over the past couple of decades (Abdel-Salama et al., 2019; Anand et al., 2018; Bilodeau et al., 2021), researchers have linked students' internet and social media use with increased social opportunities (Boyd & Ellison, 2007; Ellison et al., 2007; Jin, 2013; Kim & Kim, 2017; Shields & Kane, 2011). For example, research conducted with post-secondary students in the United States has shown that internet use can facilitate social engagement and face-to-face interactions during students' university experiences (Shields & Kane, 2011). Similarly, the authors of another study conducted with university students in the United States found that social media use was positively associated with the ability to create a diverse social network while at university (Kim & Kim, 2017). University students have also indicated that using social media sites and applications—and in particular, instant messaging, status updates, posting pictures, links, and stories—allows them to remain connected with their friends and families during the university/college transition (Ellison et al., 2007; Smock et al., 2011). More specifically, studies conducted with undergraduate students have shown that a primary reason for using social media is to facilitate instant communication with friends (Bicen, 2015), and to increase and maintain their social capital (i.e., relationship with friends and peers; Ellison et al., 2007), all of which can enhance and facilitate their transition to university and overall university experience (e.g., Archibald & Clark, 2014; Ferguson et al., 2016; Smock et al., 2011).

Researchers have also found that excessive internet and/or social media use can be problematic for students (e.g., Castellacci & Tveito, 2018; Paez et al., 2020). In fact, coinciding with the rise in internet use during the pandemic by post-secondary students (e.g., Lin, 2020; Vargo et al., 2020), there has been an increase in the risks for internet addiction (Duan et al., 2020; Falynkova et al., 2020; Ozturk & Ayaz-Alkaya, 2021) and physical and psychological adverse effects (e.g., loss of sleep, depression, and anxiety; Fraser et al., 2022; Zhang et al., 2022) among high school and post-secondary students. Likewise, researchers investigating smartphone use among university students during the pandemic have reported increased use, as well as smartphone-related adversities (e.g., sleep deprivation, emotional distress, decreased physical activity; Romero-Blanco et al., 2020) and smartphone addiction (Kil et al., 2021).

Emerging research also suggests that the many stressors brought upon and/or exacerbated by the pandemic have negatively impacted young peoples' subjective wellbeing, including their perceived satisfaction with life (e.g., Kil et al., 2021; Kokkinos et al., 2022; Rogowska et al., 2021a; Rogowska et al., 2021b). The relationship between the use of social media and subjective wellbeing has been explored in past research (e.g., Khine et al., 2020; Lindsay et al., 2016), and generally speaking, findings have shown that social relationships and engagement via social media sites are strong positive determinants of subjective wellbeing among university students (e.g., Brown & Kuss, 2020; Kross et al., 2013; Seabrook et al., 2016; Steers et al., 2014). Further, studies that have examined university students' social media and internet use (e.g., Liu & Ma, 2018; Weaver & Swank, 2020) have shown negative correlations between problematic social media use and students' satisfaction with life.

Although recent research has focused on university students' internet use and its impact on health (e.g., Kil et al., 2020; Lin et al., 2019; Peltzer and Pengpid, 2015; Yang et al., 2019), limited research has been conducted regarding Canadian university students' internet and smartphone use and risks, as well as their satisfaction with life, during the pandemic. Thus, the current thesis consists of an examination of university students' internet (including smartphone) use, experiences of internet- and social media-related incidents and risks, and satisfaction with life at the beginning of the COVID-19 pandemic

in Ontario, Canada. Given these foci, the remainder of the introduction includes a discussion and overview of these study variables and their potential relationships.

Lastly, it should be noted that definitions for each study variable are provided in the relevant sections below, and operationalized in the Method section (Chapter 2). However, it should be noted that for the purpose of the present study, the terms internet use and online use will be used interchangeably to describe post-secondary students' use of web-based sites and platforms (Anderson et al., 2016; Khan et al., 2014). Further, the term social media will be used to describe internet-based platforms including social networking sites and social media applications (Aichner et al., 2021).

## 1.2 Internet and Smartphone Use

Internet use is defined as engagement in any online activity such as social networking/social media sites, online video/audio streaming services, web browsing, and video gaming services (Anderson et al., 2016). The umbrella term *internet use*, which also encompasses *social media use*, has been defined as the use of “websites and online tools that facilitate interactions between users by providing them with opportunities to share information, opinions, and interests” (Khan et al., 2014, p. 607).

Since the early 2000s, the technology of smartphones has allowed individuals worldwide to have nearly ubiquitous and continuous access to the internet (and social media), which has greatly impacted overall internet habits and usage (Oulasvirta et al., 2021). Over the past two decades, the number of Canadians who use the internet daily has increased exponentially (e.g., Bilodeau et al., 2021; Statistics Canada, 2020). This increase has been particularly noticeable among young people; in 2012, 88% of those aged 16-24 in Canada reported using the internet at least once per day (Statistics Canada, 2012), whereas just six years later (i.e., in 2018), approximately 98% of Canadians aged 15-24 reported being regular internet users (Statistics Canada, 2018a). More specifically, among post-secondary students in Canada (including undergraduate, graduate, and college students), nearly *all* (i.e., 99%) reported regular internet use in 2018 (Statistics Canada, 2018a). With regard to specific online activities and engagement, post-secondary students report accessing the internet to use social media sites (99%; e.g., Facebook, Instagram,



etc.); to send and receive emails (100%); to use instant messaging services (99%; e.g., Facebook Messenger, WhatsApp); to make online voice and video calls (79%); to access the news (93%); and to play online video games (56%; Statistics Canada, 2018b). Given such findings, it is not surprising that internet and social media use have been highlighted as an important, even integral, part of college and university life, used by students for academic, social, and various other reasons (e.g., Ellison et al., 2007; Jones, 2009; Rayan et al., 2017; Smock et al., 2011).

Similar to the increase observed for internet use among young people in Canada, smartphone use has also become nearly universal; in 2021, 96% of individuals aged 15-24 reported having a smartphone for personal use, and 70% reported checking their smartphone at least once every 30 minutes (Statistics Canada, 2021). For many people, including young adults, smartphones provide easy (and in most cases instantaneous) access to the internet, social networks, information, and communication opportunities (Demirci et al., 2015). Such widespread access to the internet, social media, and information and communication opportunities via smartphone technology has proven to be important in students' transition from high school to university (e.g., Burton et al., 2013), and even more so during the pandemic (David & Roberts, 2021)

Generally speaking, studies examining internet use among university students have demonstrated both positive (e.g., enhanced social capital; Bicen et al., 2015; Ellison et al., 2007; Smock et al., 2011) and negative outcomes (e.g., cyberbullying, depression, and internet addiction; Castellacci & Tveito, 2018; Paez et al., 2020). In terms of potential benefits, it is undeniable that the internet has facilitated access to information (Bicen et al., 2015), improved global communication (Bicen et al., 2015; Smock et al., 2011), and created new education-related opportunities (e.g., allowing for classroom collaboration and academic networking; Lampe et al., 2011). Indeed, social engagement is an important and positive by-product of the internet, specifically among young people (Bicen et al., 2015, Smock et al., 2011). Of course, as noted above, a number of potential risks and adverse consequences of internet and smartphone use among university students have also been documented (e.g., Anderson et al., 2017; Moreno et al., 2018; Wang et al., 2020), and will be explored further below and in this study.

One form of internet use in particular—that is, the use of social networking sites—has been consistently linked with increased social opportunities for young people (Lampe et al., 2011; Williams, 2018). Social networking sites, also referred to as *social media sites* or *social media apps*, have been defined as web-based services that allow users to create profiles to their desired privacy setting; share their profiles with others (friends, family, or publicly); and share information on their platforms within the system (Boyd & Ellison, 2007; Carr & Hayes, 2015). With regard to university students in particular, social networking sites have been identified as a means through which students are able to stay connected during their transition to university life via instant messaging, status updates, and posting pictures, links, and stories (Ellison et al., 2007; Smock et al., 2011). More specifically, postsecondary students have noted that certain social media sites, such as Facebook, have allowed them to keep in touch with friends and family (Ellison et al., 2007), and have assisted them in identifying like-minded friends and peers as they made the important and oftentimes challenging transition from high school to university (Lampe et al., 2011). Additional benefits associated with internet use, as reported by university students, have included staying up to date with news, enhancing their studies, and improving relationships (Alzayyat et al. 2015; Rayan et al., 2017).

The benefits associated with the internet, and social media in particular, have also been highlighted throughout the COVID-19 pandemic (Király et al., 2020; Statistics Canada, 2020), as Canada and other countries have implemented restrictions on social gatherings, schools, and workplaces at various times throughout the pandemic (e.g., Government of Canada, 2021; Government of Ontario, 2020; WHO, 2020). As discussed above, during these uncertain times, the internet has been used widely as a medium for accessing COVID-19-related information and disseminating knowledge to the public (e.g., Chan et al., 2020; WHO, 2020); as a space for researchers and scientists to share scientific and public health information related to the pandemic (e.g., Budd et al., 2020; Whitelaw et al., 2020); and as a tool to facilitate communication and connection with others in light of physical distancing requirements and lockdown restrictions (Király et al., 2020). The internet has also provided individuals across the globe with access to entertainment, virtual exercise classes, and healthcare-related tele-consultations (Király et al., 2020).

In Canada, more than half (57%) of individuals aged 15-34 years reported spending more time on social media and online messaging services during the early phases of the COVID-19 pandemic (Statistics Canada, 2020). Additionally, young Canadians (aged 15-34) have reported an increase in their use of video streaming services (e.g., YouTube; 68%), audio streaming services (e.g., Spotify; 44%), online information services (e.g., Wikipedia; 46%), online productivity services (e.g., Google Drive; 17%) and online education services (e.g., Google Classroom; 29%; Statistics Canada, 2020) during the pandemic. In terms of reasons for use, studies conducted in Canada during the early pandemic (April, 2020-August, 2020) reiterated the findings that university students were using the internet and social media as coping methods and to stay connected (Mota et al., 2021; Prowse et al., 2021). The authors of these studies also noted some important potential risks associated with internet and social media use in this population, however. Prowse and colleagues (2021), for example, found that frequent social media use was associated with negative mental health among Canadian university students ( $n = 366$ ) during the pandemic. Furthermore, Mota and colleagues (2021) found a significant and positive correlation between university students' ( $n = 275$ , over 17 years old) level of internet use and self-reported mental health disorders. Further, Mota and colleagues suggested that *excessive internet* or *social media use* makes students more vulnerable to *problematic social media use* or internet addiction (discussed in detail below).

### 1.3 Internet- and Social Media-Related Risks

Despite the many benefits associated with internet use identified by young people (e.g., Bicen et al., 2015; Ellison et al., 2007; Smock et al., 2011), research has also shown that an increase in internet and smartphone use can place individuals at risk for various internet-related risks (e.g., cyberbullying, internet addiction, and depression; Anderson et al., 2017; Lindsay & Krysik, 2012). Experts and researchers have suggested that the increase in frequency and intensity of internet and smartphone use observed among young people in recent years (Abdel-Salama et al., 2019; Anand et al., 2018; Balhara et al., 2018; Bilodeau et al., 2021), and particularly throughout the pandemic (e.g., Mota et al., 2021), is concerning because it can lead to *problematic internet use* (Anderson et al., 2017; Demirci et al., 2015; Hwang et al., 2012). Problematic internet use has been

defined as risky, excessive, and impulsive use of the internet leading to physical, psychological, and emotional health concerns (Moreno et al., 2013; Moreno et al., 2018; Wang et al., 2020). With regard to young people specifically, pre-pandemic Statistics Canada (2018) data showed that nearly half (i.e., 47%) of people in the 15–24-year-old age category reported staying on the internet for longer than intended, and approximately one-third (34%) reported difficulties with concentrating on tasks or activities as a result of their internet use. More recently, during the early stages of the pandemic, Statistics Canada (2021) data collected with the same cohort (i.e., those aged 15-24) showed that a growing number of young people were reporting problematic smartphone habits such as checking their smartphone before going to bed (75% in 2020 vs. 70% in 2018) and checking their phone at least once every 30 minutes (70% in 2020 vs. 55% in 2018). These trends are worrisome, as researchers have noted that young people, specifically college and university students, may be one of the most vulnerable populations to problematic internet and smartphone use (e.g., Anderson et al., 2017; Barkely & Lepp, 2016; Roberts et al., 2014; Salehan & Negahban, 2013).

Given that the internet is available and easily accessible on most smartphones, the issue of problematic smartphone use has been identified as a specific and pervasive type of problematic internet use (e.g., Montag et al., 2019). The increased use of smartphones has been associated with a number of physical health-related problems among young adults (e.g., blurred vision and wrist pain; Kwon et al., 2011), as well as issues associated with mental health and general wellbeing (e.g., depression, anxiety, poor sleep quality; Demirci et al., 2015). For example, Demirci and colleagues (2015) used the Smartphone Addiction Scale to measure problematic smartphone use among university students ( $n = 319$ ) in Turkey. The results of this study showed that those who scored high on the tool reported significantly higher levels of depression and anxiety compared to students who were classified as low smartphone users. Interestingly, their findings showed a positive correlation between Smartphone Addiction Scale scores and depression levels, anxiety levels, and sleep disturbances (Demirci et al., 2015). Likewise, Kil and colleagues (2021) found that smartphone addiction, as measured via Cho and Lee (2015) measurement of smartphone addiction, was associated with emotional risks (i.e., depression, anxiety, and

stress) among post-secondary students ( $n = 601$ ) at a Midwestern university in the United States.

Approximately one third of young adults (aged 15-24) in Canada have reported a range of negative behavioural outcomes associated with social media use, including loss of sleep (34%), trouble concentrating on tasks (32%), and decreased physical activity (26%; Statistics Canada, 2020). With regard to sleeping problems specifically, Peltzer and Pengpid (2015) found that excessive internet use among university students ( $n = 20,222$ ;  $M_{\text{age}} = 20.8$ ,  $SD = 2.80$ ) from 26 different countries was associated with insomnia, which was attributed to students staying up late online (Peltzer & Pengpid, 2015). In addition, a cross-sectional study examining Spanish nursing students' ( $n = 207$ ;  $M_{\text{age}} = 20.6$ ,  $SD = 4.62$ ) sleeping patterns during the COVID-19 pandemic (February, 2020 – April, 2020) showed that sleep latency (i.e., trouble falling asleep) was significantly higher due to their increased use of the internet at that point in the pandemic (Romero-Blanco et al., 2020). Taken together, these findings are not surprising given research (e.g., Lin et al., 2019; Yang et al., 2019) showing that smartphone use before bedtime can prolong sleep latency and decrease sleep duration among university students.

Post-secondary students are susceptible to negative online interactions and social comparisons on social media, many of which are associated with negative outcomes (i.e., feelings of depression and anxiety; Samaha & Hawi, 2016). In a systematic review of 70 studies, Seabrook and colleagues (2016) noted that frequency of social media use, using social media for social comparison purposes, and problematic social media use/social media addiction were all prominent risk factors for depression and anxiety among young adults. Additionally, a strong association between social media use and perceived social isolation and loneliness was found among young adults aged 19-32 in a cross-sectional study conducted in the United States. ( $n = 1,787$ ; 50.3% female; Primack et al., 2017). More recently, Schimmele and colleagues (2021) examined the negative effects of social media use experienced by approximately 6,900 Canadians aged 15 years and older using 2018 Canadian Internet Use Survey data. They found that feelings of anxiety, depression, and feeling envious of others due to social media use were significantly more prevalent among young people (aged 15-34) than among those aged 35 to 49.

Many researchers have suggested that globally, the mental health of university students has been negatively impacted throughout the COVID-19 pandemic (e.g., Faisal et al., 2021, Huckins et al., 2020; Li et al., 2021; Sundarasan et al., 2020), and some have argued that increased social media exposure could be a contributing factor (Huckins et al., 2020; Zhong et al., 2021). Studies have shown that increased engagement with the internet and social media have been associated with stress and feelings of anxiety and depression among university students, due in part to exposure to online pandemic-related information (Browning et al., 2021; Huckins et al., 2020). Unfortunately, limited evidence exists pertaining to the potential negative outcomes and risks experienced by university students in relation to their social media and smartphone use in the context of the COVID-19 pandemic, a time in which students have relied on technology for a number of reasons (e.g., Hapsari, 2020; Mota et al., 2021; Prowse et al., 2021) and as many continue to struggle with its lingering effects (e.g., Elhai et al., 2020; Oka et al., 2021).

#### 1.4 Internet-Related Incidents

The term internet-related incidents is used throughout this study to encompass six online experiences (i.e., bullying; harassment; discrimination, stalking; fraudulent use of one's identity; and/or misuse of one's personal media), as outlined in Statistics Canada's 2018 Canadian Internet Use Survey. In Canada, pre-pandemic data has shown that 13.2% of individuals aged 15 to 24 years have reported being victims of one or more online incidents in the previous year, with the greatest proportion of young people reporting online harassment (5.5%), followed by online bullying (3.8%), misuse of personal pictures, videos or other content (3.8%), fraudulent use of one's identity (2.8%), discrimination (2.6%) and lastly, stalking (2.3%).

In relation to university students specifically, a recent systematic literature review conducted by Shaikh and colleagues (2020) showed that university students who were younger and female were more likely than older, male students to experience cyberbullying incidents (i.e., online harassment and cyberstalking). In addition to gender and age, frequency of internet use was found to be a significant indicator of risk exposure to internet-related incidents such as cyberbullying and cyberstalking (Shaikh et al., 2020). Previous to this review, Walker et al. (2011) conducted a survey-based study on

cyberbullying and associated behaviours among students in the United States ( $n = 120$ ; 70% female; ages 18-24). These researchers found that over half of students (54%) reported knowing someone who had been bullied online, and 11% reported experiencing cyberbullying themselves while in university. Students in this study, now more than a decade old, reported that Facebook, cellphones, and instant messaging were the primary mediums through which they experienced cyberbullying, cyber-harassment, and/or cyberstalking (Walker et al., 2011). Another survey-based study conducted with undergraduate students in the United States ( $n = 974$ ; 51.3% male;  $M_{age} = 20.5$ ) showed that nearly 41% of students reported being victims of cyberstalking incidents at one point in their lives, 23% reported experiencing a form of persistent and repeated online contact after asking them to stop, 20% of the students reported experiencing repeated online harassment, 13% experience unwanted online sexual advancements, 20% experienced repeated harassment, and 4% reported experiencing online threats of violence along with those incidents (Reyns et al., 2012).

Studies conducted with young people have also focused on online harassment (defined as a level of threat that is perceived to be dangerous by the victim; Hindaju & Patchin; Lindsay & Krysik, 2012) and negative messages more specifically (e.g., Finn, 2004; Lindsay et al., 2016; Lindsay & Krysik, 2012). Lindsay and Krysik (2012), for example, surveyed 355 United States undergraduate students ( $n = 422$ ;  $M_{age} = 21.8$ ,  $SD = 5.7$ ) to examine the frequency in which they reported experiencing online harassment, replicating an earlier study conducted by Finn (2004;  $n = 399$  United States undergraduate students) which was used for comparison. The online harassment incidents reported by students in Lindsay and Krysik's (2012) study were more than double those reported by students in Finn's (2004) study (i.e., approximately 43% reporting online harassment in past 2 years versus 16% reporting repeated online harassment in the past year in Finn's study). Lindsay and Krysik noted that the higher prevalence of online harassment incidents reported in their study could be due to students spending more time on social networking sites, as well as the impact of a recently publicized online harassment incident that took place on the campus of the host university during the data collection period of the study (Lindsay & Krysik, 2012).

Internet-related victimization (i.e., cyberbullying and online harassment) has been associated with several mental health-, substance use-, and general health-related problems among university students (e.g., Cénat et al., 2018; Khine et al., 2020; Ybarra et al., 2006). For example, Lindsay et al. (2016) examined incidents of online harassment reported by college students in the United States ( $n = 355$ ;  $M_{age} = 21.8$ ,  $SD = 5.7$ ) and found that these experiences were predictive of feelings of depression and anxiety in both male and female students. Their findings also showed that female students reported experiencing online harassment to a greater extent than male students, as well as more fear associated with these incidents. Further, Khine et al. (2020) found that cyberbullying victimization reported by university students ( $n = 412$ ; aged 18 to 22 years) in Myanmar was positively associated with difficulties in concentration and maladaptive behaviours such as smoking and alcohol abuse.

Throughout the COVID-19 pandemic, individuals belonging to Asian communities have reported increased incidents of discrimination and anti-Asian hate crimes (Yang et al., 2022). Researchers have examined the prevalence of such online incidents including cyberbullying, online harassment, and internet-related discrimination among Chinese university students during the pandemic (e.g., Alsawalqa, 2021; Haft & Zhou, 2021). Specifically, Haft and Zhou (2021) examined perceived discrimination and exposure to negative social media (i.e., comments, posts, etc.) among Chinese university students ( $n = 134$ ;  $M_{age} = 20.0$ ,  $SD = 1.3$ ) studying at American colleges before and during the COVID-19 pandemic. Their findings showed that Chinese students reported experiencing significantly ( $p < .001$ ) greater online discrimination during the COVID-19 pandemic compared to pre-pandemic. Haft and Zhou also reported a strong positive correlation between Chinese students' experiences of online discrimination and feelings of anxiety during the pandemic. Unfortunately, little is known about the prevalence of online experiences in other student populations around the world, and in Canada specifically, throughout the pandemic (Király et al., 2020; Statistics Canada, 2020). In fact, the need for research examining internet-related incidents among racial and ethnic minorities has been highlighted in a literature review published by Edwards and colleagues (2016), given that much of the research in this area has focused on white students in particular. Further, because many studies conducted in this area have focused on one or two



internet-related incidents (e.g., Haft & Zhou, 2021; Lindsay & Krysik, 2012), there is a general lack of reporting on other possible internet-related incidents which could also be experienced by students (e.g., discrimination, identity fraud), perhaps at greater rates during the pandemic (Statistics Canada, 2020).

## 1.5 Satisfaction with Life

As noted previously, young people's experiences of online risks and incidents can negatively affect their overall wellbeing (e.g., Khine et al., 2020; Kross et al., 2013; Lindsay et al., 2016). Wellbeing, and in particular *subjective wellbeing*, are commonly explored concepts among behavioural scientists (Kross et al., 2013). Traditionally, subjective wellbeing has been evaluated by examining both emotional and cognitive wellbeing (Kross et al., 2013). The latter component of subjective wellbeing, cognitive wellbeing, has been defined as an individual's judgement of their satisfaction with life (Diener et al., 1984; Kahneman & Deaton, 2010); a concept that is often assessed using Diener and colleagues' (1985) Satisfaction with Life Scale.

As noted above, a number of studies have explored the impacts of internet and social media use and incidents on physical health (e.g., decreased physical activity, sleep problems; Kwon et al., 2011; Peltzer & Pengpid, 2015; Statistics Canada, 2020) and psychological health (e.g., anxiety and depression; Demirci et al., 2015; Kil et al., 2021), however relatively little is known about the effects of these behaviours and risks on university students' satisfaction with life. Further, among the relatively few studies that have explored satisfaction with life in this population, mixed results have been reported. For example, a study conducted by Leung et al. (2018) aimed to explore perceptions of satisfaction with life (using Diener and colleagues' (1985) Satisfaction with Life Scale) among Chinese university students ( $n = 174$ ;  $M_{\text{age}} = 19.64$ ,  $SD = 1.17$ ) who identified as both victims (68% of students) and perpetrators (58% of students) of cyberbullying. Interestingly, Leung and colleagues found that both types of involvement in cyberbullying incidences were significantly and negatively related to life satisfaction ( $p < .001$ ) among students. Additionally, a study by Samah and Hawi (2016) explored university students' ( $n = 249$ ;  $M_{\text{age}} = 20.95$ ,  $SD = 1.93$ ) satisfaction with life—again measured by the Satisfaction with Life Scale (Diener et al., 1985)—in relation to

smartphone addiction, stress, and academic performance. They found that excessive smartphone use among university students was inversely associated with satisfaction with life. Similarly, a 2014 study conducted by Lepp et al. in the United States examined the relationship between smartphone use and university students' ( $n = 536$ ;  $M_{\text{age}} = 20.48$ ,  $SD = 2.49$ ) self-reported satisfaction with life as measured by the Satisfaction with Life Scale (Diener et al., 1985). Findings showed that students who were classified as 'high frequency smartphone users' (i.e., spent 840 minutes per day on their smartphone; Lepp et al., 2013) reported significantly lower satisfaction with life in comparison to students categorized as 'low frequency smartphone users' (i.e., spent 101 minutes per day on their smartphone; Lepp et al., 2013). Lepp and colleagues also found that depression and anxiety symptoms appeared to mediate the relationship between smartphone use and satisfaction with life; that is, high frequency smartphone users tended to have higher levels of anxiety and depression, which contributed to lower satisfaction with life.

In contrast to the abovementioned studies, Yang and colleagues (2019) explored problematic smartphone use in relation to their satisfaction among Chinese university students ( $n = 475$ ;  $M_{\text{age}} = 19.77$ ;  $SD = 1.11$ ) and did not find a significant correlation. Similarly, Kil and colleagues (2021) found no correlation between smartphone addiction (defined as abnormally high reliance on a smartphone causing negative outcomes) and satisfaction with life among university students ( $n = 601$ ) in the United States. On the other hand, Kil and colleagues found that *normal* smartphone use rather than *excessive* (i.e., 5 hours a day) among students was negatively associated with mental health issues (i.e., depression, anxiety, and stress). Interestingly, however, smartphone use (defined by their self-reported frequent use of texts, calls, emails, and social media application) was found to be positively correlated with college students' satisfaction with life, as measured by the Satisfaction with Life Scale (Diener et al., 1985).

To date, two studies have examined the relationship between university students' self-reported satisfaction with life and their online engagement during the pandemic (e.g., Rogowska et al., 2021a & Rogowska et al., 2021b). A cross-sectional study conducted by Rogowska and colleagues (2021a) examined university students' ( $n = 2,349$ ; 69% female;  $M_{\text{age}} = 23.15$ ,  $SD = 4.66$ ) satisfaction with life, measured via Diener and

colleagues' (1985) Satisfaction with Life Scale, across nine countries during the pandemic (May and July, 2020). While differences were observed in students' satisfaction with life worldwide (e.g., students in Germany and Turkey reporting the highest and lowest satisfaction with life, respectively), a consistent finding among students in majority of the countries was that those who reported experiencing negative impacts associated with the pandemic (i.e., decreased physical activity, lack of social connection, or experiencing anxiety or depression) reported significantly lower satisfaction with life. In a separate study conducted by Rogowska and colleagues (2021b), satisfaction with life—again measured using the Satisfaction with Life Scale (Diener et al., 1985)—was examined among university students in Poland ( $n = 231$ ; 59% female;  $M_{\text{age}} = 23.21$ ,  $SD = 2.28$ ) in relation to stress and coping styles during the first (March – April 2020) and second (November – December 2020) waves of the pandemic. Their findings showed that about half (48%) of students reported low satisfaction with life during the second wave of the pandemic in Poland, with an overall significant decrease in satisfaction with life among students over time (i.e., students reported being *slightly satisfied* in the first wave, which then decreased to an *average or neutral satisfaction with life* in the second wave).

Ultimately, while research pertaining to satisfaction with life among university students has focused primarily on physical and mental health, mixed results have been advanced and gaps remain in our understanding of the impact of internet and social media risks on university students' satisfaction with life, particularly in the context of the ongoing COVID-19 pandemic. Thus, this important area will be further addressed and explored in the present study.

## 1.6 Study Purpose and Hypotheses

The apparent increase in both internet and social media use by young people during the pandemic (e.g., Huckins et al., 2020; Statistics Canada, 2021; Zhong et al., 2021), in conjunction with the literature outlining the internet-related incidents reported by university students both pre- (e.g., Khine et al., 2020; Lindsay et al., 2016; Walker et al., 2011) and during the pandemic (e.g., Haft & Zhou, 2021) highlight the importance of conducting additional research in this area. Therefore, the general purpose of this study

was to examine the internet use (including smartphone use and habits), internet-related incidents, social media risks, and satisfaction with life reported by university students during the early stages of the COVID-19 pandemic in Ontario, Canada. Specific objectives were four-fold: (1) to describe and examine university students' internet use (i.e., weekly online hours) and prevalence of internet-related incidents (i.e., bullying, harassment, discrimination, fraudulent use of one's identity, and misuse of personal media) prior to and during the early stages of the COVID-19 pandemic, including an examination of changes over time (i.e., reported retrospectively in the past year and currently); (2) to describe university students' smartphone use (i.e., times checked per 30 minutes) and habits (e.g., "I check my phone when I wake up"), social media risks (e.g., sleep loss, decreased physical activity, feeling anxious, and feeling depressed), and satisfaction with life; (3) to examine potential associations between students' gender, ethnicity, education level, and age and the study variables of interest (i.e., internet use, smartphone use, internet-related incidents, social media risks, and satisfaction with life); and (4) to examine potential relationships among internet and smartphone use, internet-related incidents, and social media risks, and their relation to satisfaction with life.

Based on the documented positive associations between internet use and internet-related incidents among university students noted by Lindsay and Krisyk (2012), as well as the trend towards increased internet use and internet-related incidents among young people reported by both Statistics Canada (2020) and Haft and Zhou (2021), it was hypothesized that university students would report an increase in internet use and internet-related incidents at the beginning of the COVID-19 pandemic in Ontario. Similarly, based on the high levels of smartphone use reported by young Canadians (Statistic Canada, 2020) and the rapid increase in smartphone usage (Demirci et al., 2015) over the past few decades, it was hypothesized that university students would report high levels of smartphone use and smartphone habits.

With regard to demographic variables (gender, ethnicity, education level, and age), it was hypothesized that university students who were younger and female would be more likely to report high internet and smartphone use as reported by Demirci and colleagues (2015). Additionally, it was hypothesized that university students who identified as younger and

female would be more likely to report experiencing internet-related incidents than students who identified as male and older, as reported in Shaikh and colleagues' (2016) systematic review.

With respect to social media-related risks, it was hypothesized that university students who were categorized as high internet and smartphone users (including those categorized as being high "habitual" users) would be more likely to report social media-related risks, as reported by Seabrook and colleagues (2016). It was also expected that students who reported high frequencies of both internet and smartphone use would report lower satisfaction with life in comparison to students who reported low internet and social media use (e.g., Weaver & Swank, 2020). Finally, it was hypothesized that university students who reported experiencing any internet-related incidents would report lower satisfaction with life scores compared to those who reported no internet-related incidents, due to the detrimental impacts of such incidents highlighted in previous literature (e.g., Fullcharge & Furlong, 2016; Leung et al., 2018).

## Chapter 2

### 2 Methods

#### 2.1 Study Design and Background

This study was conducted as part of a larger, cross-sectional, survey-based study entitled “*iBelong* - Phase 1” which focused broadly on university students’ adherence to physical distancing, social media and internet use, engagement in health behaviours, as well as their perceptions of social connectedness and psychological wellbeing during the early stages of the COVID-19 pandemic in Ontario, Canada. The one-time online survey was administered via Qualtrics (Qualtrics, Provo, UT; version March 2020, © 2020 Qualtrics), a secure online survey software, from March 26th, 2020 to April 30th, 2020. Ethical approval for this study was obtained from the Non-Medical Research Ethics Board at Western University prior to recruitment and survey administration (see Appendix A for ethics approval notice).

As noted in the previous chapter, it is important to note that both the recruitment and data collection phases of this study took place shortly after the World Health Organization (2020) declared COVID-19 a global pandemic on March 11, 2020. During this time period (i.e., March-April, 2020), the Ontario government implemented a number of public health measures and restrictions/closures in an effort to control the spread of the novel coronavirus, including, but not limited to: physically distancing from individuals outside of one’s immediate household; wearing face coverings (e.g., non-medical masks) in public indoor settings; and the closure of non-essential businesses and workplaces (Government of Canada, 2020b; Government of Canada, 2020c). In addition, the Ontario government announced the temporary closure of all publicly funded schools in the province (i.e., elementary and secondary schools; Government of Ontario, 2020a). Similarly, post-secondary institutions announced in-person closures and the transition to online learning and examinations for the remainder of the Spring 2020 term (Ontario Universities Council, 2020).

## 2.2 Participants and Recruitment

Participants were eligible for the study if they: (a) were enrolled as a full-time or part-time student (undergraduate or graduate) at any university in Ontario at the time of recruitment and data collection; (b) were able and willing to complete a single online survey; and (c) provided online consent. Students were excluded if they: (a) were not enrolled at an Ontario university; (b) were unable to complete an online survey; and/or (c) did not provide consent. Several strategies were used to recruit participants, including social media posts (i.e., on Facebook, Twitter, Instagram, and LinkedIn; see Appendix B for example social media posts), a mass e-mail and class announcements at the host university, and via word-of-mouth. Post-survey draws for a chance to win one of three pairs of Apple AirPods were also advertised as a study incentive.

## 2.3 Procedure

Potential participants were able to access the survey directly through social media posts (via a QR code or link found in the description of the posts and/or bio of the accounts) and/or class announcements (via the link provided in the e-mail). Once an individual accessed the online survey, they were directed to the study's letter of information and electronic consent (see Appendix C for letter of information). Upon providing consent, individuals were then directed to a survey webpage containing several provincial and local mental health resources (see Appendix D). Next, prospective participants were asked to respond to a screening question to confirm that they were currently enrolled as an undergraduate or graduate student at a university in Ontario. Eligible participants were then able to access the full survey, which took approximately 30-45 minutes to complete. The survey concluded with confirmation of submission, and an option for students to enter their e-mail address for the incentive draws.

## 2.4 Measures

The full online survey contained a total of seven sections and approximately 185 questions, although the number of questions varied by participant given the use of the Qualtrics "skip logic" feature, which auto-populates survey questions based on participant responses (see Appendix E for the full *iBelong* - Phase 1 survey). Responses

to questions from five survey sections were utilized for the purpose of the current study, including: (1) *demographic information*; (2) *internet use*, which included questions pertaining to internet use and internet-related incidents; (3) *smartphone and social media use*, which included questions pertaining smartphone use, habits, and social media risks; and (4) *psychological wellbeing*, which contained the Satisfaction with Life Scale (Diener et al., 1985). The survey sections were administered in random order by Qualtrics for each participant, with the exception of the first section (i.e., *demographic information*) which was presented first for all participants. Descriptions of the items and measures included within each section are provided below.

#### 2.4.1 Demographic Information

As part of the larger *iBelong* – Phase 1 project, data pertaining to participant characteristics were collected via 18 items. Demographic variables included, but were not limited to: age, gender, education level, ethnicity, sex, university program, and living arrangements prior to and during the COVID-19 pandemic. For the purpose of the present study, an overview of participant demographics was included (see Table 1) to describe the students who completed the survey and were subsequently included in analyses. The specific demographic variables (i.e., gender, ethnicity, education level, and age) that were included in the study analyses to examine whether they influenced the relationships among the variables of interest (i.e., internet use, internet-related incidents, smartphone use and habits, social media risks, and satisfaction with life) are discussed further below. Table 1 (see Chapter 3) contains an overview of participants' age, gender, ethnicity, education level, and enrollment status.

##### 2.4.1.1 Gender

Participants were asked to identify their gender using the following options: *male*, *female*, and *self-describe*. Participants who selected “*self-describe*” were provided with an open-ended text box in which they could identify their gender.



Following data collection, the self-describe category was subsequently labelled “*nonbinary*” based on participant responses.<sup>1</sup> As noted by the American Psychology Association (APA, 2020), gender is a social construct referring to an individual’s social identity. Most participants who chose to self-describe their gender reported identifying as *nonbinary* – which according to APA (2020), commonly encompasses gender identities including genderqueer, gender-nonconforming, gender-neutral, agender, and gender-fluid. All participant responses for gender are presented descriptively, however it should be noted that the *nonbinary* category was excluded from Chi Square, correlational, and regression analyses due to insufficient numbers (i.e., less than 1% of the participant sample; Cameron & Stinson, 2019) required for quantitative analyses.

#### 2.4.1.2 Ethnicity

In the original survey, response options for ethnicity were as follows: *White, South Asian, Chinese, Black, Filipino, Latin American, Arab, Southeast Asian, West Asian, Korean, Japanese, and Other* (again, an open-ended text box was provided for participants who wished to specify an ethnicity that was not listed). Participants were asked to select only one ethnicity category. For descriptive purposes and in line with literature providing guidance on the reporting of race and ethnicity in medical and scientific journals (e.g., Flanagin et al., 2020; Public Health Ontario, 2020), the original ethnicity groupings were re-categorized as follows: Black, East Asian, Indigenous (i.e., Inuit, Metis, and First Nation), Latin American, Middle Eastern/North African, Multiethnic, South Asian, Southeast Asian, and White. For example, the use of the term “Multiethnic”, rather than “Mixed Race/Ethnicity”, was recommended by Flanagin and colleagues (2020) given the potential negative connotations associated with the latter term. Thus, the Multiethnic category replaced the original “Other” ethnicity category and was elaborated on, when

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<sup>1</sup>A total of 11 participants chose to self-describe their gender. Of these participants, six responded using the open-ended textbox for gender identity descriptions—five reported identifying as *nonbinary* and one identified as *agender*.

possible and as recommended by Flanagin and colleagues (2020), to identify the specific ethnicities that fell within this broad category.

For analysis purposes, it was necessary to further collapse the ethnicity categories; a practice common in other studies due to limited cell counts within groups (e.g., Khan et al., 2015; Ostermeier et al., 2021; Stafford et al., 2010). Specifically, in order to accurately examine potential associations between the study variables and ethnicity, no statistical test was deemed to be valid due to large number of ethnicity categories and the small number of participants in some groupings. Therefore, ethnic groups were further collapsed into three categories: Indigenous, white, and visible minority. *Visible minority* is a term that has been used in previous studies related to physical and mental health in Canada (e.g., Agyekum et al., 2020; Heidiger & Cotter, 2020; Mocanu et al., 2020) and has been defined by the Canadian Employment Equity Act as “persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour. ...[and] consists mainly of the following groups: South Asian, Chinese, Black, Filipino, Latin American, Arab, Southeast Asian, West Asian, Korean and Japanese” (Government of Canada, 2021, para. 1).

#### 2.4.1.3 Education Level

Participants reported on their education level using one researcher-developed question: “*Are you an undergraduate or graduate student?*”. Two response categories were provided (i.e., “*undergraduate*” or “*graduate*”), both of which were used for analysis purposes.

#### 2.4.1.4 Age

Participants were asked to report their date of birth (i.e., date, month, year) which was used to calculate age at time of survey completion. For analysis purposes, participants’ ages were categorized according to Statistics Canada (2019) age groupings: 17-19 years, 20-24 years, 25-29 years, and 30+ years).

## 2.4.2 Internet Use and Internet-Related Incidents

Participants were asked 14 questions pertaining to internet use and internet-related incidents. These items were based on and adapted from Statistics Canada's (2018) Canadian Internet Use Survey (CIUS).

### 2.4.2.1 Internet Use

Two questions related to students' internet use were created based on a single CIUS item in order to include two time points—pre-pandemic and “currently” (i.e., at the beginning of the pandemic). Specifically, participants were asked: “Prior to the COVID-19 pandemic, how many hours did you use the Internet in a ‘typical’ week?”; and “How many hours per week are you currently using the Internet (during the COVID-19 pandemic)?”. Response options included: less than 5 hours per week; 5 to less than 10 hours per week; 10 to less than 20 hours per week; 20 to less than 40 hours per week; and 40 hours or more per week. For analysis purposes, responses were then collapsed into three categories representing “low” (< 5-10 hours per week), “moderate” (10-20 hours per week), and “high” (20+ hours per week) internet use. These categories (i.e., low, moderate, and high internet use) were created based on similar categories used by Statistics Canada (2021) in the most recent 2020 CIUS.

### 2.4.2.2 Internet-Related Incidents

Twelve questions were included in the survey to assess self-reported internet-related incidents experienced by participants both prior to and during the pandemic. Again, these items were modified from the CIUS to reflect experiences during the early stages of the pandemic in addition to those experienced in the previous year. Specifically, participants were asked: “During the past 12 months (prior to the COVID-19 pandemic), have you felt that you were a victim of any of the following incidents on the Internet?”; and “Have you been a victim of any of the following incidents on the Internet during the COVID-19 pandemic?”. Six internet-related incidents were included for both of these questions, with ‘Yes’ or ‘No’ response options provided for each. The incidents included: (1) bullying; (2) harassment; (3) discrimination; (4) stalking; (5) misuse of personal pictures, videos, or other content; and (6) fraudulent use of identity. If participants answered ‘yes’ to any

of these questions, they were prompted to indicate how many times (in the past year or during the pandemic) they experienced such incidents. For the purpose of analyses, responses were categorized as either a “Yes” or a “No” to denote whether participants reported experiencing at least one internet-related incident or no incidents, prior to and during the COVID-19 pandemic. This is in line with previous studies (e.g., Shaikh et al., 2020; Walker et al., 2011) that have combined online incidents pertaining to bullying, harassment, discrimination, stalking, misuse of personal pictures, videos, or other content, and fraudulent use of identity into one category for analysis purposes.

### 2.4.3 Smartphone Use and Habits

In addition to questions about internet use, participants were asked 8 questions pertaining to their smartphone use and habits more specifically. These study variables and the associated survey items are described below.

#### 2.4.3.1 Smartphone Use

A single question was used—adapted from Statistics Canada’s 2018 CIUS—to assess students’ smartphone use, operationalized as frequency of use during a 30-minute time period. Specifically, participants were asked: “*Approximately how often do you currently check your smartphone within a 30-minute span (during the COVID-19 pandemic)?*”. Response options included: 0–5 times; 6–10 times; 10–15 times; 16–20 times; and more than 20 times. For analysis purposes, these response categories were subsequently collapsed into groups to indicate “low” (0-10 times per 30 minutes), “moderate” (10-15 times per 30 minutes), and “high” (16-20+ times per 30 minutes) smartphone use.

#### 2.4.3.2 Smartphone Habits

Participants were asked to report on their smartphone habits in a typical day during the pandemic by rating seven statements on a 5-point Likert scale ranging from “never” to “always”. Questions for habitual smartphone use included: “I check my phone right before going to sleep”, “I use my smartphone while eating”, “I use my smartphone while watching television”, “I check my smartphone as soon as I wake up”, “I use my smartphone while in class”, “I use my smartphone at the dinner table”, and “I use my

smartphone when I am with friends”. Whereas the first three items were adapted from the CIUS (Statistics Canada, 2018), the remaining four were developed by the researchers for the purpose of the present study. For analyses purposes, scores from the seven items were summed to create a total score ranging from 7 to 35, whereby a higher overall score was indicative of a higher level of habitual smartphone use in a range of settings/contexts. Based on the summary scores, the following smartphone habit categories were created: low habitual use (i.e., habit score range 7-16); moderate habitual use (i.e., habit score range 17-25); high habitual use (i.e., habit score range 26-35).

#### 2.4.4 Social Media Risks

A series of questions, again adapted from the CIUS (Statistics Canada, 2018), were used to assess students’ negative social media experiences over the past year. Participants were asked: “*During the past 12 months, have you experienced any negative effects in your life because of your use of social networking websites or apps?*”. The following 10 potential social media-related risks were then listed, rated on a 5-point Likert scale ranging from “Never” to “Always”: *stayed on for longer than originally wanted to; lost sleep; had less physical activity; had trouble concentrating on tasks; had relationship issues with family or friends; felt anxious; felt depressed; felt envious of the lives of others; felt bullied or harassed; and felt frustrated or angry*. In line with previous research conducted using 2018 CIUS data (Schimmele et al., 2021), these 10 social media risks were split into two categories for the purpose of analyses: *negative experiences* (i.e., staying online for longer than originally wanted to, losing sleep, decreased physical activity, trouble concentrating on tasks or activities, relationship issues with friends or family) and *negative emotional experiences* (i.e., feeling anxious, feeling depressed, feeling envious of others’ lives, feeling bullied or harassed, and feeling frustrated or angry). Scores for *negative social media experiences* and the *negative emotional social media experiences* were then summed, resulting in a total score for each category ranging from 5 to 25. Higher scores on the two scales indicated higher overall self-reported negative outcomes related to social media use. Based on the summary scores, negative risk and negative emotional risk categories were categorized as either *low risks* (i.e., score range 5-15) or *moderate-high risks* (i.e., score range 16-25).

### 2.4.5 Satisfaction with Life

Students' self-reported satisfaction with life was measured using the 5-item Satisfaction with Life Scale (SWLS; Diener et al., 1985). The SWLS is a standardized, valid instrument used to assess an individual's cognitive evaluation of their life (Diener et al., 1985). This scale has been found to have high internal consistency (Cronbach's alpha = 0.87; Magyar-Moe, 2009) and strong internal reliability, as well as moderate temporal stability (test-retest coefficient = 0.82; Diener et al., 1985; Pavot & Diener, 1994). The SWLS has also been used to assess university students' psychological wellbeing in previous research (e.g., Hultell & Gustavasson, 2008; Kross et al., 2013).

Using this scale, students were asked to rate their level of agreement with statements such as, "*In most ways my life is close to my ideal*", and "*I am satisfied with my life*", on a 7-point Likert scale ranging from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*). For analysis purposes, the items of this scale were summed, creating a total score that ranged from 5 to 35 (Diener et al., 1985; Pavot & Diener, 2013). In accordance with the SWLS manual (Diener et al., 1985; Pavot & Diener, 2013), the following categories were used to interpret total scores: extreme dissatisfaction with life (scores ranging from 5-9); substantial dissatisfaction with life (scores ranging from 10-14); slightly below average satisfaction with life (scores ranging from 15-19); average satisfaction with life (scores ranging from 20-24); high satisfaction with life (scores ranging from 25-29); and extreme satisfaction with life (scores ranging from 30-35; Diener et al., 1985; Pavot & Diener, 2013).

## 2.5 Analytical Plan

Two statistical programs were used for analyses in this study: R (R Core Team, 2020), which was used for handling missing data and part of the third research question (i.e., examining changes in internet use and internet-related incidents over time), and SPSS (Version 27), which was used for all other analyses. Due to the large number of statistical tests required to answer the research questions in this study, a Bonferroni correction method (Jafari & Ansari-Pour, 2019) was applied to decrease the likelihood of

committing a Type I Error (Chen et al., 2017); thus, a more conservative  $p$  value ( $p < .001$ ) was used to determine significance throughout.

First, frequencies were calculated to describe participants' demographic information (i.e., gender, ethnicity, education level, age, and enrollment status). Next, in order to assess the first research question, frequencies (i.e., percentages and cell count) were calculated for all internet use and internet-related incident categories. Following this, a series of McNemar's Chi-squared tests (McNemar, 1947) were conducted to determine whether there were differences in students' self-reported internet use and internet-related incidents over time (i.e., retrospectively from prior to the pandemic and during the early stages of the pandemic).

With regard to the second research question, frequencies were calculated and reported as percentages and counts for smartphone use and habits, and for social media risk categories. Means and standard deviations were also calculated for age and satisfaction with life. To examine the third research question, a series of Pearson's chi-square tests and Fisher's exact tests were conducted to determine whether students' gender, ethnicity, education level, or age were associated with internet use, internet-related incidents, smartphone use and habits, social media risks, and satisfaction with life.

Insofar as the fourth research question is concerned, Spearman's correlations were conducted to determine whether internet use, smartphone use, and smartphone habits were related to students' experiences of internet-related incidents and social media-related risks. It should be noted that the McNemar's chi-square tests, Pearson's chi-square tests, Fisher's exact tests, and Spearman's correlations used in this study were chosen due to the fact that the variables assessed were categorical. Having said that, a standard multiple regression using an enter method was also conducted as part of the fourth research question, to examine whether university students' self-reported gender, age, ethnicity, education level, internet use, internet-related risks, smartphone use and habits, and/or social media risks were related to satisfaction of life. A regression was selected because of its ability to determine the strength of the relationships between the abovementioned variables and the outcome variable (i.e., satisfaction with life). For the

purpose of the regression analysis, categorical variables (i.e., gender, ethnicity, education level, age, internet use, internet-related incidents, and smartphone use) were dummy coded, while scale scores for variables such as smartphone habits, social media risks, and satisfaction with life were treated as continuous variables.

### 2.5.1 Missing Data

Multiple methods were used to handle missing data based on the percentage of missing variables within each case (i.e., each participant's survey). First, a Missing Value Analysis was conducted to identify the frequency and patterns of missingness (Buuren & Groothuis-Oudshoorn, 2011; Mayer & Mucche, 2012). Participants were removed from analyses using listwise deletion if they had missing data in the range of 43% to 80%; this range was identified based on the sample size and pattern of missingness as suggested by McNeish (2015). Prior to the removal of these participants, chi-square tests were conducted to determine whether there were significant differences in demographic characteristics (i.e., gender, ethnicity, education level, and age) between participants who were removed and those who were retained; no significant differences were found.

Since the remaining missing data (i.e., the participant data that were retained in analyses at less than 43% missing; McNeish, 2015) were found to be missing at random, Multiple Imputation by Chained Equations (MICE; Buuren & Groothuis-Oudshoorn, 2011), a method of random imputation, was subsequently performed using the statistical package R (Buuren & Groothuis-Oudshoorn, 2011) to replace missing data in categorical variables (i.e., internet use and smartphone use). With regard to the binary variables of interest (i.e., internet-related incidents, gender, and education level), mode imputation was used whereby missing data were replaced with the most frequent value (Mayer & Mucche, 2012). Data missing for variables that were assessed using a 5-point Likert scale (i.e., smartphone habits, social media risks, satisfaction with life) were replaced using a median of three (Mayer & Mucche, 2012). Similarly, missing data within the age categories created for the present study were replaced using the mean age category (i.e., 2 = 20-24 years of age).



## Chapter 3

### 3 Results

#### 3.1 Participants

A total of 2,011 university students completed the *iBelong* – Phase 1 survey. Based on the results of the abovementioned missing value analysis, 387 participants were removed using listwise deletion (Buuren & Groothuis-Oudshoorn, 2011; McNeish, 2015). Thus, following the removal of these 387 cases, a total of 1,624 university students were included in the analyses for this study. These students reported a mean age of 22.4 years ( $SD = 5.1$ ; range = 17 to 77 years), with the majority identifying as female (78.8%;  $n = 1,277$ ), and White (58.5%;  $n = 942$ ). With regard to education level, approximately three-quarters of students (74.3%;  $n = 1,204$ ) identified as undergraduate students. While 21 universities in Ontario are represented in the sample, the vast majority of students (i.e., 92.2%;  $n = 1,497$ ) reported attending the host university (i.e., Western University). All participant characteristics are outlined in Table 1.

**Table 1***Participant Characteristics (N = 1,624)*

Participant Characteristic	<i>n</i> (%)
<b>Age</b>	
17-19 years	412 (25.4)
20-24 years	888 (54.7)
25-29 years	223 (13.7)
30+ years	101 (6.2)
<b>Gender</b>	
Female	1,280 (78.8)
Male	333 (20.5)
Nonbinary	11 (0.7)
<b>Ethnicity</b>	
Visible Minority <sup>a</sup>	642 (39.6)
Black	31 (1.9)
East Asian <sup>b</sup>	218 (13.4)
Latin American	35 (2.2)
Middle Eastern/North African <sup>c</sup>	62 (3.9)
Multiethnic	71 (4.4)
Arab and Asian	3 (4.2)
Asian and Latino	1 (1.4)
Arab and White	1 (1.4)
Black and Latino	1 (1.4)

Participant Characteristic	<i>n</i> (%)
Black and Asian	2 (2.8)
Indigenous and White	4 (5.6)
Latino and White	1 (1.4)
Mixed Asian	3 (4.2)
White and Black	5 (7.0)
White and Asian	26 (36.6)
Unidentified Mixed Ethnicity	24 (33.8)
South Asian	182 (11.2)
Southeast Asian <sup>d</sup>	42 (2.6)
Indigenous (i.e., First Nation, Inuit, and Métis)	28 (1.7)
White	942 (58.5)
Education Level	
Undergraduate	1,205 (74.2)
Graduate	419 (25.8)
Enrollment Status	
Full-time student	1,575 (97.0)
Part-time student	49 (3.0)

*Note.* Numbers vary across demographic variables due to missing data. Participants had a mean age of 22.4 ( $SD = 5.1$ ).

<sup>a</sup> Includes participants who identified as Black, East Asian, Latin America, Middle East/North African, Multiethnic, South Asian, and/or Southeast Asian. <sup>b</sup> Includes participants who identified as Chinese, Korean, and/or Japanese. <sup>c</sup> Includes participants who identified as West Asian, North African, and/or Arab. <sup>d</sup> Includes participants who identified as Filipino, Vietnamese, Cambodian, Taiwanese, Laotian, etc.

### 3.2 Internet Use and Internet-Related Incidents Prior to and During COVID-19

The first objective of this study was to describe and examine university students' internet use and experiences of internet-related incidents prior to and during the COVID-19 pandemic. Descriptive results showed that pre-pandemic, 43.3% of students ( $n = 704$ ) reported low internet use (i.e., less than 5 hours per week) and 18.2% reported high use (i.e., more than 20 hours per week;  $n = 295$ ). In contrast, during the early stages of the pandemic, the proportion of students reporting low internet use decreased to 17.5%, while those reporting high internet use increased to 44.9% ( $n = 729$ ). As noted previously, in order to examine changes in internet use over time (i.e., retrospectively in the past year and currently during the early pandemic), a McNemar's test (McNemar, 1947) was conducted along with continuity correction (Edwards, 1948). Results were found to be statistically significant,  $\chi^2(3) = 631.29$  ( $p < .001$ ); that is, the increase in the reported high internet use among students from pre-pandemic to early pandemic was significant, as was the decrease in the reported low internet use between the two time-points asked about in the survey. Please see Table 2 for data pertaining to internet use and internet-related incidents, including McNemar test and significance results.

University students were also asked to indicate whether they had experienced any internet-related incidents (i.e., bullying, harassment, discrimination, stalking, fraudulent use of one's identity, misuse of personal media) prior to and/or during the COVID-19 pandemic. A total of 12.6% ( $n = 205$ ) and 10.8% ( $n = 175$ ) of university students reported experiencing at least one internet-related incident prior to and during the pandemic, respectively. A McNemar's test revealed that there were no significant differences between both reported time-points for any of the internet-related risks assessed among university students. Table 2 contains additional information pertaining to internet-related incidents experienced by university students.

**Table 2**

*University Students' (N = 1,624) Self-Reported Internet Use and Internet-Related Incidents Prior to and During the Early Stages of the COVID-19 Pandemic in Ontario, Canada*

Internet Use Variables	<i>n</i> (%)		$\chi^2$
	Pre-Pandemic	Early Pandemic	
Hours Spent on the Internet			631.29*
Low Use (< 5 hours per week)	704 (43.3)	285 (17.5)	
Moderate Use (10 to 20 hours per week)	625 (38.5)	610 (37.6)	
High Use (> 20 hours per week)	295 (18.2)	729 (44.9)	
Internet-Related Incidents <sup>a</sup>			
Bullying	60 (3.7)	79 (4.9)	2.92
Harassment	77 (4.7)	64 (3.9)	1.45
Discrimination	93 (5.7)	105 (6.5)	0.89
Stalking	63 (3.9)	37 (2.3)	9.47
Misuse of Personal Media	25 (1.5)	22 (1.4)	0.03
Fraudulent Use of One's Identity	28 (1.7)	19 (1.2)	2.56
Experienced At Least One Internet-Related Incident	205 (12.6)	175 (10.8)	3.39

<sup>a</sup>Participants were asked to indicate if they had experienced any of the internet-related incidents listed above (Statistics Canada, 2018) by answering "Yes" or "No". The frequencies provided represent students who answered "Yes" to these questions.

\* $p < .001$

### 3.3 Smartphone Use and Habits, Social Media Risks and Satisfaction with Life

As per the second research objective in this study, descriptions of university students' smartphone use, smartphone habits, social media risks, and satisfaction with life are presented in the sections below.

#### 3.3.1 Smartphone Use

Insofar as smartphone use during the pandemic is concerned, results showed that almost half of students (45.3%;  $n = 736$ ) reported checking their phone 0 to 5 times in the span of 30 minutes, while close to a third (31.1%;  $n = 505$ ) reported checking their phone 6 to 10 times during this time period. The remaining 23.5% of students ( $n = 383$ ) reported looking at their phones 11 or more times within 30 minutes.

#### 3.3.2 Smartphone Habits

With regard to specific smartphone habits reported by students at the start of the pandemic, the vast majority (> 90%) of university students reported always or often checking their phone right before going to sleep and immediately upon waking (90.6% [ $n = 1,471$ ] and 91.5% [ $n = 1,486$ ], respectively). The greatest proportion of students also reported always or often using their smartphone while engaging in other activities such as watching television ( $n = 1,038$ ; 63.9%) and eating ( $n = 708$ ; 43.6%). In contrast, the greatest proportion of students indicated that they rarely or never used their phones in class or while at the dinner table (31.8% [ $n = 517$ ] and 21.0% [ $n = 341$ ], respectively). Responses for using a smartphone when with friends was distributed roughly evenly over all categories of use ranging from rarely/never to always/often. Tables 3 and 4 contain an overview of university students' responses pertaining to smartphone use and smartphone habits, respectively.

**Table 3**

*University Students' (N = 1,624) Self-Reported Smartphone Use at the Beginning of the COVID-19 Pandemic in Ontario, Canada*

Checked Smartphone Per 30 Minutes	<i>n</i> (%)
0 to 5 times	736 (45.3)
6 to 10 times	505 (31.1)
11 to 15 times	207 (12.7)
16 to 20 times	96 (5.9)
> 20 times	80 (4.9)

**Table 4**

*University Students' (N = 1,624) Self-Reported Smartphone Habits at the Beginning of the COVID-19 Pandemic in Ontario, Canada*

Smartphone Habit	<i>n</i> (%)		
	Never/Rarely	Sometimes	Often/Always
I check my smartphone right before going to sleep	47 (2.9)	106 (6.5)	1,471 (90.6)
I check my smartphone as soon as I wake up	43 (2.6)	95 (5.8)	1,486 (91.5)
I use my smartphone while watching television	221 (13.6)	365 (22.5)	1,038 (63.9)
I use my smartphone while in class	621 (38.2)	486 (29.9)	517 (31.8)

I use my smartphone while eating	434 (26.7)	482 (29.7)	708 (43.6)
I use my smartphone while at the dinner table	971 (59.8)	312 (19.2)	341 (21.0)
I use my smartphone when I am with friends	482 (29.7)	589 (36.3)	553 (34.1)

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### 3.3.3 Social Media Risks

As noted previously, the past-year social media risks experienced by students were divided into two broad categories—negative social media risks and negative emotional social media risks (Schimmele et al., 2021). The negative risks reported in the greatest proportions by university students (i.e., those reporting *always* or *often* experiencing the risk in the past 12 months) included staying online for longer than intended (66.1%;  $n = 1,074$ ), having trouble concentrating on tasks such as school and work (46.2%;  $n = 751$ ), and losing sleep (35.4%;  $n = 575$ ). The negative emotional social media risks for which the greatest proportion of students reported that they *never* or *rarely* experienced included feeling bullied or harassed (91.4%;  $n = 1,485$ ), angry or frustrated (62.8%;  $n = 1,020$ ), depressed (57.0%;  $n = 926$ ), anxious (47.3%;  $n = 768$ ), and envious of others' lives (37.8%;  $n = 614$ ). Table 5 contains an overview of university students' responses pertaining to social media risks.

**Table 5**

*Social Media Risks Reported by University Students ( $N = 1,624$ ) During the Past 12 Months*

	Never/Rarely	Sometimes	Often/Always
Negative Social Media Risks	<i>n</i> (%)		
Stayed online for longer than originally wanted to	148 (9.1)	402 (24.8)	1,074 (66.1)
Lost sleep	536 (33.0)	513 (31.6)	575 (35.4)
Had less physical activity	606 (37.3)	495 (30.5)	523 (32.2)
Had trouble concentrating on tasks (e.g., school or work)	312 (19.2)	561 (34.5)	751 (46.2)
Had relationship issues with family or friends	1,263 (77.8)	233 (14.3)	128 (7.9)

Negative Emotional Social Media Risks	<i>n</i> (%)		
Felt anxious	768 (47.3)	509 (31.3)	347 (21.4)
Felt depressed	926 (57.0)	409 (25.2)	289 (17.8)
Felt envious of the lives of others	614 (37.8)	564 (34.7)	446 (27.5)
Felt bullied or harassed	1,485 (91.4)	107 (6.6)	32 (2.0)
Felt frustrated or angry	1,020 (62.8)	406 (25.0)	198 (12.2)

*Note.* The *negative social media risk* and *negative emotional social media risk* categories were created based on those used in a study conducted by Schimmele and colleagues (2021) using the same 2018 Statistics Canada Canadian Internet Use Survey (CIUS) items.

### 3.3.4 Satisfaction with Life

The mean scale score for university students' self-reported satisfaction with life during the pandemic was 17.1 ( $SD = 9.6$ ; range = 15 – 29) out of a total possible score of 35. This score reflects a slightly below average satisfaction with life as per the Satisfaction with Life Scale scoring manual (i.e., fell between 15 and 19; Pavot & Diener, 2013). The internal reliability for this scale was excellent, with a Cronbach's alpha of .96, which is consistent with other studies (e.g., Paez et al., 2019; Kil et al., 2020).

## 3.4 Associations Between Demographic and Study Variables

A series of analyses (i.e., Pearson chi square and Fisher's exact tests) were conducted to address the third research question in this study; that is, to examine whether specific demographic variables (i.e., students' gender, ethnicity, education level, and age) were associated with the study variables of interest (i.e., internet use, internet-related incidents, smartphone use and habits, social media risks, and satisfaction with life) at the start of the pandemic. As noted previously, a more conservative  $p$  value ( $p < .001$ ) was used to determine significance (Jafari & Ansari-Pour, 2019) given the large number of statistical tests conducted.

### 3.4.1 Gender

#### 3.4.1.1 Internet Use and Internet-Related Incidents

To determine whether self-reported internet use and internet-related incidents differed by students' gender during the early COVID-19 pandemic, a series of chi-square tests and Fisher's exact tests were performed, respectively. Results from the 2x3 chi-square test revealed that there were no significant differences between male and female students in terms of their internet use (i.e., < 5 hours per week, 10 to 20 hours per week, 20+ hours per week). Similarly, the results of the 2x2 Fisher's exact test showed no significant differences for gender and students' reports of internet-related incidents (i.e., "Yes" or "No" categories). Table 6 contains chi-square and Fisher's exact values for the following variables of interest by gender: internet use, internet-related incidents, smartphone use and habits, social media risks, and satisfaction with life.

### 3.4.1.2 Smartphone Use and Habits

Again, 2x3 chi-square tests were performed to examine differences between gender and smartphone use (i.e., low smartphone use, moderate smartphone use, and high smartphone use) and gender and smartphone habits (i.e., low habitual use, moderate habitual use, and high habitual use) during the early COVID-19 pandemic. No significant differences were found (see Table 6).

### 3.4.1.3 Social Media Risks

Two 2x2 Fisher Exact tests were performed to determine whether the two of social media risks (negative risks [low social media risks and moderate-high social media risks] and negative emotional risks [low social media risks and moderate-high social media risks]) experienced by students in the past 12 months differed by gender. Results showed that significantly more female students (44.9%;  $n = 574$ ) reported experiencing *moderate to high negative social media risks* (i.e., losing sleep, low physical activity, having trouble concentrating on tasks, having relationship issues with family or friends, and staying online for longer than originally wanted to;  $p < .001$ ) compared to their male counterparts (30.9%;  $n = 103$ ). Results also showed that a significantly greater number of female students (16.2%;  $n = 207$ ) reported *moderate to high negative emotional social media risks* (i.e., feeling anxious, depressed, envious of others' lives, bullied/harassed, and angry/frustrated;  $p < .001$ ) than male students (8.1%;  $n = 27$ ).

### 3.4.1.4 Satisfaction with Life

A 2x6 chi-square test was conducted to assess university students' satisfaction with life categories (i.e., extreme dissatisfaction with life, substantial dissatisfaction with life, slightly below average satisfaction with life, average satisfaction with life, high satisfaction with life, and extreme satisfaction with life) in relation to gender. Results revealed no significant differences between male and female university students and their satisfaction with life during the early stages of the COVID-19 pandemic in Ontario.

**Table 6**

*Chi-Square Statistics for Ontario University Students' (N = 1,624) Internet Use, Internet-Related Incidents, Smartphone Use and Habits, Social Media Risks, and Satisfaction with Life by Gender*

Variables	Chi-square		
	$\chi^2$	$df$	$p$
Internet Use (Hours/Week)	7.24	2	.03
Experienced at Least One Internet-Related Incident <sup>a</sup>	-	-	.77
Smartphone Use (Times Checked/30 Minutes)	5.86	4	.21
Smartphone Habits	6.11	2	.05
Negative Social Media Risks <sup>a</sup>	-	-	<.001*
Negative Emotional Social Media Risks <sup>a</sup>	-	-	<.001*
Satisfaction with Life	11.44	5	.04

<sup>a</sup>Fisher's Exact Tests were conducted for internet-related risks, negative social media risks, and negative emotional social media risks due to small cell counts in the 2x2 tables.

\* $p < .001$

### 3.4.2 Ethnicity

A series of chi-square tests were performed to determine whether students' self-reported internet use, internet-related incidents, smartphone use and habits, social media risks, and satisfaction with life differed by ethnicity (categorized as Indigenous, visible minority, and white, as outlined in the Method section; Statistics Canada, 2021). Table 7 contains an overview of the chi square values and p values relating to students' ethnicity and variables of interest.

#### 3.4.2.1 Internet Use and Internet-Related Incidents

A 3x3 chi-square test revealed no significant differences in students' internet use (i.e., < 5 hours per week, 10 to 20 hours per week, 20+ hours per week) based on their reported ethnicity (i.e., Indigenous, visible minority, white) at the beginning of the COVID-19 pandemic. Similarly, no significant differences were found between students' ethnicity and their reported experiences of internet-related incidents (yes/no categories), as assessed via a 3x2 chi-square test.

#### 3.4.2.2 Smartphone Use and Habits

A 3x3 chi-square test revealed that there were no significant differences in students' smartphone use (checking phone 0 to 5 times, 6 to 10 times, and 11+ times) based on ethnicity during the early stages of the COVID-19 pandemic. With regard to smartphone habits (low, moderate, high), a 3x3 chi-square test revealed some significant differences based on ethnicity. Specifically, a significantly greater number of students who were categorized as belonging to a visible minority group (46.2%;  $n = 293$ ) or who identified as Indigenous (60.7%;  $n = 17$ ) reported high habitual smartphone use (i.e., checking their phones right before going to sleep and as soon as they wake up, using their phone while watching TV, eating dinner, with their friends and/or at the dinner table;  $p < .001$ ) in comparison to students who identified as white (38.4%;  $n = 364$ ).

#### 3.4.2.3 Social Media Risks

Two 3x2 chi-square tests were administered to determine whether differences existed between ethnicity and students' past-year experiences of negative social media risks (low

and moderate-high risks) and negative emotional social media risks (low and moderate-high risks). While no significant differences were observed for negative emotional risks by ethnicity, significant differences were found for overall negative experiences due to social media use. Specifically, a significantly greater proportion of students who were categorized as belonging to a visible minority group (50.8%;  $n = 322$ ;  $p < .001$ ) or who identified as Indigenous (39.3%;  $n = 11$ ;  $p < .001$ ) reported moderate to high negative social media risks (i.e., staying online for longer than originally wanted to, losing sleep, less physical activity, trouble concentrating on tasks, and had relationship issues with family or friends) than students who identified as white (36.3%;  $n = 344$ ;  $p < .001$ ).

#### 3.4.2.4 Satisfaction with Life

To determine whether there were significant differences in university students' satisfaction with life (i.e., extreme dissatisfaction, substantial dissatisfaction, slightly below average satisfaction, average satisfaction, high satisfaction, and extreme satisfaction) by ethnicity during the early COVID-19 pandemic, a 3x6 chi-square test was administered (see Table 7 for chi-square values). A significant difference was found in that significantly more students who identified as belonging to a visible minority group (23.9%;  $n = 122$ ;  $p < .001$ ) or as an Indigenous person (32.0%;  $n = 8$ ;  $p < .001$ ) reported having *slightly below average* satisfaction with life than did white students (14.1%;  $n = 108$ ;  $p < .001$ ).

**Table 7**

*Chi-Square Statistics for Ontario University Students' (N = 1,624) Internet Use, Internet-Related Incidents, Smartphone Use and Habits, Social Media Risks, and Satisfaction with Life by Ethnicity*

Variables	$\chi^2$	Chi-square	
		$df$	$p$
Internet Use (Hours/Week)	10.74	4	.03
Experienced at Least One Internet-Related Incident	2.93	3	.23
Smartphone Use (Times Checked/30 Minutes)	8.91	4	.06
Smartphone Habits	18.85	4	< .001*
Negative Social Media Risks	32.88	2	< .001*
Negative Emotional Social Media Risks	1.37	2	.50
Satisfaction with Life	76.02	10	< .001*

\* $p < .001$



### 3.4.3 Education

To determine whether there were significant differences in students' self-reported internet use, internet-related incidents, smartphone use and habits, social media risks, and satisfaction with life by education (i.e., undergraduate versus graduate students), a series of chi-square tests and Fisher's exact tests were performed (see Table 8 for chi-square values pertaining to education).

#### 3.4.3.1 Internet Use and Internet-Related Incidents

To examine potential differences in students' internet use and internet-related incidents based on their education level (i.e., undergraduate versus graduate student) during the early COVID-19 pandemic, a series of 2x3 chi-square and 2x2 Fisher's exact tests were administered. Results revealed that there were no significant differences for any of these internet-related variables based on students' education level.

#### 3.4.3.2 Smartphone Use and Habits

Two 2x3 chi-square tests were performed to determine whether university students' smartphone use (i.e., checking their smartphones 0 to 5 times, 6 to 10 times, and 11+ times) and habits (low, moderate, high) differed by education level during the early COVID-19 pandemic. Results revealed some significant differences. With respect to smartphone use, significantly more undergraduate students (25.5%;  $n = 305$ ;  $p < .001$ ) reported checking their smartphones more than 11 times every 30 minutes compared to graduate students (18.1%;  $n = 75$ ;  $p < .001$ ). Furthermore, significantly more undergraduate students (44.4%;  $n = 531$ ;  $p < .001$ ) reported *high habitual use* (e.g., checking smartphones as soon as they wake and right before going to sleep, using their smartphones in classes, while watching TV and with friends, etc.) compared to graduate students (34.5%;  $n = 143$ ;  $p < .001$ ).

#### 3.4.3.3 Social Media Risks

Two 2x2 Fisher's exact tests were conducted to explore potential differences in students' reported negative social media risks (low and moderate-high) and negative emotional risks (low and moderate-high) by education level. Whereas no significant differences

were observed for emotional risks, some significant differences were found with regard to overall social media risks. Specifically, significantly more undergraduate students (47.4%;  $n = 567$ ;  $p < .001$ ) reported *moderate to high social media risks* compared to graduate students (26.5%;  $n = 110$ ;  $p < .001$ ).

#### 3.4.3.4 Satisfaction with Life

A 2x6 chi-square test used to assess potential differences in students' perceived satisfaction with life by education level revealed no significant differences.

**Table 8**

*Chi-Square Statistics for Ontario University Students' ( $N = 1,624$ ) Internet Use, Internet-Related Incidents, Smartphone Use and Habits, Social Media Risks, and Satisfaction with Life by Education*

Variables	Chi-square		
	$\chi^2$	$df$	$p$
Internet Use (Hours/Week)	1.88	2	.39
Experienced at Least One Internet-Related Incident <sup>a</sup>	-	-	.49
Smartphone Use (Times Checked/30 Minutes)	18.75	2	< .001*
Smartphone Habits	25.00	2	< .001*
Negative Social Media Risks <sup>a</sup>	-	-	<.001*
Negative Emotional Social Media Risks <sup>a</sup>	-	-	.05
Satisfaction with Life	12.26	10	.03

<sup>a</sup> Fisher's Exact Tests were conducted for internet-related risks, negative social media risks and negative emotional social media risks due to the small cell counts in the 2x2 tables.

\* $p < .001$ .

### 3.4.4 Age

Chi-square tests (4x3 and 4x2) were performed to examine whether there were differences in students' self-reported internet use, internet-related incidents, smartphone use, smartphone habits, social media risks, and satisfaction with life by age (17-19 years, 20-24 years, 25-19 years, 30+ years). Results revealed no significant differences for any of these variables in relation to age (see Table 9 for chi-square values).

**Table 9**

*Chi-Square Statistics for Ontario University Students' (N = 1,624) Internet Use, Internet-Related Incidents, Smartphone Use and Habits, Social Media Risks, and Satisfaction with Life by Age*

Variables	$\chi^2$	Chi-square	
		$df$	$p$
Internet Use (Hours/Week)	10.55	6	.10
Experienced at Least One Internet-Related Incident	1.73	3	.63
Smartphone Use (Times Checked/30 Minutes)	19.79	12	.07
Smartphone Habits	4.12	6	.66
Negative Social Media Risks	5.15	3	.16
Negative Emotional Social Media Risks	4.73	3	.19
Satisfaction with Life	8.29	15	.91

\* $p < .001$

### 3.5 Associations between Internet and Smartphone Use and Online Risks

To address the first part of the fourth research—that that is, to examine potential relationships among internet and smartphone use, internet-related incidents, and social media risks—a series of Spearman’s rank order correlational analyses were conducted. Spearman’s rank order correlation coefficients were interpreted based on Akoglu’s (2018) guide on correlation coefficients, whereby correlation coefficients in the range of .01 – .03 were deemed to be weak/small, those in the range of 0.4 – 0.6 were considered to be moderate, and those ranging from 0.7 – 1.0 were deemed to be strong correlations. See Table 11 for correlation and significance values.

#### 3.5.1 Internet Use and Internet-Related Incidents

Results revealed no significant correlations between students’ self-reported internet use (i.e., < 5 hours per week; 10 to less than 20 hours per week; and 20+ hours per week) and internet-related incidents (i.e., “Yes” or “No” to experiences of bullying, harassment, discrimination, stalking, misuse of one’s personal media, and fraudulent use of one’s identity).

#### 3.5.2 Internet Use and Smartphone Use and Habits

The correlations between university students’ internet use and their reported smartphone use and habits were found to be statistically significant. Results from the Spearman’s rank-order correlation showed a small, positive, and significant correlation between internet use and smartphone use ( $r_s = .116, p < .001$ ) during the pandemic. A statistically small, positive correlation was also found between internet use and smartphone habits (e.g., checking phone first thing in the morning and right before bed;  $r_s = .120, p < .001$ ).

#### 3.5.3 Smartphone Use and Internet-Related Incidents

A Spearman’s rank-order correlation was also run to assess the association between university students’ self-reported smartphone use and internet-related incidents during the early phases of the pandemic; results were not significant. Similarly, the correlation between students’ self-reported smartphone habits (e.g., checking their phone first thing

in the morning and right before bed) and internet-related incidents was also non-significant.

#### 3.5.4 Internet Use and Social Media Risks

The correlation between university students' internet use and their experiences of negative social media risks over the past year was not significant, nor was the association between internet use and past-year negative emotional risks.

#### 3.5.5 Smartphone Use and Social Media Risks

A statistically significant positive correlation was found, although small, between students' smartphone use and their experiences of both negative emotional social media risks ( $r_s = .159, p < .001$ ) and overall social media risks ( $r_s = .204, p < .001$ ). Results of the Spearman's rank-order correlation also showed a statistically significant, positive, small correlation between students' smartphone habits and their experiences of both negative emotional social media risks ( $r_s = .157, p < .001$ ) and negative social media risks ( $r_s = .297, p < .001$ ).

**Table 10**

*Descriptive Statistics and Correlation Values for Ontario University Students' (N = 1,624) Self-Reported Internet Use, Smartphone Use and Habits, Internet-Related Risks, and Social Media Risks*

Variables	<i>n</i>	1	2	3	4	5	6
1. Internet Use	1,612	-					
2. Internet-related Incidents	1,609	.005	-				
3. Smartphone Use	1,612	.116*	-.004	-			
4. Smartphone Habits	1,609	.120*	.004	.329*	-		
5. Negative Social Media Risks	1,612	.066	.036	.204*	.297*	-	
6. Negative Emotional Social Media Risks	1,612	-.004	-.001	.159*	.157*	.342*	-

*Note.* Values in the table represent the correlation coefficient ( $r_s$ ) between each variable.

\* $p < .001$ .

### 3.6 Associations Between Study Variables and Satisfaction with Life

To examine the latter part of the fourth research question—to examine the relationship between the abovementioned study variables and satisfaction with life—a multiple regression analysis was conducted whereby overall satisfaction with life was the dependent variable. Table 12 contains a summary of the regression analysis results.

Prior to the regression analysis, correlations were conducted to determine if there were any significant associations between the study variables and the outcome variable (i.e., satisfaction with life). Three demographic variables (i.e., gender, ethnicity, and education level) were found to be significantly correlated with satisfaction with life. Specifically, significant positive correlations were found for both gender and ethnicity in relation to satisfaction with life, while education level was found to be significantly negatively correlated with satisfaction with life. Smartphone use and social media risks (i.e., overall and emotional) were also found to be significantly negatively correlated with satisfaction with life.

With regard to the multiple regression analysis, all six predictors in the model were significant,  $F(9, 1603) = 11.431, p < .001$ . As outlined in Table 12, gender, ethnicity, emotional social media risks, and smartphone use added significantly to the prediction of satisfaction with life among university students. The regression model indicated that ethnicity was significantly related to satisfaction with life ( $\beta = .097, p < .001$ ), whereby white university students reported higher satisfaction with life than students who identified as either visible minority or Indigenous. Gender was also found to be significantly related to satisfaction with life, in that female students reported higher satisfaction with life than male students ( $\beta = .068, p = .006$ ). High smartphone use (i.e., checking smartphones 6 to 10 times every 30 minutes) was also significantly negatively related to satisfaction with life ( $\beta = -.015, p < .01$ ). The emotional social media risk variable was also found to be significantly negatively related to satisfaction of life ( $\beta = -.216, p < .001$ ), showing that students who reported feeling anxious, depressed, or envious of other peoples' lives as a result of social media reported lower satisfaction with

life. The adjusted  $R^2$  value for the total model was .049, indicating that an overall 4.9% of the variance in students' satisfaction with life was explained by four study variables (i.e., gender, ethnicity, smartphone use, and negative emotional social media risks) in this model.

**Table 11**

*Multiple Regression Results for University Students' (N = 1,624) Satisfaction with Life (SWL)*

SWL	<i>B</i>	95% CI for <i>B</i>		<i>SE B</i>	$\beta$	$R^2$	$\Delta R^2$
		<i>LL</i>	<i>UL</i>				
Model						.054	.049**
Constant	18.852**	16.688	21.015	1.103			
Gender <sup>a</sup>	1.613*	.467	2.759	.584	.068*		
Ethnicity <sup>b</sup>	1.897**	.922	2.872	.497	.097**		
Education Level <sup>c</sup>	-.338	-1.426	.751	.555	-.015		
Negative Social Media Risks	.075	-.078	.227	.078	.031		
Negative Emotional Social Media Risks	-.497**	-.635	-.359	.070	-.216**		
Smartphone Use <sup>d</sup>	1.397*	.312	2.482	.553	-.015*		

*Note.* Model = "Enter" method in SPSS Statistics; *B* = unstandardized regression coefficient; CI = confidence interval; *LL* = lower limit; *UL* = upper limit; *SE B* = standard error of the coefficient;  $\beta$  = standardized coefficient;  $R^2$  = coefficient of determination;  $\Delta R^2$  = adjusted  $R^2$ . <sup>a</sup> Female = 1, male = 0. <sup>b</sup> White = 1, Visible minority and Indigenous = 0. <sup>c</sup> Undergraduate = 1, graduate = 0. <sup>d</sup> Checked smartphone 6 to 10 time every 30 minutes = 1, Checked smartphone less than 6 times every 30 minutes = 0.

\* $p < .01$ . \*\* $p < .001$ .



## Chapter 4

### 4 Discussion

The overall purpose of this study was to examine the internet use (including smartphone use), internet-related incidents, social media risks, and satisfaction with life reported by university students at the beginning of the COVID-19 pandemic in Ontario, Canada. Four specific objectives were advanced: (1) to describe and examine university students' internet use and the prevalence of internet-related incidents prior to and during the early stages of the COVID-19 pandemic, including whether there were changes over time based on retrospective responses; (2) to describe university students' smartphone use, smartphone habits, social media risks, and satisfaction with life; (3) to examine potential associations between students' gender, ethnicity, education level, and age and the study variables of interest; and (4) to examine potential relationships among internet and smartphone use, internet-related incidents, and social media risks, and their relation to university students' satisfaction with life. To our knowledge, this is the first study conducted that has explored university students' internet use and risks over time (i.e., retrospectively from pre-pandemic and currently during the early pandemic in a Canadian context), and examined associations among smartphone use, smartphone habits, social media risks, and satisfaction with life. In fact, only a handful of studies have examined university students' technology-related experiences during the COVID-19 pandemic (e.g., Larnyo et al., 2021; Sam et al., 2022; Milasaukiene et al., 2021); the focus of most of these studies has been to address the sudden changes in pedagogy as a result of the transition to online learning (Karamollahi et al., 2022), as well as students' mental health and wellbeing (Larnyo et al., 2021).

A number of findings presented in this study warrant further discussion. As per the first research question, results revealed that significantly more university students reported high internet use (44.9 %; i.e., 20+ hours online per week) during the early stages of the pandemic versus pre-pandemic (18.2%), lending support to the hypothesis predicting an increase in internet use during the pandemic. The early pandemic data are similar to those reported in the 2020 Canadian Internet Use Survey (CIUS; Statistics Canada, 2021b), implemented in late 2020 and early 2021, showing that 42.5% of young adults (aged 15-

24) reported high internet use (also defined as spending 20+ hours per week online; Statistics Canada, 2021b). This observed increase in internet use among university students throughout the pandemic is also consistent with other research findings (e.g., Bilodeau et al., 2021; Li et al., 2021). For example, a longitudinal study conducted by Li and colleagues (2021) showed that 46.2% of university students in China spent more than 2 hours per day online (specifically on social media) during the initial spread of the COVID-19 virus in February 2020. As noted previously, researchers have suggested that pandemic-related public health measures and mandates played a role in students' increased internet use (Ben Rejeb et al., 2021; Charmaraman et al., 2022; Marciano et al., 2021); in an effort to cope with the unknowns of the pandemic as well as ongoing public health measures and restrictions, the internet has served as a valuable tool for students to facilitate online learning, access information, maintain social connections and communication, and for entertainment purposes (Larnyo et al., 2021; Lemenager et al., 2021). Thus, among other potential factors, the increase in high internet use observed among students in our study could be attributed to the rapid transition to online learning at the start of the pandemic in Ontario (Government of Canada, 2020; Sam et al., 2021). Again, such increases in time spent online have been associated with various risks among young people including internet addiction and problematic internet use (Kiraly et al., 2020; Sam et al., 2021). It is clear that the examination of internet use among university students, as well as the factors related to and impacts of such use, remain an important priority, both currently and post-pandemic.

With regard to internet-related incidents, results showed that approximately one in 10 university students (10.8%) reported experiencing at least one internet-related incident (i.e., bullying, harassment, discrimination, stalking misuse of personal media, and/or fraudulent use of ones' identity) at the start of the COVID-19 pandemic. The three most prevalent experiences reported by university students were online discrimination (6.5%), bullying (4.9%), and harassment (3.9%). Results also showed that contrary to our hypothesis, while there was a slight decrease in the proportion of university students who reported at least one internet-related incident from pre- to early-pandemic (i.e., 12.6% to 10.8%, respectively), the change was not statistically significant. Interestingly, a decrease in the same internet-related incidences reported by young people aged 15 to 24 was also

reported by Statistics Canada (2021d) from 2018 (13.2%) to 2020 (8.2%). In addition, Statistics Canada data from 2020 were also comparable to the prevalence of specific incidents reported in the present study, in that 6.5% of individuals in the 15- to 24-year-old age group in Canada had reported bullying, harassment or discrimination in the past year (Statistics Canada, 2021d).

In contrast to the above noted findings, some studies have highlighted an increase in reports of cyberbullying, online discrimination, and harassment experienced by both young people (e.g., Karmakar & Das, 2020; Shi et al., 2022) and university students (e.g., Alrawashda, 2021; Alswalqa, 2021) during the early stages of the pandemic. For example, Karmakar and Das (2020) investigated trends in cyberbullying among young people via an examination of 454, 046 public ‘tweets’ (i.e., social media posts via Twitter) and reported a significant increase in cyberbullying-related tweets from January through June, 2020. Other researchers (e.g., Alswalqa et al., 2021) examined the cyberbullying experiences reported by university students ( $n = 525$ ) in Jordan during the pandemic, and found that students of East and Southeast Asian ethnicity reporting cyberbullying via discrimination and stigma linked to the geographical origin of the COVID-19 virus. Not surprisingly, research has shown that experiences of internet-related incidents (e.g., cyberbullying) have been found to be detrimental to students’ mental health, related specifically to feelings of sadness, anxiety, and low self-esteem (e.g., Haft & Zhou, 2021; Lindsay et al., 2016). It is important to note that the numbers reported in the present study, as well as in other research in this area, are very likely underestimates of the actual prevalence of such negative experiences. Watts and colleagues (2014) have suggested that individuals who have experienced such incidents may feel powerless and fail to report them. Others have suggested that post-secondary students may not be aware of the definitions of or what behaviours might constitute such incidents (Meter et al., 2021), which could lead to confusion about these experiences, and further reduce the likelihood of reporting. Although the prevalence of such incidents reported in this study are in line with Canadian data (e.g., Statistics Canada, 2021d), and did not appear to increase from pre- to early-pandemic in the present study, it is important to continue to examine and address these experiences among university students in order to further educate and advocate for university students and their wellbeing.

With respect to the second research question which included an exploration of university students' smartphone use, results showed that nearly half of the university students (44.9%) in the study were categorized as “high” internet users (i.e., spending 20+ hours online per week) during the early stages of the COVID-19 pandemic in Ontario. Further, the vast majority of students reported smartphone habits such as “always” or “often” checking their phones before going to sleep (90.6%) and as soon as they wake up (91.5%). Many of these findings are in line with those reported by Statistics Canada based on the results of both the 2018 and 2020 CIUS (Statistics Canada, 2020). For example, in the 2018 CIUS, nearly one third (31.6%) of young adults (aged 15-24 years) in Canada were deemed to be high internet users (defined as spending 20-40 or 40+ hours online per week; Statistics Canada, 2021a), and similar to the present study, the majority of these young adults reported regularly engaging in smartphone habits such as checking their smartphones before going to sleep (70.1%; Statistics Canada, 2021d). Similarly, in a recent study specific to university students, Alsayed and colleagues (2020) found that over 90% of nursing students reported always carrying their smartphones with them and checking them immediately upon waking. Together, these findings support the notion that internet use is ubiquitous among university students, and that students regularly use—and rely heavily on—their smartphones for a variety of purposes (Alsayed et al., 2020; Gikas & Grant, 2013; Hossain & Ahmed, 2016). Unfortunately, as noted previously, while internet and smartphone use have been found to be associated with several important benefits for students (e.g., accessing information, social interaction, communication, education during the pandemic, etc.; Xie et al., 2022), consistently high internet use has also raised concerns given that it can lead to problematic internet and smartphone use among young adults (Kiraly et al., 2020).

With regard to overall social media risks, close to one third of university students in the present study reported they stayed online for longer than intended (66.1%), lost sleep (35.4%), and experienced reduced physical activity levels (32.2%) over the course of the past year as a result of their social media use. These too are in keeping with Statistics Canada (2021d) data from 2018, whereby it was noted that staying online for longer periods than anticipated was the most prevalent social media risk reported by young adults (aged 15 to 24; 46.9%), followed by losing sleep (34.6%), and decreased physical

activity (25.9%). Findings in the present study also indicated that students reported experiencing multiple emotional adversities due to their social media use, including feeling envious of others' lives (27.5%) or experiencing anxiety (21.4%), depression (17.8%), and frustration or anger (12.2%). Again, these values correspond closely with Statistics Canada (2018) data showing that feeling envious of the lives of others was the most prevalent emotional social media risk reported by young Canadians (aged 15 to 24; 19.7%), followed by feeling anxious (16.5%), depressed (13.4%), and frustrated or angry (16.2%). Generally speaking, these findings are also consistent with those reported in a literature review conducted by De-Sola Gutierrez and colleagues (2016) containing studies related to smartphone addiction and adversities among young people (aged 14-30 years). De-Sola Gutierrez and colleagues found that post-secondary students who used smartphones and social media excessively were more susceptible to mental health problems such as anxiety, stress, irritability, and fear of missing out.

With reference to the third research question which consisted of an examination of potential demographic differences in students' self-reported internet use, internet-related incidents, smartphone use and habits, social media risks, and satisfaction with life, findings were both unique and consistent in the context of the current literature. Firstly, unlike findings presented in previous studies (e.g., Adone et al., 2016; Busch & McCarthy, 2020; Lemenager et al., 2021; Schimmele et al., 2021) and contrary to the study hypotheses concerning gender differences, no significant differences were found between gender and internet use, smartphone use, and smartphone habits during the pandemic in the present study. With regard to gender, for example, studies have presented conflicting findings relating to the frequency of internet and smartphone use among young males and females (e.g., Adone et al., 2016; Busch & McCarthy, 2020; Lemenager et al., 2021; Schimmele et al., 2021), which could be attributed, at least in part, to the wide variety of online activities that have been studied including the use of social networking sites and computer-/video-gaming. For example, Lemenager and colleagues (2021) found that male internet users (aged 18 to 24) spent more time internet surfing (information gathering) and playing online video games, while female internet users spent more time on their smartphones and social media apps, which is also consistent with the findings of other studies in this area (i.e., Adone et al., 2016; Busch &

McCarthy, 2020). One might argue, perhaps, that an examination of ‘overall’ internet use in the present study (focused on frequency rather than on specific types of or reasons for use) contributed to the lack of difference observed between males and females with regard to their internet and smartphone use.

Secondly, significant differences were observed for gender and students’ self-reported social media risks during the early COVID-19 pandemic. In comparison to male students, a significantly greater proportion of female students reported moderate to high overall social media risks (i.e., trouble concentrating on tasks, lost sleep, reduced physical activity) as well as emotional social media risks (i.e., feeling anxious or depressed, feeling envious of others’ lives, feeling angry or frustrated, and feeling bullied or harassed) in the previous year. Again, findings from the 2018 Canadian Internet Use Survey data, as reported by Schimmele and colleagues (2021), are in line with these results. Specifically, Schimmele and colleagues (2021) reported that females in the 15- to 19-year age group were significantly more likely to experience a number of social media-related risks than the male counterparts, including having trouble concentrating on tasks, lower levels of physical activity, feeling envious of the lives of others, and feeling anxious and depressed. It has been suggested that the increased likelihood of social media risks experienced by female students could be explained by an overall increase in social media use in this cohort (e.g., Schimmele et al., 2021). Interestingly, with regard to social media use, research has also suggested that an increase in social media use may be attributed to the fact that females have reported higher levels of social media-related stress (i.e., a higher need for online belonging, fear of missing out, and perceived stress due to popularity; Beyens et al., 2016). While social media use was not measured in the present study, correlation analyses did reveal that smartphone use was significantly and positively related to social media risks, suggesting that overall, a higher frequency of phone use is related to a greater risk of negative social media-related risks and experiences among university students.

A third finding of interest related to demographic factors is that significant differences were found for ethnicity (operationalized for analysis purposes as Indigenous, visible minority, or white). More specifically, a significantly greater proportion of students who

identified as Indigenous or belonging to a visible minority group reported high smartphone use and high social media risks (i.e., both general and emotional) in comparison to students who identified as white. Interestingly, no significant differences were found for ethnicity and students' internet use or internet-related incidents. While there is limited research exploring ethnic differences in relation to technology use (e.g., internet and smartphone use) and its associated risks, the studies that do exist have generated mixed findings (e.g., Elhai et al., 2021; Jackson et al., 2011; Kalichman et al., 2002). In line with the current findings, Elhai and colleagues (2021) found that undergraduate students in the United States who identified as belonging to a racial minority group (i.e., African American, Latinx, or Asian) reported spending significantly more time checking their smartphones than undergraduate students who identified as white (Elhai et al., 2021). With regard to potential reasons for differences in smartphone use by ethnicity, Tsetsi and Rains (2017) found that young adults in ethnic minority groups tended to use smartphones more often for social connection and networking purposes than did those who identified as white. Conversely, other studies (e.g., Kalichman et al., 2002; Jackson et al., 2011) have shown no significant differences in internet use based on young people's race or ethnicity. In addition, although we did not find any significant differences in students' reports of internet-related incidents by ethnicity, previous studies that have explored cyberbullying, online discrimination, and harassment during the COVID-19 pandemic have reported an increase in racially targeted internet-related incidents, specifically towards Asian groups during the early pandemic (e.g., Alrawashda et al., 2021; Alswalqa et al., 2021; Shi et al., 2022). Some have suggested that such incidents might be attributed to the novelty and unknowns associated with disease outbreaks (Jalloh et al., 2015), as well as the racial stereotyping and labelling which occurred during the early stages of the pandemic (e.g., Dubey et al., 2020; Litam et al., 2020; Lu et al., 2022).

The fourth research question consisted of an examination of the relationships among university students' internet use, internet-related incidents, smartphone use and habits, social media risks, and satisfaction with life during the early phases of the pandemic. The results provided support for the study hypothesis in that they demonstrated significant relationships among smartphone use, smartphone habits, and social media risks. With

regard to smartphone use in particular (i.e., number of times students checked their phones in a 30 minute time period), findings showed that high use was significantly and positively associated with overall social media risks (i.e., losing sleep, trouble concentrating on everyday tasks, less physical activity, staying online for longer than originally wanted, and relationship issues with family and friends) as well as negative emotional risks (i.e., feeling anxious, depressed, envious of others' lives, bullied or harassed, and/or angry or frustrated) during early pandemic. Similarly, high habitual smartphone use (i.e., checking one's smartphone immediately upon waking and right before bed, using one's smartphones in classes, at the dinner table, and while watching TV, eating, and with friends) during the early pandemic was significantly and positively associated with experiencing both overall negative and emotional social media risks. This is consistent with findings from the 2018 CIUS reported by Scimmele and colleagues (2021). They noted that high intensity smartphone use among young adults (i.e., checking their smartphones every 30 minutes and immediately upon waking) were significantly related to reports of having trouble concentrating on tasks, reduced physical activity levels, feeling envious of the lives of others, and feeling anxious and depressed as a result of their social media use (Schimmele et al., 2021).

It has been suggested that the abovementioned correlation between smartphone use and social media risks might be explained by the displacement hypothesis (e.g., Kwok et al., 2021). This hypothesis, as discussed in the context of university students in Hong Kong by Kwok and colleagues (2021), suggests that when university students spend a substantial amount of time on one activity, they tend to neglect others (e.g., sleep and physical activity). Indeed, the vast majority of students (90.6%) in the present study reported checking their phones right before going to sleep and more than one third of participants reported losing sleep (35.4%) as a result of their social media use. Lack of sleep has been identified as a significant problem impacting young people (Almoradi et al., 2019) and university students in particular (Kwon et al., 2011; Pletz & Pengpid, 2015), and has been attributed, alongside other factors, to the pandemic (Milasauskiene et al., 2021; Romero-Blanco et al., 2020) and to blue light exposure from screens before bed (e.g., Amez et al., 2020). Studies have also shown that excessive time online can lead to problematic internet use and/or internet addiction (including smartphone addiction;



Anderson et al., 2017), which has also been linked to depressive symptoms and other adversities among university students (Blank & Lutz, 2018; Lindsay et al., 2016; Tang et al., 2017). In short, the findings from this study align with previous studies showing that excessive smartphone use tends to be associated with negative mental health outcomes among university students (Beranuy et al., 2003; Lee et al., 2013; Roberts et al., 2014), including an increased susceptibility to anxiety and depressive symptoms (Kil et al., 2021).

Insofar as satisfaction with life is concerned, the hypothesis that internet use and internet-related incidents would be negatively related to satisfaction with life was not supported. However, study findings did provide support for the hypothesis that smartphone use and social media risks would be negatively related to satisfaction with life; specifically, students who reported checking their phone 6-10 times (versus 0-5 times) in a 30-minute span and frequent (versus no) experiences of negative emotional risks related to social media (e.g., feeling anxious, depressed, envious of others' lives, bullied or harassed, and frustrated or angry) had significantly lower satisfaction with life scores. Results also showed that students who identified as white, female, and who were studying at the undergraduate level reported significantly higher satisfaction with life scores in comparison to students reporting otherwise.

Studies pertaining to smartphone use and satisfaction with life among university students have presented mixed or contradictory results. Kil and colleagues (2021) and Yang and colleagues (2019), for example, did not find relationships between satisfaction with life and excessive smartphone use or smartphone addiction among university students in the United States ( $n = 600$  students) and China ( $n = 475$  students), respectively. Conversely, some researchers have reported significant associations between smartphone use and satisfaction with life among young people. For example, Nie and colleagues examined the relationship between smartphone use and subjective well-being (i.e., satisfaction with life) among young adults ( $n = 493$ ) in China. Their findings showed that young people who spent more than three hours per day on their smartphones had significantly lower satisfaction with life scores than those who spent less time on their phones.

Interestingly, a recent study conducted by David and Roberts (2021) showed that American undergraduate students' ( $n = 400$ ) smartphone use during the pandemic was significantly and positively associated with perceptions of social connectedness, which was also significantly and positively associated with positive psychological well-being. Indeed, it is clear that smartphone use among university students may be associated with both positive and negative outcomes, depending on the frequency and type of use, as well as various other potential factors (e.g., social, psychological, environmental, demographic), all of which require further attention and examination.

## 4.1 Implications and Future Directions

This study is one of the first to examine university students' satisfaction with life in relation to internet use, smartphone use, and internet-related risks during the COVID-19 pandemic. As such, the results from this study represent an important first step in understanding the online experiences of university students during the COVID-19 pandemic in Ontario, Canada, as well as the potential impact of internet (including smartphone) use on university students, both in terms of risks and wellbeing (i.e., satisfaction with life).

These data will be used to help guide and inform future research in this area. For example, logical next steps include an examination of variables such as frequency of internet and social media use, types of and reasons for internet and social media use, internet-related risks experienced throughout subsequent stages of the pandemic, and the health and wellbeing (including satisfaction with life) of university students. Further, in an effort to establish cause-and-effect, it would be worthwhile to explore these variables using a longitudinal research design. Fortunately, the *iBelong2* study, which represents a continuation of *iBelong* – Phase 1, addresses many of these issues and will allow the research team to examine many of these variables over a longer period of time throughout the pandemic (i.e., at three time points from August, 2020 to January, 2022) with a broader cohort of young people (i.e., students and non-students in Ontario between the ages of 15 and 24). Additional future directions might include exploring the online risks (e.g., cyberbullying and harassment) experienced by those in other age groups (older and younger), as well as by those in minority groups, including the LGBTQ2S+ community,

who face numerous other adversities that may have been further impacted by the COVID-19 pandemic.

There are several noteworthy implications related to the research presented in this thesis. The significant increase in university students' internet use from pre- to early-pandemic, which was hypothesized given the circumstances at the time of data collection (e.g., the rapid shift to online learning, physical distancing, work and business closures, social restrictions, etc. at the time of data collection), is concerning. It has been noted previously that university students use the internet and other technology (e.g., smartphones) as a medium to cope with challenges (e.g., the transition to university; Archibald & Clark, 2014; Ferguson et al, 2016), to build social relationships and capital (Jin, 2013; Kim & Kim, 2017), and for entertainment and information gathering (Bicen et al., 2015). This increased reliance on the internet is predicted to continue *post-pandemic* as post-secondary institutions embrace distance learning and expand their online curricula and courses (Goldman & Karam, 2020). While there are certainly benefits to online and blended these models for many students (e.g., increased access to education; Sari et al., 2021), excessive internet use can also lead to problematic internet (and smartphone) use and various negative outcomes, as discussed previously; e.g., Bradley et al., 2020; Demirci et al., 2015; Jackson et al., 2011). Thus, future research and education focused on the responsible use of the internet among university students could be one effective approach to mitigating such risks.

Taken together, the findings presented in this study could be used to inform university administrators, policymakers, and other stakeholders in creating evidence-based supports, resources, and programs for university students in which both preventative and protective measures related to internet use and risks could be developed and implemented. These findings, via various knowledge translation activities (including social media platforms), could also be tailored for and disseminated to university students themselves, to help them understand the potential implications of increased internet, smartphone, and social media use and to shed light on specific internet-related risks. Lastly, these findings could be foundational in the design of a needs assessment conducted to identify what strategies

and resources might be most effective in terms of educating and promoting behaviour change among university students regarding the safe use of the internet and social media.

## 4.2 Strength and Limitations

This study has a number of strengths that are worthy of mention. First, it was timely in that it captured university students' online experiences during the very early stages of COVID-19 pandemic in Ontario, Canada—a time that was particularly challenging and unique, both generally and in the context of the pandemic itself. The online survey was administered approximately two weeks after COVID-19 had been declared a global pandemic (WHO, 2020b), which allowed for a very early 'snapshot' of university students' internet use, risks, and satisfaction with life. Given this unprecedented moment in time for many students (i.e., the rapid and sudden shift to full online learning, the complete disruption to work and social activities, etc.), it will be important and interesting to contrast and compare the current findings with data collected at various other stages throughout the pandemic. Another strength of this study is the large number of university students who completed the survey, which provided sufficient strength for statistical analyses and some degree of generalizability among the Ontario university student population. With regards to generalizability, participant demographics (i.e., age and gender) were similar to those of the general Ontario university student population (current study sample: 78.8% female;  $M_{\text{age}} = 22.4$ ,  $SD = 5.1$ ; Ontario student population aged 20-24: 60.5% female; Statistics Canada, 2021e). Moreover, most survey items were adapted from Statistics Canada's (2018) Canadian Internet Use Survey (CIUS), which allowed for important and timely comparisons of the current data to a national sample of individuals in similar age groups.

Several important study limitations should also be noted. The first is that due to the cross-sectional design of the study and categorical nature of many study variables, there were limitations to the statistical analyses conducted, and of course, cause-and-effect inferences could not be made. As noted above, ongoing research in this area (i.e., *iBelong2*), which uses a longitudinal study design, will provide additional insight into such cause-and-effect relationships and allow for the observation of changes over time. A

second limitation is that all data collected were self-reported. The use of self-reported data, a common limitation in survey-based studies (Althubaiti, 2016), are potentially problematic because of participant biases (e.g., social desirability bias and recall bias; Bergen & Labonte, 2020) and difficulties associated with accurately recalling past events. Third, while many of the internet use, smartphone use, and smartphone habit items were adapted from Statistics Canada's CIUS, they are not validated measures. Finally, while demographic information and time spent online were assessed, as noted above, *type* of internet use and *reasons* for internet use were not accounted for in this study.

### 4.3 Conclusion

The findings presented in this study shed light on the internet use, smartphone use, and internet-related incidents and risks reported by university students in Ontario during the early stages of the COVID-19 pandemic. Further, the potential relationships among important demographic factors, the study variables noted above, and satisfaction with life were also examined. Generally speaking, results support the conclusion that internet use among university students increased significantly from pre-pandemic to the early stages of the pandemic. Such increases in use were not limited to the internet; a large number of students also reported high smartphone use, operationalized via frequent phone-checking and the assessment of habits such as checking one's phone before bed and immediately upon waking. High use of the internet and smartphones was also associated with certain negative effects associated with their use, including lost sleep, decreased physical activity, feelings of depression and anxiety, and many other internet- and social media-related risks. In addition, and in relation to student wellbeing, those who reported using their smartphones frequently and those who experienced negative emotional social media risks scored significantly lower on the satisfaction with life scale.

Overall, this study represents an important contribution to the literature related to the online experiences of university students during the COVID-19 pandemic in Ontario, Canada. The evidence presented herein will be beneficial for researchers with interests in technology use, the pandemic-related experiences of university students, and the promotion of health and wellbeing of students throughout (and beyond) the pandemic. Finally, the study findings could be of use to students, educators, administrators, and

policymakers, and could also serve as a foundation for the development of programs, policies, and supports designed to increase awareness of and mitigate the internet-related risks experienced by university students.

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# Appendices

## Appendix A: Example of Social Media Post

**Western**  
"iBelong":  
Social Distancing, Social Connectedness, and Social Media Use among University Students during COVID-19

**Are you an undergraduate or graduate student at an ONTARIO UNIVERSITY?**  
Get involved by participating in a Western University research study related to social distancing, social connectedness, and social media use!

**As a participant, you will be invited to:**  
Complete ONE ~30-min online survey between March and April 2020

**If you participate, you can be entered into a draw to WIN APPLE AirPods!!!**

**FOLLOW THE QR CODE TO LEARN MORE AND ACCESS THE SURVEY:**

**Draw for AirPods**

**Draw for AirPods**

**iBelong**  
April 3, 2020 · 🌐

Enter now for a chance to win Apple AirPods!!  
[https://uwo.eu.qualtrics.com/jfe/form/SV\\_ac7YS6cxDI67xSI](https://uwo.eu.qualtrics.com/jfe/form/SV_ac7YS6cxDI67xSI)

7 Shares

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## Appendix B: Ethics Approval



**Date:** 25 March 2020

**To:** Dr. Shauna Burke

**Project ID:** 114497

**Study Title:** iBelong: Exploring the influence of social media on first-year university students' perceptions of social connectedness, wellbeing, and transition to university

**Short Title:** iBelong: Exploring the influence of social media on first-year university students

**Application Type:** NMREB Initial Application

**Review Type:** Delegated

**Full Board Reporting Date:** May 1 2020

**Date Approval Issued:** 25/Mar/2020

**REB Approval Expiry Date:** 25/Mar/2021

Dear Dr. Shauna Burke

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the WREM application form for the above mentioned study, as of the date noted above. NMREB approval for this study remains valid until the expiry date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

This research study is to be conducted by the investigator noted above. All other required institutional approvals must also be obtained prior to the conduct of the study.

**Documents Approved:**

Document Name	Document Type	Document Date	Document Version
CLEAN_Email_Recruitment_21-03-20	Recruitment Materials	21/Mar/2020	
CLEAN_iBelong_FocusGroup_Guide_02-03-20	Focus Group(s) Guide	02/Mar/2020	2
CLEAN_iBelong_LOI and Consent_FocusGroup_18-03-20	Written Consent/Assent	18/Mar/2020	
CLEAN_iBelong_LOI and consent_Survey_22-03-20	Implied Consent/Assent	22/Mar/2020	
CLEAN_iBelong_Script for Verbal Recruitment_22-03-20	Oral Script	22/Mar/2020	3
CLEAN_iBelong_SocialMediaRecruitment_22-03-20	Recruitment Materials	22/Mar/2020	
CLEAN_iBelong_Survey_23-03-20	Online Survey	23/Mar/2020	
CLEAN_Invitational_FocusGroup_Email_18-03-20	Recruitment Materials	18/Mar/2020	
CLEAN_NoticeofIncentive_02-03-20	Other Data Collection Instruments	02/Mar/2020	2
CLEAN_PosterClass_PPT_Recruitment 22_03_20	Recruitment Materials	22/Mar/2020	
CLEAN_Social_Distancing_Survey_REVISIED-23-03-20_FINAL	Online Survey	23/Mar/2020	2
FINAL_Social_Distancing_Email_Recruitment_18-03-20	Recruitment Materials	18/Mar/2020	
FINAL_Social_Distancing_LOI:C_18-03-20	Implied Consent/Assent	18/Mar/2020	

FDNAL_Social_Distancing_NoticeofIncentive_18-03-20	Other Data Collection Instruments	18/Mar/2020
FDNAL_Social_Distancing_Online_Classes_PPT_Recruitment_18_03_20	Recruitment Materials	18/Mar/2020
FDNAL_Social_Distancing_SMRecruitment_18-03-20	Recruitment Materials	18/Mar/2020

**Documents Acknowledged:**

Document Name	Document Type	Document Date	Document Version
CLEAN_iBelong_ScreeningQuestions_02-03-20	Screening Form/Questionnaire	02/Mar/2020	
FDNAL_Social_Distancing_ScreeningQuestions_18-03-20	Screening Form/Questionnaire	18/Mar/2020	
MENTAL HEALTH RESOURCES_16-03-20	Other Materials	16/Mar/2020	1

No deviations from, or changes to the protocol should be initiated without prior written approval from the NMREB, except when necessary to eliminate immediate hazard(s) to study participants or when the change(s) involves only administrative or logistical aspects of the trial.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario. Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Please do not hesitate to contact us if you have any questions.

Sincerely,

Kelly Patterson, Research Ethics Officer on behalf of Dr. Randal Graham, NMREB Chair

*Note: This correspondence includes an electronic signature (validation and approval via an online system that is compliant with all regulations).*

## **Appendix C: Letter of Information and Consent**

### **Letter of Information for University Students in Ontario**

*iBelong*: Social Distancing, Social Connectedness, and Social Media Use Among University Students During COVID-19

Thank you for your interest in participating in the “*iBelong*” research study. Before you decide whether to participate, the investigators would like you to read some important information about the study. There are also mental health resources available to you on the next page. If you choose to participate, the “consent” button can be found at the end of this letter of information:

#### **Invitation to Participate**

You are invited to participate in the *iBelong* research study; a study regarding university students’ use of social media and their perceptions of social connectedness, social distancing, and health/wellbeing.

#### **Purpose of the Letter**

The purpose of this letter is to provide you with information required for you to make an informed decision regarding participation in this research study.

#### **Purpose of this Study**

The primary purpose of this study is to examine university students’ perceptions of social distancing, social connectedness, social media use, and overall student health and well-being.

#### **Inclusion Criteria**

You are eligible to participate in this study if you are currently enrolled as a university student (undergraduate or graduate) in any program at a post-secondary institution in Ontario.

#### **Exclusion Criteria**

Individuals who are not currently enrolled at an Ontario university are not eligible to participate in this study.

#### **Study Procedures**

If you consent to participate in this study, you will be asked to complete an online survey between March and April 2020. It is anticipated that the survey will take approximately 30 minutes to complete. You will be asked to complete the survey before the survey link expires on April 30<sup>th</sup> 2020. You will be able to complete the survey on your own time at a location of your choice (where internet is available).

We would also like to request that if you know of other students or friends attending Western University or other Ontario universities,



that you please notify them of the study. If they are interested, please share the survey with them or tell them to contact Ms. Nerida K. van der Linden at or Dr. Shauna Burke.

### **Possible Benefits**

While there are no direct benefits to participation in this study, a reflection of your own social media use and the strategies used during social distancing may be beneficial. Findings from this study could also benefit society, as findings regarding students' perceptions of belonging and wellness, as well as their social media use, during social distancing and the COVID-19 pandemic might be particularly relevant and timely.

### **Compensation**

We aim to recruit as many participants as possible. If you participate in the survey and wish to leave your e-mail address, you will be entered in a draw to win one of three Apple AirPods. You may only win one draw. If you win a draw, you will be notified by e-mail and will be asked to provide your mailing address so that we can mail the prize to your home address (as you will be unable to pick this prize up in-person). E-mail and mailing addresses will be collected and stored separately from research data and only used to notify you of winning the prize; this information will be deleted after mailing winners their prize.

### **Voluntary Participation**

Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions, or withdraw from the study at any time with no effect on your future or current academic or professional standing.

### **Confidentiality**

Your survey responses will be collected through a secure online survey platform called Qualtrics. Qualtrics uses encryption technology and restricted access authorizations to protect all data collected. In addition, Western's Qualtrics server is in Ireland, where privacy standards are maintained under the European Union safe harbour framework. The data will then be exported from Qualtrics and securely stored on a Western University server. All data collected will remain confidential and accessible only to the investigators of this study. While we will do our best to protect your information, there is no guarantee that we will be able to do so. We are collecting some sensitive information. For example, in order to calculate body mass index (BMI), full date of birth (i.e., day/month/year), height, and weight information is required. E-mail addresses are being requested as we require them to notify winners

of the incentive. If you have entered your e-mail address for the draw to win AirPods, we will also require your address, postal code, and full name (as we will be mailing all prizes). We are also collecting information such as ethnicity, year of study, sex, year of study, and university program, which may allow the research team members to link the data and identify you.

After a minimum of 7 years, all data (electronic and paper) will be destroyed. By participating in this research, you agree that the results may be used for scientific purposes, including publication in scientific journals. No individual information will be reported. Only group-level and aggregated data will be reported. You do not waive any legal rights by consenting to this study. The results of the study will be reported without identifying you personally, thus maintaining your confidentiality. Representatives of The University of Western Ontario Non-Medical Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research.

### **Contacts for Further Information**

If you require any further information regarding this research project or your participation in the study, you may contact Ms. Nerida K. van der Linden or Dr. Shauna Burke.

If you have any questions about your rights as a research participant or the conduct of this study, you may contact The Office of Human Research Ethics.

### **Publication**

If the results of the study are published, your name will not be used. If you would like to receive a copy of any potential study results, please e-mail Ms. Nerida L. van der Linden or Dr. Shauna Burke.

### **Consent**

Prior to participating in this study, you will be asked to provide consent. If you do not provide consent, you will not be able to proceed to the survey.

Thank you for considering participation in this study.

Below are two buttons. If you do not consent and do not wish to participate in the study, please choose the appropriate option. You will not be penalized in any way if you choose not to participate.

By clicking “I consent and begin the study”, you acknowledge that you understand the terms and conditions of participating in this study and are making an informed decision to participate. Furthermore, submitting the survey is also an indication of your consent to participate in the study. Thank you.

*Please note that this survey will be best displayed on a laptop or desktop computer. Some features may be less compatible for use on a mobile device.*

## Appendix D: Mental Health Resources

*While we (the researchers) do not foresee any potential risks associated with filling out the following online survey, we acknowledge that answering some questions (for example, those related to anxiety, depression, and social relationships) might elicit difficult or negative thoughts and emotions in some individuals. Thus, we have included a list of mental health support services, available to students in Ontario and at Western University.*

**Please keep this for your records.**

First and foremost, **if you are in an emergency situation or in immediate danger, please call 911**, or go to nearest hospital/emergency department

Ontario Mental Health Support Services:

Ontario university students seeking help regarding mental health concerns can use these Ontario mental health resources:

- General Mental Health Support:
  - Website: <https://www.ontario.ca/page/find-mental-health-support>
- Kids Help Phone (ages 5 – 20):
  - Phone: 1 800 668 6868
- Good2Talk (ages 17 – 25):
  - Phone: 1 866 925 5454
- ConnexOntario:
  - Phone: 1 866 531 2600
  - Social Media: ConnexOntario app

Western University and City of London Resources:

Information regarding health- and wellness-related services available to Western University students may be found online at: <http://www.health.uwo.ca/>.

Western University students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in. Campus mental health resources may be found online at: [http://www.health.uwo.ca/mental\\_health/resources.html](http://www.health.uwo.ca/mental_health/resources.html).

City of London mental health resources:

- ReachOUT – Mobile and Chat Services:
  - Phone: 519 433 2023
  - Website: ReachOut247.ca
- The Mental Health & Addiction Crisis Centre:
  - 648 Huron Street, London, ON

- Walk in: Open 24/7 for crisis and support
- Phone: 519 434 9191 (8:30am-4:30pm)
  
- Anova Woman's Community House:
  - 24 Hour Phone:
    - Abused Women's Helpline: 519 642 3000
    - Crisis and Support line: 519 438 2272

## Appendix E: Full iBelong Survey

### SECTION I: Demographic Information

#### What is your height?

In feet/inches: \_\_\_\_\_

#### What is your weight?

In pounds: \_\_\_\_\_

#### What is your date of birth? (DD/MM/YYYY)

#### What is your sex at birth? (Refers to sex assigned at birth.)

- Male
- Female

#### What is your gender? (Refers to current gender which may be different from sex assigned at birth and may be different from what is indicated on legal documents.)

- Male
- Female

OR

- Other: \_\_\_\_\_

#### What term best describes your sexual orientation (National Centre for Health Statistics [NCHAS], 2018)?

- Asexual
- Bisexual
- Gay
- Lesbian
- Pansexual
- Queer
- Questioning
- Same Gender Loving
- Straight/Heterosexual
- Another identity (please specify: \_\_\_\_\_)

#### Are you an Indigenous person, that is, First Nations, Métis or Inuk (Inuit)? (Note: First Nations includes Status and Non-Status.)

- No, not an Indigenous person
- Yes, First Nations (Status or Non-Status)
- Yes, Métis
- Yes, Inuk (Inuit)

#### Do you identify as:

- White
- South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.)
- Chinese
- Black
- Filipino
- Latin American
- Arab
- Southeast Asian (e.g., Vietnamese, Cambodian, Laotian, Thai, etc.)
- West Asian (e.g., Iranian, Afghan, etc.)
- Korean

- Japanese
- Other – specify: \_\_\_\_\_

Education:

**Are you enrolled as a full-time or part-time university student?**

- Full-time student
- Part-time student

**Are you an undergraduate or graduate student?**

- Undergraduate

**What year are you currently enrolled in?**

- 1
- 2
- 3
- 4
- 5+

- Graduate

**What degree are you currently taking?**

Masters

PhD

Professional

Other – Please specify: \_\_\_\_\_

**Please tell us what program you are currently enrolled in:** \_\_\_\_\_

**Are you currently enrolled as an international student?**

- Yes
- No

**Do you currently attend Western University?**

- Yes
- No

**If NO, what university do you currently attend?:** \_\_\_\_\_

**If YES, which campus at Western University are you currently enrolled in?**

- Main (Western)
- Huron
- King's
- Brescia

Living Arrangements:

**Where do you currently live (amidst the COVID-19 pandemic)?**

- Campus residence hall
- Other college/university housing
- Parent/guardian's house
- Other off-campus housing: Please specify \_\_\_\_\_
- Other: Please specify: \_\_\_\_\_

**Where did you previously live (prior to the COVID-19 pandemic)?**

- Campus residence hall
- Other college/university housing
- Parent/guardian's house
- Other off-campus housing: Please specify \_\_\_\_\_

- Other: Please specify: \_\_\_\_\_

**How many people (not including yourself) are you currently in isolation with?**

- 0
- 1
- 2
- 3
- 4
- 5
- 6+
- I am not currently self-isolating

**Who are you currently in isolation with? Please check all that apply.**

- Parents/guardians
- Siblings
- Other relatives
- Friends
- Other: Please specify: \_\_\_\_\_
- I am not currently self-isolating

***Before you begin the survey it's important for you to know there are no right or wrong answers. Please answer questions openly and honestly. Thank you.***

*\*The following sections will be administered in random order via Qualtrics with the exception of Section 1.*

### **SECTION I: Social Distancing and Social Media Use**

In the wake of the COVID-19 pandemic, numerous strategies have been proposed to reduce the risk and spread of this virus. One such strategy is **SOCIAL DISTANCING** (also referred to as “**physical distancing**”), which has been defined as deliberately increasing the amount of physical space between people to avoid spreading illness (Johns Hopkins Medicine, 2020).

1. Have you engaged in *social distancing* during the COVID-19 pandemic?

- Yes
  - Please tell us about your reasons for engaging in social distancing.  
*\*leave blank space in Qualtrics for open-ended responses*
- No
  - Please tell us about your reasons for NOT engaging in social distancing.  
*\*leave blank space in Qualtrics for open-ended responses*

2. Which, if any, of the following measures have you taken to practice *social distancing* during the COVID-19 pandemic?

a. Avoided travel to other countries?

- Yes
- No
- Not applicable

b. Avoided large crowds (e.g., music concerts, live theatre, conferences), prior to them being cancelled or banned?

- Yes
- No
- Not applicable



- c. Avoided family gatherings?
  - Yes
  - No
  - Not applicable
- d. Avoided gatherings with friends?
  - Yes
  - No
  - Not applicable
- e. Avoided the mall?
  - Yes
  - No
  - Not applicable
- f. Avoided public transit?
  - Yes
  - No
  - Not applicable
- g. Avoided public and/or university libraries?
  - Yes
  - No
  - Not applicable
- h. Avoided the gym (prior to them closing)?
  - Yes
  - No
  - Not applicable
- i. Moved out of residence?
  - Yes
  - No
  - Not applicable
- j. Avoided residence dining halls?
  - Yes
  - No
  - Not applicable
- k. Avoided coffee shops?
  - Yes
  - No
  - Not applicable
- l. Avoided the grocery store, pharmacy, or other essential service locations?
  - Yes
  - No
  - Not applicable
- m. Avoided any one-on-one social interaction(s)?
  - Yes
  - No
  - Not applicable
- n. Avoided going outside?
  - Yes

- No
  - Not applicable
- o. Engaged in paid work (outside of school work) from home?
- Yes
  - No
  - Not applicable
- p. Avoided restaurants and bars (prior to them closing)?
- Yes
  - No
  - Not applicable
- q. Avoided, in general, other public places prior to them closing (e.g., recreation centres, movie theatres, etc.)?
- Yes
  - No
  - Not applicable
- r. Stayed at least 2 metres (6 feet) away from other individuals? (Please note that this does **not** include individuals you live with).
- Yes
  - No
  - Not applicable
- s. Avoided food and beverage take-out services?
- Yes
  - No
  - Not applicable
- t. Avoided food and beverage delivery services?
- Yes
  - No
  - Not applicable
- u. Engaged in a self-isolation procedure for at least two weeks?
- Yes
  - No
  - Not applicable
3. What, if any, of the following strategies have you used to *remain socially connected* during the COVID-19 pandemic? Please select all that apply.
- Video calls (e.g., FaceTime)
  - Telephone
  - Online video games
  - Text
  - Social media
  - E-mail
  - Staying home with family
  - Outdoor time with friends or family
  - Other: Please specify
- 
- I did not change any of my social behaviours

4a. The following questions relate to your *thoughts and feelings about social distancing*. Please rate the extent to which you agree or disagree with the statements using the following scale (*Strongly disagree* to *Strongly agree*).

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
It has been difficult to change my behaviours to be more socially distant.					
I feel that social distancing is effective.					
I feel comfortable with social distancing.					
I feel isolated when I am socially distancing.					
It has been easy to remain connected with my friends while socially distancing.					
It has been easy to remain connected with my family while socially distancing.					
I feel anxious when I am socially distancing.					
I feel relieved when I am socially distancing.					
I am more social online when I am socially distancing.					
I am more social in my home environment when I am socially distancing.					
I feel pressure from others to <b>not</b> socially distance.					
I feel that social distancing is unnecessary.					
I feel judged by others when I am socially distancing.					
I feel self-conscious when I am socially distancing.					
I feel in control when I am socially distancing.					
I feel angry when I am socially distancing.					
I feel sad when I am socially distancing.					
My peers support me in practicing social distancing.					
My family members support me in practicing social distancing.					
I feel happy when I am socially distancing.					
I feel stressed when I am socially distancing.					
I feel irritable when I am socially distancing.					
I feel confused when I am socially distancing.					
I have trouble sleeping because of social distancing.					
Social distancing has left me feeling numb.					
I feel guilty when I am socially distancing.					
I feel scared when I am socially distancing.					

I have argued with other people about social distancing.					
Social distancing has made me feel closer to the people I live with.					
Social distancing has made me feel closer to the people I am <u>not</u> living with.					

4b. Please share any other comments you have about how social distancing makes you feel in the space below:

*\*Leave space in Qualtrics for open-ended responses.*

5. How has your use of social media (e.g., Facebook, Instagram, Twitter, Snapchat, etc.) **changed** during the COVID-19 pandemic?

- It has increased greatly
- It has increased somewhat
- It has not changed
- It has decreased somewhat
- It has decreased greatly
  - Please explain: *\*leave space for open-ended responses*

6. For what **purpose(s)** are you are using the following social media sites or apps during the current COVID-19 pandemic? Please select all that apply.

**FACEBOOK**

a. I am using **Facebook** during the COVID-19 pandemic to:

- Stay connected with friends and family
- Share and receive information, photos, and videos **unrelated** to COVID-19
- Share and receive news and information and **related** to COVID-19
- Other (please specify): \_\_\_\_\_
- I do not use Facebook

b. Please rate the extent to which you agree or disagree with the statement below using the following scale (*Strongly disagree* to *Strongly agree*).

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Using <b>Facebook</b> has been helpful for me during the COVID-19 pandemic.					

Please explain: \_\_\_\_\_

**INSTAGRAM**

a. I am using **Instagram** during the COVID-19 pandemic to:

- Stay connected with friends and family
- Share and receive information, photos, and videos **unrelated** to COVID-19
- Share and receive news and information and **related** to COVID-19
- Other (please specify): \_\_\_\_\_
- I do not use Instagram

b. Please rate the extent to which you agree or disagree with the statement below using the following scale (*Strongly disagree to Strongly agree*).

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Using <b>Instagram</b> has been helpful for me during the COVID-19 pandemic.					

Please explain: \_\_\_\_\_

### SNAPCHAT

a. I am using **Snapchat** during the COVID-19 pandemic to:

- Stay connected with friends and family
- Share and receive information, photos, and videos **unrelated** to COVID-19
- Share and receive news and information and **related** to COVID-19
- Other (please specify): \_\_\_\_\_
- I do not use Snapchat

b. Please rate the extent to which you agree or disagree with the statement below using the following scale (*Strongly disagree to Strongly agree*).

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Using <b>Snapchat</b> has been helpful for me during the COVID-19 pandemic.					

Please explain: \_\_\_\_\_

### TWITTER

a. I am using **Twitter** during the COVID-19 pandemic to:

- Stay connected with friends and family
- Share and receive information, photos, and videos **unrelated** to COVID-19
- Share and receive news and information and **related** to COVID-19
- Other (please specify): \_\_\_\_\_
- I do not use Twitter

b. Please rate the extent to which you agree or disagree with the statement below using the following scale (*Strongly disagree to Strongly agree*).

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Using <b>Twitter</b> has been helpful for me during the COVID-19 pandemic.					

Please explain: \_\_\_\_\_

### TIK TOK

a. I am using **Tik Tok** during the COVID-19 pandemic to:

- Stay connected with friends and family
- Share and receive information, photos, and videos **unrelated** to COVID-19
- Share and receive news and information and **related** to COVID-19
- Other (please specify): \_\_\_\_\_
- I do not use TikTok

b. Please rate the extent to which you agree or disagree with the statement below using the following scale (*Strongly disagree* to *Strongly agree*).

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Using <b>Tik Tok</b> has been helpful for me during the COVID-19 pandemic.					

Please explain: \_\_\_\_\_

**Are there any other social media sites or apps that you are using during the current COVID-19 pandemic? If so, please specify:** \_\_\_\_\_

a. I am using **other social media sites or apps** during the COVID-19 pandemic to:

- Stay connected with friends and family
- Share and receive information, photos, and videos **unrelated** to COVID-19
- Share and receive news and information and **related** to COVID-19
- Other (please specify): \_\_\_\_\_
- I do not use any other social media sites or apps

b. Please rate the extent to which you agree or disagree with the statement below using the following scale (*Strongly disagree* to *Strongly agree*).

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Using " <b>Other</b> " (social media sites and apps) has been helpful for me during the COVID-19 pandemic.					

Please explain: \_\_\_\_\_

## **SECTION II: Self-Reported Health and Health Behaviours**

### **General Health:**

**How would you describe your current health?**

- Excellent
- Very good
- Good
- Fair
- Poor

Current Physical Activity and Screen Time:

*Think about the physical activities you are currently engaging in **during the COVID-19 pandemic**. Think about both **moderate-intensity physical activities** that will cause you to sweat a little and breathe harder (e.g., brisk walking, bike riding), and **vigorous-intensity physical activities** that will cause you to sweat and make you breathe much harder than normal (e.g., jogging).*

**Keeping in mind the above definitions, approximately how many minutes per day do you currently engage in moderate- to-vigorous intensity physical activity?**

- Less than 15 minutes per day
- 15-30 minutes per day
- 31-45 minutes per day
- 46-60 minutes per day
- More than 60 minutes per day

**During the COVID-19 pandemic, approximately how many hours of recreational screen time (e.g., time spent watching television, browsing the internet, using a cell phone, playing video games, etc.) do you currently engage in per day?**

- Less than 1 hour per day
- 1-2 hours per day
- 3-4 hours per day
- 5-6 hours per day
- 7-8 hours per day
- 9-10 hours per day
- More than 10 hours per day

**SECTION III: Use of the Internet**

**How many hours per week are you currently using the Internet (during the COVID-19 pandemic)?**

- Less than 5 hours per week
- 5 to less than 10 hours per week
- 10 to less than 20 hours per week
- 20 to less than 40 hours per week
- 40 hours or more per week

**Prior to the COVID-19 pandemic, how many hours did you use the Internet in a “typical” week?**

- Less than 5 hours per week
- 5 to less than 10 hours per week
- 10 to less than 20 hours per week
- 20 to less than 40 hours per week
- 40 hours or more per week

**Which of the following activities related to communication do you currently engage in using the Internet?**

*Do you:*

- Use social networking websites or apps (e.g., Facebook, Twitter, Instagram, Snapchat)?
  - Yes
    - For approximately how many hours per day?
      - Less than 1 hour per day

- 1-2 hours per day
  - 3-4 hours per day
  - 5-6 hours per day
  - More than 6 hours per day
  - No
- Use dating websites or apps (e.g., Tinder, Plenty of Fish, Bumble, Match)?
- Yes
    - For approximately how many hours per day?
    - Less than 1 hour per day
    - 1-2 hours per day
    - 3-4 hours per day
    - 5-6 hours per day
    - More than 6 hours per day
  - No

**During the past 12 months (prior to the COVID-19 pandemic), have you felt that you were a victim of any of the following incidents on the Internet?**

*Did you experience:*

- Bullying?
  - Yes
    - How many times in the past 12 months? \_\_\_\_\_
  - No
- Harassment?
  - Yes
    - How many times in the past 12 months? \_\_\_\_\_
  - No
- Discrimination?
  - Yes
    - How many times in the past 12 months? \_\_\_\_\_
  - No
- Stalking?
  - Yes
    - How many times in the past 12 months? \_\_\_\_\_
  - No
- Misuse of personal pictures, videos or other content?
  - Yes
    - How many times in the past 12 months? \_\_\_\_\_
  - No
- Fraudulent use of your identity?
  - Yes
    - How many times in the past 12 months? \_\_\_\_\_



- No

**Have you been the victim of any of the following incidents on the Internet during the COVID-19 pandemic?**

*Have you experienced:*

- Bullying?
  - Yes  
How many times? \_\_\_\_\_
  - No
- Harassment?
  - Yes  
How many times? \_\_\_\_\_
  - No
- Discrimination?
  - Yes  
How many times? \_\_\_\_\_
  - No
- Stalking?
  - Yes  
How many times? \_\_\_\_\_
  - No
- Misuse of personal pictures, videos or other content?
  - Yes  
How many times? \_\_\_\_\_
  - No
- Fraudulent use of your identity?
  - Yes  
How many times? \_\_\_\_\_
  - No

For this question, please select the number twelve to demonstrate your attention.

- 6
- 2
- 12
- 10

**SECTION IV: Use of Smartphone and Social Networking Sites/Apps**

**Do you have a smartphone that you use for personal use?** (e.g., Apple iPhone, Samsung Galaxy, etc.)

- Yes
- No

**IF YES:**

Approximately how often do you *currently* check your smartphone within a 30-minute span (during the COVID-19 pandemic)?

- 0 – 5 times
- 6 – 10 times
- 11 – 15 times
- 16 – 20 times
- More than 20 times

**In a typical day during the COVID-19 pandemic, please rate the extent to which of the following scenarios apply to you:**

	Never	Rarely	Sometimes	Often	Always
I check my smartphone right before going to sleep.					
I check my smartphone as soon as I wake up.					
I use my smartphone while watching television.					
I use my smartphone while in class.					
I use my smartphone while eating.					
I use my smartphone at the dinner table.					
I use my smartphone when I am with friends.					

Use of Social Networking Websites or Apps

**Do you have any social networking accounts?** (e.g., Facebook, Instagram, Snapchat, Twitter, LinkedIn, etc.)

- Yes
- No

**Please list which social networking sites or apps you use, and how many personal accounts you have with each.**

Facebook

- Yes → # of personal accounts: \_\_\_\_\_  
If yes, what do you typically use Facebook for? (check all that apply)
  - Connect with friends and family
  - Share information, photos, and videos
  - Entertainment
  - News
  - Other (please specify): \_\_\_\_\_

- No

Instagram

- Yes → # of personal accounts: \_\_\_\_\_  
If yes, what do you typically use Instagram for? (check all that apply)
  - Connect with friends and family
  - Share information, photos, and videos
  - Entertainment
  - News

- Other (please specify): \_\_\_\_\_
  - No
- Snapchat
- Yes → # of personal accounts: \_\_\_\_\_  
If yes, what do you typically use Snapchat for? (check all that apply)
    - Connect with friends and family
    - Share information, photos, and videos
    - Entertainment
    - News
    - Other (please specify): \_\_\_\_\_
  - No

- Twitter
- Yes → # of personal accounts: \_\_\_\_\_  
If yes, what do you typically use Twitter for? (check all that apply)
    - Connect with friends and family
    - Share information, photos, and videos
    - Entertainment
    - News
    - Other (please specify): \_\_\_\_\_
  - No

- Tik Tok
- Yes → # of personal accounts: \_\_\_\_\_  
If yes, what do you typically use Tik Tok for? (check all that apply)
    - Connect with friends and family
    - Share information, photos, and videos
    - Entertainment
    - News
    - Other (please specify): \_\_\_\_\_
  - No

- Other (please list): \_\_\_\_\_
- Yes → # of personal accounts: \_\_\_\_\_  
If yes, what do you typically use this other form of social media for? (check all that apply)
    - Connect with friends and family
    - Share information, photos, and videos
    - Entertainment
    - News
    - Other (please specify): \_\_\_\_\_
  - No

**Do you have social media accounts for reasons other than personal? (i.e., business pages, pet pages, photography pages, etc.)**

- Yes  
If yes, how many?

- 1
- 2
- 3
- 4
- More than 4
- No

**In general, why do you engage with other social media accounts? (Select all that apply)**

- To share photos and videos with friends, family, and followers
- To stay connected with friends, family, and followers
- To be noticed or recognized by followers and other social media accounts
- Other (please specify): \_\_\_\_\_

**IF NONE: Why do you not regularly use social networking websites or apps?**

*Select all that apply.*

- No need, no interest or no time
- Security or privacy concerns
- Lack of confidence, knowledge, skills or training
- Restricted access to the Internet
- Been bullied or harassed
- Negative experience other than being bullied or harassed
- Other

Specify other reasons: \_\_\_\_\_

**What activities do you regularly do on social networking websites or apps?**

*Select all that apply.*

- Keep up to date with the activities of friends and family
- Communicate with friends and family
- Share or post your own thoughts, pictures or videos with friends and family
- Share or post your own thoughts, pictures or videos publicly
- Viewing public pages (i.e., celebrity or meme accounts)
- Follow current events
- Other (please list) :

\_\_\_\_\_

OR

- None

**How do you most often use your social networking websites or apps?**

- I actively engage with others via online communication, sharing photos, commenting, etc.
- I scroll passively through other peoples' posts
- Other

OR

- None

**During the past 12 months, have you experienced any negative effects in your life because of your use of social networking websites or apps?**

Specifically, how often have you:

Never	Rarely	Sometimes	Often	Always
-------	--------	-----------	-------	--------

Stayed online for longer than you originally wanted to?					
Lost sleep?					
Had less physical activity?					
Had trouble concentrating on tasks or activities (e.g., school, work)?					
Had relationship issues with friends or family?					
Felt anxious?					
Felt depressed?					
Felt envious of the lives of others?					
Felt bullied or harassed?					
Felt frustrated or angry?					

**During the past 12 months, have you ever spread a rumour or written nasty things about another individual using social networking sites or apps?**

- Yes  
If yes, how many times in the past 12 months? \_\_\_\_\_
- No

**During the past 12 months, have you ever posted an embarrassing photo of another individual using social networking sites or apps?**

- Yes  
If yes, how many times in the past 12 months? \_\_\_\_\_
- No

For this question, please select the number two to demonstrate your attention.

- 8
- 2
- 4
- 10

#### **SECTION V: Perceptions of Belonging and 'Connectedness'**

*The following questions relate to your thoughts about interacting with others online and in-person. Please rate the extent to which you agree or disagree with the statements using the following scale (Strongly disagree to Strongly agree).*

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel more comfortable interacting with my <b>friends</b> through <u>social networking sites</u> than I do in person					
I feel more comfortable interacting with my <b>family</b> through <u>social networking sites</u> than I do in person					
I feel more comfortable interacting with my <b>partner</b> through <u>social networking sites</u> than I do in person					

I feel more comfortable interacting with <b>strangers</b> through <u>social networking sites</u> than I do in person					
It is easier to make <b>friends</b> using <u>social networking sites</u> than it is in person					
I prefer to interact with people <u>in person</u> , rather than through social networking sites					
I would like to gain more social skills to be able to interact comfortably with people <u>in person</u>					
I would like to gain more social skills to be able to interact comfortably with people <u>online</u>					
I am more social <u>online</u> than I am in person					
I am more outgoing <u>online</u> than I am in person					
Being on my smartphone takes away or distracts me from the <u>face-to-face</u> social interactions I have with my <b>friends</b>					
Being on my smartphone takes away or distracts me from the <u>face-to-face</u> interactions I have with my <b>family</b>					
Being on my smartphone prevents me from initiating or engaging in conversation with others <u>in person</u>					
Being on my smartphone prevents me from engaging in friendly behaviours (including small-talk) with <b>strangers</b> when I am out in public					
Being on my smartphone helps to <b>distract me</b> when I am in stressful situations					
I feel <b>anxious</b> when I don't have my smartphone with me					
I feel <b>uncomfortable</b> when I am in a <u>social situation</u> and I don't have my phone					
Social networking sites and apps have helped with my <b>transition to college/university</b>					

The Facebook Social Connectedness Scale (Grieve et al., 2013) – Online Connectedness:  
 Following are a number of statements that reflect various ways in which we view ourselves. Rate the degree to which you agree or disagree with each statement using the following scale  
 (1 = Strongly Disagree and 6 = Strongly Agree).  
 Since each social media site has different ways to describe their users (e.g., friends, followers, subscribers) the term, “social media friends/followers”, is an integrated definition which includes offline friends, online friends, followers, etc.

1- Strongly disagree	2-Disagree	3-Slightly disagree	4-Slightly agree	5-Agree	6-Strongly agree
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I feel comfortable in the presence of strangers when I'm on social media sites and apps.						
I am in tune with the social media world.						
Even among my social media friends, there is no sense of brother/sisterhood.						
I fit in well in new social media situations.						
I feel close to people on social media sites and apps.						
I feel disconnected from the social media world around me.						
Even around social media friends/followers I know, I don't feel that I really belong.						
I see social media friends/followers as friendly and approachable.						
I feel like an outsider when I'm on social media sites and apps.						
I feel understood by the people I know when I'm on social media sites and apps.						
I feel distant from social media friends/followers.						
I am able to relate to my social media friends/followers.						
I have little sense of togetherness with my social media friends/followers.						
I find myself actively involved in my social media friends/followers' lives.						

I catch myself losing a sense of connectedness with society when I am on social networking sites/apps.						
I am able to connect with other people through social media.						
I see myself as a loner when I am on social media.						
I don't feel related to most people on social media.						
My social media friends/followers feel like family.						
I don't feel I participate with anyone or any group on social media sites or apps.						

Social Connectedness Scale – Revised (Lee et al., 2001) – In-Person Connectedness:

	1-Strongly disagree	2-Disagree	3-Slightly disagree	4-Slightly agree	5-Agree	6-Strongly agree
I feel distant from people.						
I don't feel that I can relate to most people.						
I feel like an outsider.						
I see myself as a loner.						
I feel disconnected from the world around me.						
I don't feel I participate with anyone or any group.						
I feel close to people.						
Even around people I know, I don't feel that I really belong.						
I am able to relate to my peers.						



I catch myself losing a sense of connectedness with society.						
I am able to connect with other people.						
I feel understood by the people I know.						
I see people as friendly and approachable.						
I fit in well in new situations.						
I have little sense of togetherness with my peers.						
My friends feel like family.						
I find myself actively involved in people's lives.						
Even among my friends, there is no sense of brother/sisterhood.						
I am in tune with the world.						
I feel comfortable in the presence of strangers						

**SECTION VI: Psychological WellBeing**

**Brief Symptom Inventory - 18 (Derogatis, 2001)**

*Following are a number of statements that reflect various ways in which we may be distressed. Rate the degree to which you relate to each statement using the following scale*

*(0 = Not at all; 1 = A little bit; 2 = Moderately; 3 = Quite a bit; 4 = Extremely; R = Refused).*

**During the past 7 days, how much were you distressed by:**

	0-Not at all	1-A little bit	2-Moderately	3-Quite a bit	4-Extremely	R-Refused
Faintness or dizziness						
Feeling no interest in things						
Nervousness or shakiness inside						

Pains in heart or chest						
Feeling lonely						
Feeling tense or keyed up						
Nausea or upset stomach						
Feeling blue						
Suddenly scared for no reason						
Trouble getting your breath						
Feeling of worthlessness						
Spells of terror or panic						
Numbness or tingling in parts of your body						
Feeling of hopeless of the future						
Feeling so restless you couldn't sit still						
Feeling weak in parts of your body						
Thoughts of ending your life						
Feeling fearful						

**Satisfaction with Life Scale (Diener et al., 1985)**

*Following are a number of statements that reflect various ways in which we may view our life. Rate the degree to which you agree or disagree with each statement using the following scale*

*(1 = Strongly Disagree and 7 = Strongly Agree).*

1- Strongly disagree	2- Disagree	3- Slightly disagree	4-Neither agree nor disagree	5- Slightly agree	6-Agree	7- Strongly agree
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In most ways my life is close to my ideal							
The conditions of my life are excellent							
I am satisfied with my life							
So far I have gotten the important things I want in life							
If I could live my life over, I would change almost nothing							

\*LAST PAGE (after student submits survey they will be redirected to one additional **optional** survey about the incentive):

***Congratulations! You have successfully submitted the online survey.***  
**Would you like to be entered into a draw to win Apple AirPods for completion of this survey?**

- Yes

If you would like to be entered in the draw for AirPods, please provide your email address. *Please note that the e-mail address you provide here will not be connected in any way with the responses you provided in the online survey.*

E-mail address: \_\_\_\_\_

- No, I am not interested

## Curriculum Vitae

**Name:** Maram Omar

### Post-Secondary Education and Degrees

2020 – Present MSc in Health and Rehabilitation Sciences  
Western University, London, Ontario

2014 – 2018 BHSc - Honours Specialization in Rehabilitation Sciences  
Western University, London, Ontario

### Honours and Awards

2017 – 2018 Dean's Honour List  
Western University, London, Ontario

2014 Western Scholarship of Distinction  
Total Award: \$1,000  
Western University, London, Ontario

### Related Work Experience

2022 Guest Lecture  
Graduate Health Promotion Seminar

2021 Guest Lecture  
HS 1001: Personal Determinants of Health

2021 – 2022 Teaching Assistant  
HS 1001a: Personal Determinants of Health  
Western University, London, Ontario

2020 – 2021 Graduate Fellow  
*iBelong* Research Program  
Western University, London, Ontario

2020 – 2021 Teaching Assistant  
HS 1001a: Personal Determinants of Health  
Western University, London, Ontario

## Conference Presentations

**Omar, M.**, van der Linden, N. K., Holmes, O. K., Dumas, T., Zarbatany, L., Ellis, W., Donelle, L., Irwin, J. D., Tucker, T., Pearson, E. S., Gilliland, J., Seabrook, J. A. & Burke, S. M. (2022, February 2-3). Internet use, social media risks, and satisfaction with life among university students during the COVID-19 pandemic: A cross-sectional study [Online verbal presentation]. Western University Health and Rehabilitation Sciences Graduate Student Research Conference 2022 (“Evolution and Innovation”).

**Omar, M.**, Koert van der Linden, N., Holmes, O. K., Dumas, T., Zarbatany, L., Ellis, W., Donelle, L., Irwin, J. D., Tucker, T., Pearson, E. S., Gilliland, J., & Burke, S.M. (2021, June 8-10). Internet use and risks reported by university students during the COVID-19 pandemic [Online verbal presentation]. International Society of Behavioral Nutrition and Physical Activity (ISBNPA) Xchange Initiative 2021 Virtual Conference.

Koert van der Linden, N., Holmes, O.K., **Omar, M.**, Dumas, T., Zarbatany, L., Ellis, W., Donelle, L., Irwin, J. D., Tucker, T., Pearson, E. S., Gilliland, J., & Burke, S.M. (2021, June 8-10). Self-reported health, health behaviours, and psychological wellbeing among university students during the COVID-19 pandemic [Online verbal presentation]. International Society of Behavioral Nutrition and Physical Activity (ISBNPA) Xchange Initiative 2021 Virtual Conference.

Holmes, O.K., Koert van der Linden, N., **Omar, M.**, Dumas, T., Zarbatany, L., Ellis, W., Donelle, L., Irwin, J. , Tucker, T., Pearson, E. S., Gilliland, J., & Burke, S.M. (2021, June 8-10). University students' social media use and social connectedness during the COVID-19 pandemic [Online verbal presentation]. International Society of Behavioral Nutrition and Physical Activity (ISBNPA) Xchange Initiative 2021 Virtual Conference.

**Omar, M.**, Koert van der Linden, N., Holmes, O.K., Dumas, T., Zarbatany, L., Ellis, W., Donelle, L., Irwin, J., Tucker, T., Pearson, E. S., Gilliland, J., & Burke, S.M. (2021, March 25-26). A cross-sectional examination of internet use and risks among university students during the COVID-19 pandemic [Online verbal presentation]. Eastern Canada Sport and Exercise Psychology Symposium. Virtual conference hosted by the University of Windsor, Ontario, Canada.

Koert van der Linden, N., Holmes, O. K., **Omar, M.**, Dumas., T., Zarbatany, L., Ellis, W., Donelle, L., Irwin, J., Tucker, T., Pearson, E. S., Gilliland, J., & Burke, S.M. (2021, March 25-26). A cross-sectional examination of self-reported health, health behaviours, and psychological wellbeing among Ontario university students during COVID-19 [Online verbal presentation]. Eastern Canada Sport and Exercise Psychology Symposium. Virtual conference hosted by the University of Windsor, Ontario, Canada.

Holmes, O.K., Koert van der Linden, N., **Omar, M.**, Dumas., T., Zarbatany, L., Ellis, W., Donelle, L., Irwin, J., Tucker, T., Pearson, E. S., Gilliland, J., & Burke, S.M. (2021, March 25-26). A cross-sectional investigation of Ontario university students' social media use and social connectedness during the COVID-19 pandemic [Online verbal presentation]. Eastern Canada Sport and Exercise Psychology Symposium. Virtual conference hosted by the University of Windsor, Ontario, Canada.