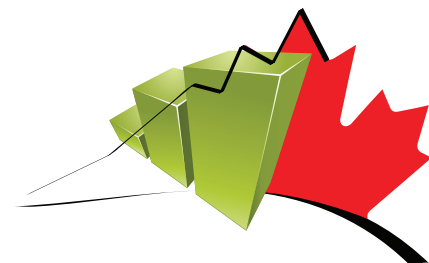


Economic and Social Reports

Canadians' use of the Internet and digital technologies before and during the COVID-19 pandemic



by David Wavrock, Grant Schellenberg and Christoph Schimmele

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Abstract

This study uses a common set of questions from the 2018 and 2020 cycles of the Canadian Internet Use Survey to categorize Canadians into one of five Internet user groups in each year, ranging from non-users to advanced users. An upward shift across categories is observed. From 2018 to 2020, the share of Canadians aged 15 or older who were classified as either non-users or basic users of the Internet and digital technologies decreased by 4.8 percentage points. The share classified as advanced users increased by 4.5 percentage points. While increasing shares of Internet users reported many online activities, the difference in uptake between basic users and intermediate users widened on many of them, suggesting that basic users fell further behind other users during this period. The upward shift across Internet user groups was most evident among Canadians aged 50 to 64 and aged 65 or older.

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Introduction

There can be little doubt that the COVID-19 pandemic and responses to it have contributed to, and probably accelerated, the roles that the internet and digital technologies play in our lives, thrusting large numbers of people and organizations online. When surveyed in late 2020 and early 2021—well into the pandemic—three-quarters of Canadians said that they were conducting online activities more frequently than before, using the internet to maintain contact with family and friends, access entertainment, buy food and goods, access government services, and telework. Nearly half of Canadians were doing at least one of these online activities for the first time (Bilodeau et al., 2021). A host of other metrics also testify to the increasing prevalence of digital engagement since early 2020 (Aston et al., 2020; Beaunoyer et al., 2020; Deng et al., 2020; Statistics Canada, 2020a; Statistics Canada, 2020c; van Deursen, 2020).

But internet and digital skills vary and not everyone had the same capacity to rapidly shift activities of daily life online (Nguyen et al., 2021; van Deursen, 2020; Van Jaarsveld, 2020). A year prior to the pandemic, about one in four Canadians had either no engagement or only very basic engagement with the internet and digital technologies. If they adapted to the shift of so much of daily life online during the pandemic, they began with no digital skills or only elementary digital skills (Wavrock et al., 2021). This was particularly so among individuals in older age groups and with less education. Other research has also highlighted the roles that age and education play in internet and digital technology engagement (Büchi et al., 2016; Montagnier & Wirthmann, 2011; Scheerder et al., 2017).

The risks and benefits that internet engagement has offered to individuals during the pandemic have been examined in recent studies. A study in the Netherlands found that, although older individuals were likely to use the internet to seek information about COVID-19, this did not necessarily lead to beneficial outcomes, such as being informed about the coronavirus or reducing their risk of exposure (van Deursen, 2020). Other studies indicate that older individuals face skills-based challenges in sorting and evaluating the vast amount of information available online (Garcia et al., 2021; Hargittai et al., 2019; van Dijk, 2013; Van Jaarsveld, 2020).¹ In terms of benefits, an American study showed that people with stronger digital skills at the onset of the pandemic were better able to maintain contact with family and friends through online platforms (Nguyen et al., 2021) and a British study showed that more frequent use of the internet among people aged 55 to 75 years was correlated with lower levels of depression and higher quality of life. Among frequent users of the internet, maintaining social contact through online voice and video calls was particularly beneficial for well-being (Wallinheimo & Evans, 2021).

The objective of this paper is to document the changes in the online activities and skills reported by Canadians prior to and during the COVID-19 pandemic. Data from the 2018 and 2020 cycles of the Canadian Internet Use Survey (CIUS) are used to categorize Canadians into one of five internet user groups, ranging from non-users to advanced users. The shift of the population across these categories from 2018 to 2020 is estimated, and an upward shift into more adept user groups is observed. The magnitude of this shift is estimated across sociodemographic characteristics, with particular focus on Canadians in older age groups and with lower levels of educational attainment. The prevalence of specific online activities reported in each of the two years is also documented, shedding light on the types of online adaptations Canadians made over the period.

1 Age differences in internet skills partially reflect differences in levels of educational attainment, but large gaps between seniors and younger individuals remain after adjusting for education (Wavrock et al., 2021).

Data and methods

Data

Data for this study are from the 2018 and 2020 cycles of the CIUS. The CIUS collects a broad range of information on access to and use of the internet and digital technologies from Canadians aged 15 years or older living in Canada's 10 provinces.² The 2018 CIUS was fielded from November 2018 to March 2019 and was the last iteration conducted prior to the onset of the COVID-19 pandemic. The 2020 CIUS was fielded from November 2020 to March 2021 and reflects Canadians' reported use of the internet and digital technologies some 8 to 12 months into the pandemic. This provides information collected from two nationally representative cross-sections of Canadians in the provinces using a common set of questions. The 2018 CIUS had an overall response rate of 43.7% and a final sample of just over 13,800 respondents, while the 2020 CIUS had an overall response rate of 41.6% and a final sample of just over 17,400 respondents.

Methods

Central to this study are questions regarding the internet use, online activities and digital skills of Canadians that were common to the 2018 and 2020 surveys. A stocktaking found 45 such questions with a one-to-one correspondence across surveys. In addition, there were three instances when multiple questions on the 2018 CIUS were combined into a single question on the 2020 CIUS and two instances when a single question in 2018 was subdivided into several questions in 2020.³ The necessary transformations to each dataset were made to establish one-to-one correspondence.⁴ This yielded a total of 50 internet activity and digital skill questions common to both surveys. Some activity and skill questions on the 2018 CIUS were not included in 2020 and could not be used in this analysis. These questions were relatively few in number and generally had low rates of affirmative responses in 2018 (e.g., buying or selling financial products online, updating router security settings). Notable exceptions were questions regarding the use of ride sharing apps and device-related activities (e.g., connecting devices via WiFi or Bluetooth, file sharing and file backup on the cloud), which were prevalent in 2018 but not included in 2020.

Given the differences in the 2018 and 2020 CIUS iterations, the cluster specifications defined by Wavrock et al. (2021) required updating. Typology groups in that paper were generated using the k-modes algorithm developed by Huang (1998), which were found to be well-suited for survey data with binary responses. However, the k-modes algorithm assigns observations to cluster groups based on discrete (integer) distances, making this sorting more sensitive than other algorithms (e.g., k-means) to changes in the variables used to generate the clusters. As a result, applying the cluster groups developed by Wavrock et al. (2021) to the 2020 CIUS could produce spurious assignments to different cluster groups, especially as some 2018 questions used in the typology were combined into single questions in 2020.

For this reason, a new typology based on the activity and skill variables common to the two surveys was generated. The 2018 CIUS was selected as the reference point, allowing internet activities during the

2 Excluding full-time residents of institutions.

3 For example, separate questions regarding the online purchase of new or used goods were asked in 2018, while a single question regarding the online purchase of new or used goods was asked in 2020. A single question regarding "researching information online" in 2018 was split into three separate questions in 2020, distinguishing between researching information on health, community events, and goods and services.

4 For example, if two questions in 2018 were combined into a single question in 2020, a new variable was generated for 2018 that was equal to 1 if either response was equal to 1, and vice versa if two questions in the 2020 CIUS were covered by one question in 2018.

pandemic to be compared against a pre-pandemic benchmark. This also facilitates comparison with the results of Wavrock et al. (2021).⁵

A k-modes cluster algorithm was first run 100 times on all the activity and skill variables to determine which of them had rates of affirmative responses that were either low or high enough to warrant their removal from the analysis. This was done because the k-modes algorithm is highly sensitive to minute differences in variable responses, meaning that affirmative responses on low-uptake variables or negative responses on high-uptake variables can add extra noise when determining which cluster group each respondent belongs to. Variables were removed by calculating the average modal matrix⁶ across all 100 trials and removing variables for which the average value across clusters was less than 0.05 or greater than 0.95. These correspond to activities where the mode for each cluster is almost always 0 or 1. From an initial set of 50 activity and skill variables, this process yielded a final set of 29 variables that were retained for the cluster analysis.

Next, 2,000 k-modes algorithms were run on the retained set of variables. In each iteration, the k-mode algorithm was first run by randomizing the initial mode matrix and then iteratively feeding the mode matrix back into the algorithm until the output matrix was the same as the input matrix. Although the k-mode algorithm itself is generally stable in producing cluster groups, this was done to ensure that the final set of clusters was not coincident. With the full set of 2,000 cluster specifications, the clusters with the smallest overall within-group distance were selected, and from that set, the clusters with the smallest average within-group distance were selected. This identified the clusters from the large number of trials yielding the least amount of variance within each cluster group, thus representing the most homogeneous typological groups.

As was the case for Wavrock et al. (2021), this procedure resulted in a small set of cluster specifications that were identical except for the arbitrary numerical labels assigned to them by the algorithm. The first cluster specification was picked arbitrarily from this set and cluster groups were relabelled from the smallest number of activities in the mode to the largest.

Finally, using the cluster group selected by the above procedure, respondents from the 2020 CIUS were assigned to cluster groups based on their responses to the same set of activity variables used to generate the typology for 2018 respondents. This was done by calculating the simple distance,⁷ which was also used to generate the k-modes clusters, for each 2020 respondent's activities to each mode in the final cluster and assigning them to the cluster where this distance was minimized. If an observation was equidistant from two or more modes, they were assigned to the cluster with the lower number of activities. This yielded four groups of internet users, identified as basic users, intermediate users, proficient users and advanced users. The cluster analysis omitted non-users of the internet by design. Non-users were added as a fifth user group, defined as CIUS respondents who had not used the internet in the three months prior to the survey.

Overall, the cluster analysis condensed a broad set of internet activities and digital skills into five internet user groups. The original typology presented by Wavrock et al. (2021) was based on 36 variables available on the 2018 CIUS, while the updated typology is based on 29 variables available on both the 2018 and 2020 cycles of the CIUS. In spite of this difference, the two approaches yielded similar distributions of Canadians across internet user groups in 2018 (see Appendix Table 1). The largest difference was the slightly larger share of the 2018 population classified as intermediate users in the

5 For analytical purposes, the typology was also generated based on 2020 CIUS responses on the same set of common variables. For the sake of brevity, these alternative typology groups are not discussed in this paper.

6 The number of columns is equal to the number of clusters among internet users (4), and the number of rows is equal to the number of activities that could be used in generating the cluster (50).

7 The simple distance between two vectors of categorical variables is equal to the number of entries in each vector that are different. When these categorical variables are binary, this is equivalent to the Hamming distance on binary strings.

updated typology (21.2%) than in the original typology (19.7%) and the slightly smaller share classified as advanced users (at 32.3% and 33.8%, respectively).

Results

Internet user groups in 2018 and 2020

The distributions of Canadians across the five internet user groups in 2018 and 2020 are shown in Table 1. Overall, an upward shift across user groups is observed as the shares of Canadians classified as non-users or basic users declined and the share classified as advanced users increased.

Looking more closely, the share of Canadians identified as non-users was 0.9 percentage points lower in 2020 than in 2018 and the share classified as basic users was 3.9 percentage points lower. Combined, the share of Canadians in these two groups declined by almost 5 percentage points, from 23.8% in 2018 to 18.9% in 2020. This percentage point difference applied to most of the Canadian population and hence represents a large absolute change. Indeed, almost 1.4 million fewer Canadians aged 15 and older were on the “have not” side of the digital divide in 2020 than in 2018, if this is defined using the categories of non-users and basic users.

In contrast, the share of Canadians classified as advanced users increased by more than 4 percentage points, reaching 36.7% in 2020. In absolute terms, the number of Canadians aged 15 and older in this group increased by over 1.6 million over the two-year period. As for the two “middle” internet user groups, the share of Canadians classified as intermediate users increased by 1.3 percentage points while the share classified as proficient users declined by 0.9 percentage points.

Table 1
Distributions of Canadians by Internet user group, Canada, 2018 and 2020

			Percentage point change from 2018 to 2020	Population estimate ¹	
	2018	2020		2018	2020
	percent			number	
Non-users	8.7	7.7	0.9	2,684,000	2,452,000
Basic users	15.1	11.2	3.9	4,695,000	3,551,000
Intermediate users	21.2	22.5	-1.3	6,576,000	7,115,000
Proficient users	22.7	21.8	0.9	7,042,000	6,897,000
Advanced users	32.3	36.7	-4.5	9,999,000	11,628,000
Total	100.0	100.0	0.0	30,996,000	31,643,000

1. Rounded to nearest thousand.

Source: Canadian Internet Use Survey, 2018 and 2020.

Looking at the changing prevalence of specific internet activities sheds some light on how online behaviours changed over this period. Table 2 presents information on the 29 online activities used for the cluster analysis. The results in the left panel show the percentages of 2020 CIUS respondents in each of the four internet user groups reporting each activity.⁸ The results in the right panel show the percentage point change in the shares of CIUS respondents reporting each activity in 2018 and 2020.

As seen in the first line of the table, 19% of basic users reported in 2020 that they had changed their location privacy settings on a digital device. This share was 13.5 percentage points higher than in 2018, when 5.5% of basic users reported that they had done so.⁹ Among advanced users, 88% reported that they had changed their location privacy settings in 2020, up 4 percentage points from 2018. The smaller increase among advanced users reflects the greater prevalence of this activity already evident in 2018 and the more limited scope for further increase. The shares of intermediate and proficient users who changed their location privacy settings increased by 22 and 26 percentage points respectively, suggesting a fairly widespread behavioural change within these groups. These results are shown graphically in Chart 1.

Between 2018 and 2020, the shares of intermediate and proficient Users who changed their personal information privacy settings increased by 9 and 14 percentage points respectively. The shares of Canadians reporting that they blocked messages on their digital device—another activity related to privacy—increased most among proficient and advanced users. Increases on these measures were smallest among basic users, raising the question of whether they were left further behind over this period. This is discussed below.

The COVID-19 pandemic saw a large shift to online communication. Among the activities in the cluster analysis, this was most evident in the use of online voice or video calls, as the shares of Canadians in each internet user group who engaged in this activity increased by more than 10 percentage points. In 2020, about one in four basic users were using online voice or video calls, as were about one-half of intermediate users and three-quarters of proficient users (Chart 2). The prevalence of other communications-related activities, specifically instant messaging and social media, increased little or not at all over the period. In 2018, instant messaging was already prevalent among all groups except basic users, leaving less scope for further increase.

The COVID-19 pandemic also accelerated the longer-term trend towards online entertainment. Between 2018 and 2020, the shares of Canadians subscribing to streaming services increased by 7 percentage points among basic users, by 15 and 10 percentage points respectively among intermediate and proficient users and by 5 percentage points among advanced users (Chart 3, Table 2). Other entertainment-related activities also became more prevalent, increasing by 4 to 6 percentage points among intermediate and proficient users and by smaller magnitudes among basic users and advanced users.

Considering commercial activities, the widespread use of online shopping during the pandemic stands out. Virtually all advanced users (97%) purchased goods online in 2020, as did over 90% of proficient users (Chart 4). And even though online shopping was already prevalent among these groups in 2018, large percentage point increases were still observed from 2018 to 2020. Online shopping was prevalent among intermediate users as well, increasing by 16 percentage points and reaching 79% in 2020. About one in four basic users reported online shopping that year, up 9 percentage points from 2018.

8 Non-users of the internet, the fifth group, are not in scope for Table 2.

9 The estimate of 5.5% of basic users changing location privacy settings in 2018 is calculated by subtracting the percentage point change from 2018 to 2020 (right panel) from the percentage share observed in 2020 (left panel). That is, $(19.0\% * 100) - 13.5 = 5.5$.

While online shopping increased markedly, online banking did not. In part, this may reflect the prevalence of this activity among proficient and advanced users in 2018. More puzzling were the 7 and 4 percentage point *declines* in the share of basic and intermediate users who used online banking between 2018 and 2020. The reason for this remains to be determined.

Considering other online activities associated with daily life, increasing shares of Canadians used the internet to book appointments. This likely included appointments related to the pandemic itself, such as booking COVID-19 tests. Likewise, increasing shares of Canadians had online contact with government; again, this may include interactions associated with the pandemic, such as online applications for income support benefits. Other online activities were less prevalent in 2020 than in 2018. Fewer Canadians in each group searched for locations or directions online, an expected outcome given travel bans and stay-at-home directives. Also, fewer Canadians checked school registration and class schedules online, likely reflecting the cancellation of in-person classes during the lockdowns.

Finally, the cluster analysis includes the use of various software programs and file management activities, many of which are likely associated with paid employment. In most cases, the prevalence of these activities did not change or declined somewhat over the 2018-to-2020 period.

Overall, across the population of internet users, significant increases in the prevalence of 14 of the 29 activities used in the analysis were observed between 2018 and 2020. The magnitude of the increases tended to be smaller among advanced users than intermediate and proficient users, reflecting the greater prevalence of these activities already observed among advanced users in 2018. The increase in the prevalence of activities among basic users was generally smaller than those observed among intermediate and proficient users, although this is sensitive to the measurement of change using percentage points rather than percentages.¹⁰

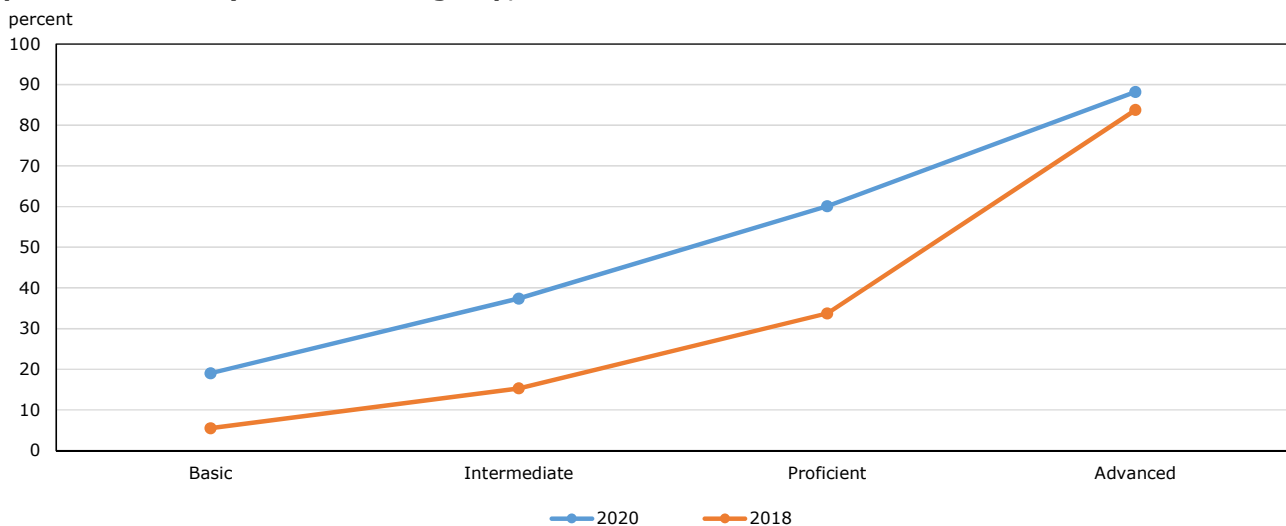
10 The relatively low prevalence of many activities among basic users in 2018 means that small percentage point increases translate into larger percentage increases. For example, the 10.8 percentage point increase in the share of basic users using online voice or video calls represented an 88% increase.

Table 2
Individuals in Internet user groups reporting online activities and digital skills, Canada, 2018 and 2020

	Percentage reporting online activity or digital skill in 2020				Percentage point change in share reporting online activity or digital skill between 2018 and 2020			
	Basic	Intermediate	Proficient	Advanced	Basic	Intermediate	Proficient	Advanced
	percent				percentage points			
Privacy settings, location	19.0	37.4	60.1	88.2	13.5	22.1	26.4	4.4
Privacy settings, personal information	8.7	23.2	42.7	84.8	2.5	8.5	14.3	5.3
Blocked email or spam	13.2	23.9	67.0	85.6	-5.9	-3.0	-0.7	0.2
Blocked other messages	5.2	15.5	27.9	70.2	-0.4	1.8	6.0	7.2
Voice or video calls	23.0	54.7	74.9	88.3	10.8	18.6	17.2	13.5
Instant messaging	28.9	82.1	86.7	95.3	0.4	2.4	2.9	1.2
Social media	24.5	76.1	79.2	90.4	-0.5	-1.2	-0.2	-2.1
Streaming service—subscription	23.6	60.9	80.6	88.8	7.4	14.5	10.3	4.9
Listened to podcasts	5.4	24.8	31.6	55.5	2.2	5.7	6.2	9.0
Listened to music	25.2	77.4	81.1	92.5	1.8	5.8	5.6	2.0
Accessed news	38.9	82.5	89.3	95.1	2.8	4.8	4.8	4.3
Watched video-sharing (e.g., YouTube)	20.7	74.1	83.6	93.7	2.1	6.1	4.2	1.3
Bought goods	26.0	79.0	90.9	96.6	8.9	16.4	17.4	8.6
Banking	27.2	78.1	87.1	92.8	-6.8	-3.5	0.7	0.6
Booked appointments	11.7	39.2	42.1	76.6	5.0	16.1	15.3	9.0
Contacted government	29.8	72.9	86.2	91.9	3.6	6.3	5.0	1.3
Searched locations or directions	28.6	82.8	89.1	95.6	-8.4	-6.6	-4.6	-2.0
Informal training	2.2	12.5	13.1	48.9	-0.8	-2.5	-3.4	-7.8
School schedules or registration	3.6	18.5	13.9	51.4	-1.0	-4.6	-14.4	-19.0
Word processing software	11.4	23.2	85.2	95.5	-5.5	-5.3	-3.3	-0.4
Media editing software	3.1	8.6	25.8	72.3	-0.9	-3.7	-4.4	-2.7
Data analysis software	0.9	1.4	15.8	39.8	-0.5	-1.5	-0.7	-3.6
Spreadsheet software	4.7	7.9	57.0	80.8	-3.0	-4.7	-8.5	-3.2
Created presentations	3.1	8.4	31.5	77.8	-0.7	-3.7	-8.4	-3.2
Operating system updates	11.2	20.5	61.6	79.9	-6.8	-2.6	-0.2	2.0
Downloaded files	6.1	13.6	73.0	89.4	-1.1	-2.1	5.6	2.2
Copied or moved files or folders	11.3	17.7	82.9	93.1	-1.8	-6.8	-4.1	-0.7
Uploaded files to cloud	4.6	14.1	37.7	83.1	-0.7	-3.6	-5.7	-3.7
Deleted browser history	14.6	27.3	69.3	79.3	-8.2	-3.7	-4.7	-1.0

Source: Canadian Internet Use Survey, 2018 and 2020.

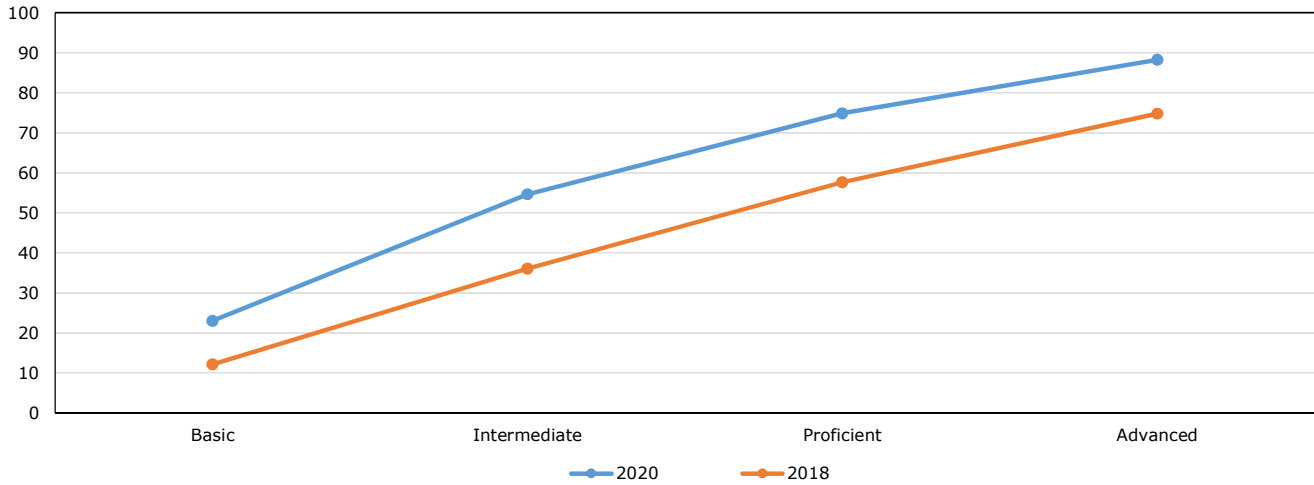
Chart 1
Internet users who changed location privacy settings on an account or app in the past 12 months by Internet user group, 2018 and 2020



Source: Canadian Internet Use Survey, 2018 and 2020.

Chart 2
Internet users who used online voice or video calls in past three months by Internet user group, 2018 and 2020

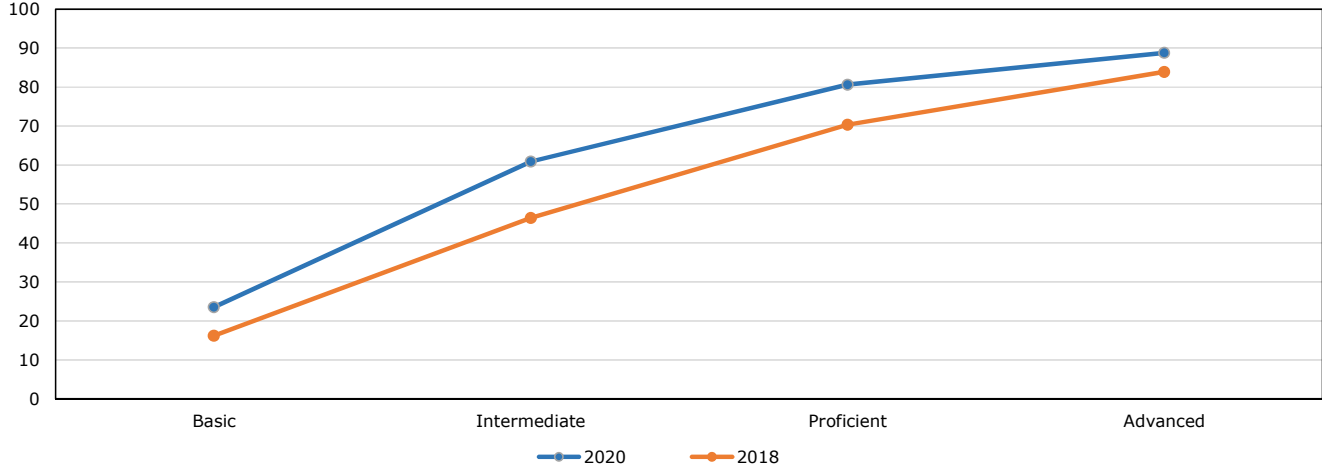
percent



Source: Canadian Internet Use Survey, 2018 and 2020.

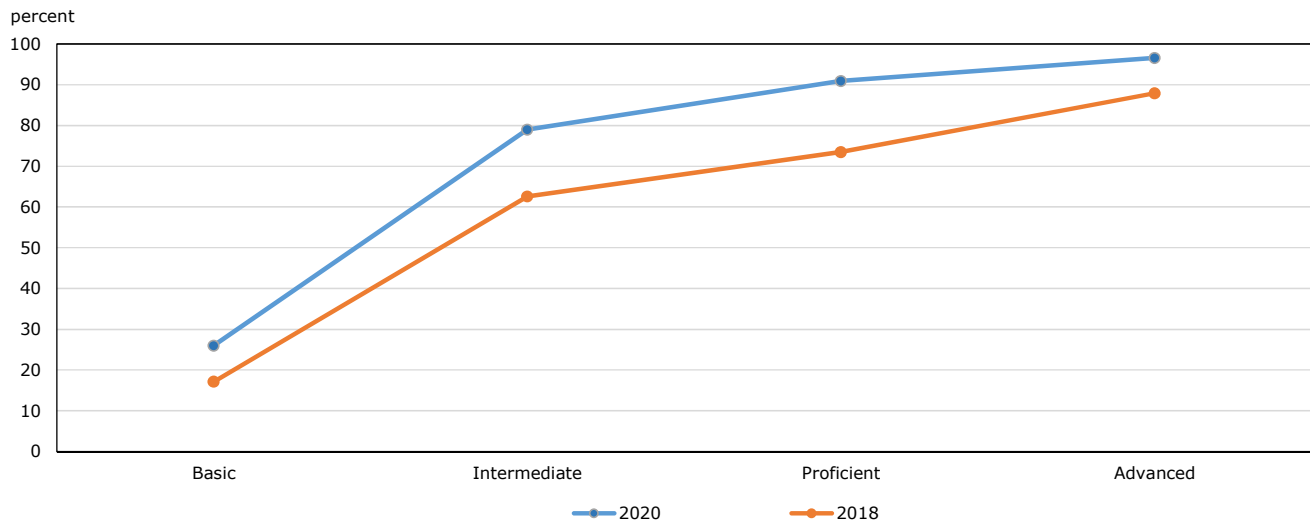
Chart 3
Internet users who subscribed to streaming services in past three months by Internet user group, 2018 and 2020

percent



Source: Canadian Internet Use Survey, 2018 and 2020.

Chart 4
Internet users who bought goods online in past three months by Internet user group, 2018 and 2020



Source: Canadian Internet Use Survey, 2018 and 2020.

One question that arises is whether less adept users of the internet and digital technologies kept up with the pace of change from 2018 to 2020. This paper’s assessment of this focuses on basic users as they are among the most vulnerable of the four internet user groups. The metric used is the share of basic users reporting each activity relative to intermediate users. Consider this example: in 2018, 12% of basic users and 36% of intermediate users reported using online voice and video calls, yielding a difference of 24 percentage points between them. In 2020, 23% of basic users and 55% of intermediate users used online voice and video calls, yielding a difference of 32 percentage points between them. When the differences observed in each year are compared, the gap in the shares of basic and intermediate users using online voice and video widened by 8 percentage points, suggesting that basic users fell further behind. The shares of basic users who changed privacy location settings, subscribed to a streaming service, or went online to buy goods or book appointments fell 6 or more percentage points further behind the shares of intermediate users doing so.

More broadly, the gap between basic and intermediate users widened by 4 percentage points or more on 9 of the 29 activities, and by 2.5 to 3.9 percentage points on another 5. Conversely, the gap narrowed by 2.5 percentage points or more for 5 of the 29 activities. The remaining 10 activities had observed changes between basic and intermediate users that were close enough to zero that an increase or decrease could not be firmly established given the variability of the point estimates.¹¹ These narrowing gaps were mainly observed on activities that declined in prevalence between 2018 and 2020, such as the use of various work-related software. Larger declines in the prevalence of activities between 2018 and 2020 among intermediate users than among basic users resulted in a smaller gap, but one that does not signal that basic users are gaining ground. Overall, it appears that basic users did fall further behind intermediate users, at least when measured in terms of activity prevalence rates. The same comparison between intermediate and proficient users yields less telling evidence, as the gaps between these two

11 For each point estimate, 95% confidence intervals (CIs) for the within-cluster difference of activity uptake between 2020 and 2018 were calculated using Newcombe’s interval, with bounds for individual CIs calculated using approximate survey-adjusted Clopper-Pearson intervals. Newcombe’s intervals were used to test whether observed increases or decreases in gaps between basic and intermediate users could be shown to be statistically distinct from zero, with most estimates in the gap change between -2.5 and 2.5 failing this statistical test.

groups did not change significantly on 9 of the 29 activities and narrowed on about the same number of activities as they widened.

Sociodemographic characteristics and internet user groups in 2018 and 2020

The analysis now turns to how Canadians with different characteristics were distributed across internet user groups in 2018 and 2020. Information on this is presented in Table 3. The left panel shows how individuals with a given sociodemographic characteristic were distributed across different user groups in 2020. The right panel shows the percentage point change in each share from 2018 to 2020. The present analysis focuses on differences across age groups and educational attainment, given the established relationships between these characteristics and internet use and digital activities (Wavrock et al., 2021).

Table 3
Distribution of Canadians across Internet user groups by sociodemographic characteristics, 2018 and 2020

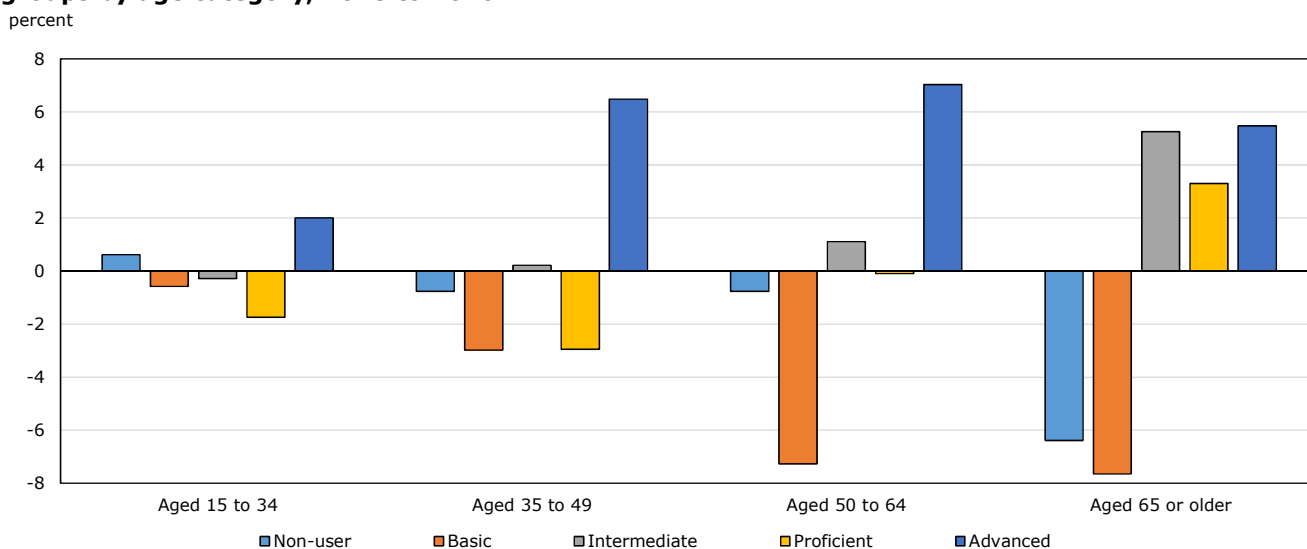
	Percentage of Canadians in each Internet user group in 2020					Percentage point change in share of Canadians in each Internet user group between 2018 and 2020				
	Non-user	Basic	Intermediate	Proficient	Advanced	Non-user	Basic	Intermediate	Proficient	Advanced
	percent					percentage points				
Age group										
15 to 34	1.9	5.2	18.2	21.7	53.0	0.6	-0.6	-0.3	-1.7	2.0
35 to 49	1.9	4.6	23.2	23.2	47.0	-0.8	-3.0	0.2	-3.0	6.5
50 to 64	6.3	12.2	27.3	25.1	29.0	-0.8	-7.3	1.1	-0.1	7.0
65 and older	22.4	25.4	22.5	17.8	11.9	-6.4	-7.6	5.3	3.3	5.5
Educational attainment										
High school or less	19.2	18.3	28.3	17.6	16.7	-4.5	-6.8	5.6	2.4	3.4
Non-university postsecondary	6.1	10.9	24.6	26.7	31.7	0.0	-5.1	1.5	-0.5	4.1
University degree	2.5	4.7	14.1	25.3	53.4	0.4	-2.7	0.2	-4.2	6.3
Student	2.2	3.5	10.9	19.7	63.8	1.3	-1.3	-5.1	-2.3	7.5
Sex										
Male	7.2	11.0	21.5	22.8	37.5	-0.7	-4.0	1.2	-1.0	4.4
Female	8.4	11.5	23.6	20.8	35.8	-1.1	-3.9	1.4	-0.9	4.5
Household size										
Multi-person	5.7	9.9	22.7	22.9	38.9	-0.4	-4.3	1.1	-1.1	4.6
Single	20.3	19.4	21.0	15.2	24.1	-3.0	-1.2	1.9	-0.6	2.8
Place of residence										
Urban	7.0	10.6	22.2	21.6	38.6	-1.3	-4.1	1.4	-0.9	4.9
Rural	11.1	13.9	24.0	22.6	28.4	0.5	-3.6	0.1	-1.4	4.4
Province of residence										
Newfoundland and Labrador	14.0	17.2	24.6	19.9	24.3	-3.9	-2.2	3.3	-0.3	3.1
Prince Edward Island	11.5	16.0	20.0	24.2	28.2	-2.9	-4.6	6.3	-3.6	4.7
Nova Scotia	11.5	14.7	24.4	23.5	25.9	-2.3	-1.3	2.4	-2.0	3.2
New Brunswick	10.8	20.0	22.0	23.2	24.0	-1.5	-5.3	3.0	-0.4	4.2
Quebec	12.0	16.3	22.8	23.7	25.2	0.9	-5.0	0.1	-1.4	5.3
Ontario	7.8	14.5	20.1	22.1	35.4	-1.9	-3.9	2.3	-0.2	3.7
Manitoba	8.8	16.2	25.1	21.8	28.0	-0.1	-2.9	-4.2	-1.3	8.5
Saskatchewan	10.1	12.0	24.3	22.1	31.6	-1.5	-1.3	1.6	-1.7	2.9
Alberta	5.9	13.7	22.5	21.1	36.9	-1.1	-2.2	0.2	-0.4	3.4
British Columbia	6.0	15.7	18.0	24.5	35.9	-0.2	-5.1	1.8	-2.2	5.7

Source: Canadian Internet Use Survey, 2018 and 2020.

Between 2018 and 2020, the share of Canadians aged 65 or older who were non-users of the internet declined by 6 percentage points and the share who were basic users declined by almost 8 percentage points. Combined, the share of seniors who were either non-users or basic users declined from 62% to 48%, with this 14 percentage point decline representing a shift of almost 869,000 seniors from the “have not” to the “have” side of the digital divide. The shares of seniors classified as intermediate and advanced users both increased by over 5 percentage points.

An upward shift across internet user groups was also evident among Canadians aged 50 to 64. The share of this age group classified as either non-users or basic users declined by 8 percentage points over the period, while the share classified as advanced users increased by 7 percentage points. An upward shift across internet user groups was also observed among Canadians aged 35 to 49, and, to a far smaller degree, among Canadians aged 15 to 34 years. In all age groups except seniors, this upward shift was almost entirely observed in the growth of the advanced user group. These changes are shown graphically in Chart 5.¹²

Chart 5
Percentage point change in distribution of individuals across Internet user groups by age category, 2018 to 2020

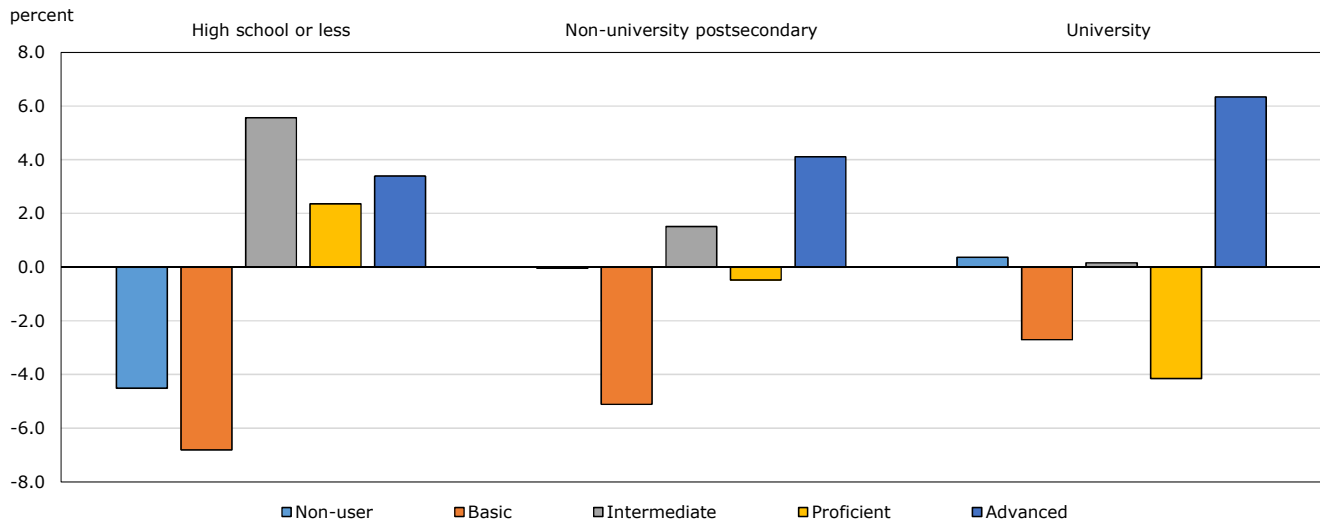


Source: Canadian Internet Use Survey, 2018 and 2020.

In terms of educational attainment, the shares of Canadians with a high school education or less who were either non-users or basic users of the internet and digital technologies declined by 11 percentage points from 2018 to 2020, while the shares who were intermediate users increased by over 5 percentage points. A shift upward across internet user groups was also observed among individuals with non-university postsecondary credentials or a university degree.

12 Again, these estimates are based on cross sectional data that show the net result of inflows and outflows of people between internet user groups. The inflows and outflows themselves cannot be observed in cross-sectional data.

Chart 6
Percentage point change in distribution of non-students across Internet user groups, by educational attainment, 2018 to 2020



Source: Canadian Internet Use Survey, 2018 and 2020.

While smaller shares of seniors and individuals with a high school education or less were in the non-user and basic user groups in 2020 than 2018, it is notable that such individuals still accounted for the largest shares of non-users and basic users in 2020. As shown in Appendix Table 2, seniors accounted for 64% of non-users and 49% of basic users in 2020, but accounted for just 17% of proficient users and 7% of advanced users. Likewise, individuals with a high school education or less accounted for almost two-thirds of non-users and almost one-half of basic users in 2020 (Appendix 2).

The change in the distributions of Canadians across internet user groups from 2018 to 2020 did not vary appreciably across other sociodemographic variables. For example, comparable shares of men and women were in each internet user group in 2020 and the percentage point changes in the shares classified as non-users or basic users were very similar, at -4.7 and -5.0 percentage points respectively (Table 3). Likewise, the shares of individuals in multi-person households and single-person households who were non-users or basic users changed by similar amounts.

Conclusion

Digital technologies have long been having transformative impacts on individuals, communities and societies. These impacts were highlighted and likely accelerated by the COVID-19 pandemic as online activities played an increasingly large role in most people's lives. Information on online and digital activities collected in 2018 and 2020 have been used to categorize Canadians into internet user groups and to document how their distribution across these groups changed over the pre-pandemic and pandemic periods.

From 2018 to 2020, there was a substantial upward shift in the distribution of Canadians across internet user groups. The shares identified as non-users and basic users of the internet and digital technologies decreased, representing a shift of about 1.4 million Canadians from the "have not" to the "have" side of the digital divide.

In the pre-pandemic environment, individual preferences may have partially contributed to Canadians' decisions to do tasks and activities online rather than offline. But preferences were likely a less salient reason during the COVID-19 pandemic when many offline options for tasks and activities were either limited or suspended. Between 2018 and 2020, there was not only a decrease in the proportions of non-users and basic users (particularly among seniors and people with less education) and an increase in advanced users, but there were spikes in the uptake of a wide range of online activities. This suggests that the shifts observed across internet user groups were largely attributable to the need to be online during the lockdowns. Of course, technological processes were also ongoing, with an increasing share of Canadians likely to have undertaken new online activities regardless of the pandemic. Disentangling the independent effects of each of these factors was beyond the scope of this paper.

Behind the upward shift of Canadians across internet user groups was an increased uptake of most online activities. For example, for many Canadians, online communication became a replacement for face-to-face contact during the physical distancing mandates and may have helped them cope with the negative impact of social isolation. Increasing numbers of internet users also took actions to protect themselves from online threats, as evidenced by increases in the management of settings to restrict access to personal information and location histories on digital devices. The reported prevalence of other digital skills increased to a far smaller degree, suggesting that the shift across user groups was mainly driven by the uptake of activities.

When considering which Canadians shifted most across internet user groups, changes within age groups stand out. A relatively small degree of change in the distribution of Canadians aged 15 to 34 years across internet user groups was observed between 2018 and 2020. By 2018, most young Canadians were already proficient users or advanced users and the categorization offered less scope for them to move further up the distribution than it did for older Canadians. Moreover, the classification of internet user groups in terms of reported activities makes the approach sensitive to changes at the extensive margin—that is, the change in the shares of individuals reporting an activity—but insensitive to changes at the intensive margin, such as the amount of time that individuals doing a particular activity spent on it each day. The shares of younger Canadians undertaking various activities did not change much between 2018 and 2020; whether they spent more time on these activities cannot be determined from the data used here.

Among older Canadians, increasing engagement in online activities is observed at the extensive margin and the number of seniors and near-seniors on the "have not" side of the digital divide declined considerably from 2018 to 2020. Nonetheless, many were still non-users or basic users, highlighting the degree to which seniors vary in their capacities to benefit from the opportunities and avoid the risks posed by the digital transformation.

Looking ahead, the next cycle of the CIUS will be fielded in late 2022 or early 2023. This will allow the shift of Canadians across the internet user groups above to be tracked over an additional two years and allow the user groups themselves to be updated and refined to reflect Canadians' continued adaptations in the digital environment.

Appendix

Appendix Table 1

Distributions of Canadians across Internet user groups, Canada, 2018

	2018—Original typology ¹	2018—Adapted typology ²
	percent	
Non-users	8.7	8.7
Basic users	15.6	15.1
Intermediate users	19.7	21.2
Proficient users	22.2	22.7
Advanced users	33.8	32.3
Total	100.0	100.0

1. Cluster groups based on 36 activity and skill variables from the 2018 Canadian Internet Use Survey (Wavrock et al., 2021).

2. Cluster groups based on 29 activity and skill variables common to the 2018 and 2020 cycles of the Canadian Internet Use Survey.

Source: Canadian Internet Use Survey, 2018 and 2020.

Appendix Table 2
Composition of Internet user groups by demographic characteristics, 2018 and 2020

	Non-user		Basic		Intermediate		Proficient		Advanced	
	2018	2020	2018	2020	2018	2020	2018	2020	2018	2020
	percent									
Age group										
15 to 34	4.5	7.9	12.0	14.8	27.2	25.1	32.3	30.6	49.4	44.4
35 to 49	7.4	6.2	11.8	9.7	25.7	24.2	27.3	24.7	29.7	29.7
50 to 64	20.3	21.1	31.8	26.9	30.5	29.5	27.4	27.6	16.8	19.0
65 and older	67.8	64.8	44.5	48.6	16.6	21.2	13.1	17.1	4.0	6.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Education										
High school or less	71.8	64.1	47.6	48.6	32.0	36.5	17.5	20.4	10.8	11.4
Non-university postsecondary	19.9	22.4	32.7	32.2	35.1	35.3	33.4	34.2	24.1	24.0
University degree	6.7	9.5	14.7	14.4	20.4	20.8	35.1	33.4	39.8	41.6
Student	1.5	3.9	5.0	4.9	12.5	7.4	13.9	12.0	25.3	23.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Sex										
Male	44.6	45.7	48.7	48.4	47.2	47.2	51.7	51.8	50.7	50.7
Female	55.4	54.3	51.3	51.6	52.8	52.8	48.3	48.2	49.3	49.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Household size										
Multi-person	59.2	62.5	79.4	75.3	86.4	86.7	89.5	90.0	90.0	90.7
Single	40.8	37.5	20.6	24.7	13.6	13.3	10.5	10.0	10.0	9.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Place of residence										
Urban	81.2	73.8	82.2	77.3	82.7	80.6	83.7	81.1	88.6	85.9
Rural	18.8	26.2	17.8	22.7	17.3	19.4	16.3	18.9	11.4	14.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Province of residence										
Newfoundland and Labrador	2.3	1.9	1.6	1.9	1.7	1.8	1.3	1.3	1.1	1.1
Prince Edward Island	0.5	0.5	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4
Nova Scotia	3.5	3.1	2.6	3.2	3.0	3.1	2.7	2.6	2.1	2.1
New Brunswick	2.6	2.5	2.7	2.7	2.1	2.3	2.1	2.2	1.5	1.6
Quebec	31.6	37.6	24.7	22.8	24.5	22.9	23.9	23.2	17.9	18.8
Ontario	35.4	29.9	37.6	37.2	37.1	39.0	38.1	39.3	43.0	41.7
Manitoba	3.6	3.9	3.8	4.1	4.2	3.3	3.4	3.3	3.1	3.5
Saskatchewan	3.5	3.3	2.4	2.8	3.5	3.4	2.9	2.8	3.0	2.8
Alberta	7.8	7.0	10.3	11.6	12.2	11.4	10.7	10.8	13.1	12.4
British Columbia	9.2	10.4	13.9	13.2	11.3	12.2	14.4	14.2	14.9	15.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Canadian Internet Use Survey, 2018 and 2020.

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