An Analysis of Canadians' Scope of Internet Usage

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Introduction

This study builds on previous analyses of the 2005 Canadian Internet Use Survey (CIUS), to provide additional insights into how Canadians are using the Internet in their daily lives. The focus of this study is on the *scope* of Internet usage, as measured by the number and type of online activities reported by users. Scope has been used as a proxy measure for users' comfort level with the Internet (e.g. Underhill & Ladds, 2007), and may also provide an indication of the perceived usefulness of the Internet among specific types of users. The analysis provided here could be of use to policymakers in understanding differences among high- and low-scope Internet users, with a view to developing strategies to help increase low-scope users' level of comfort with online activities and to encourage them to take greater advantage of the Internet. Such outcomes are important in developing a population of Internet users that have the skills needed to make the most of the Internet, and to receive the economic and social benefits attributed to participation in the Information Economy[1].

Scope can be measured by simply counting the number of online activities in which each Internet user participates. There are twenty-one activities in the 2005 CIUS, and the mean

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[1] This paper does not provide a review of literature discussing the global efforts to encourage participation in the Information Society, and to develop capacity among individual citizens to enable their use of Information and Communication Technologies. These issues are covered extensively elsewhere (e.g. Information Highway Advisory Council, 1997; International Telecommunication Union, 2006, 2007; Menou & Taylor, 2006; Organisation for Economic Co-operation and Development, 2000; Statistics Canada, 2003; UNCTAD Secretariat, 2006; World Summit on the Information Society, 2003).

number of online activities Canadians reported undertaking in the previous year was 9.4[2]. There is a core of basic activities, including email, web browsing, banking, and information search, that are widely adopted. Bivariate analysis yields the conclusion that scope of Internet usage declines with age, and is generally lower among women, rural residents and those with lower educational attainment. With the exception of sex, these findings mirror adoption patterns (McKeown, Noce, & Czerny, 2007), and are not surprising. Indeed, it is well-understood that age, geographic location, and education also have a strong influence on frequency of Internet usage and intensity of usage (hours spent online) (Middleton & Leith, 2007), but methods of mitigating or harnessing these demographic factors to encourage increased Internet adoption and more engaged levels of use (as indicated by increased scope of use) are less clear.

This paper explores the dimensions of scope of usage, with the aim of identifying factors that differentiate between high and low scope users, and developing a better understanding of what types of activities specific groups of users find valuable. Broader categories of activities are identified with a view to understanding differences among categories (for instance, utilitarian activities like searching or communication versus ones that are more focused on entertainment). The impact of user characteristics (e.g. longevity of Internet usage, attitudes toward privacy and security, broadband connectivity) and user demographics (age, sex, income and education) on scope are considered. The paper concludes with discussion of how to encourage increased scope of usage among various categories of Internet users.

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[2] All data reported in this paper come from the 2005 Canadian Internet Use Survey Public Use Microdata File (Statistics Canada, 2007a). Estimates produced from this data set may vary from those based on the Master Data File. This figure is based on counts of online activities for all Canadians who reported using the Internet in the twelve months prior to responding to the survey.

It is acknowledged that the data used in this analysis are now somewhat out of date. However, these data provide a very useful baseline for further research, enabling assessment of Canada's progress toward becoming a society in which all citizens are capable of engaging with the Internet. The analysis presented here can easily be replicated with the 2007 CIUS data once it is available, to determine whether the dimensions of scope of usage have changed in the past two years, and to consider whether further efforts are needed to encourage increased scope of usage among specific populations. It is also noted that conclusions based on analysis of the Canadian Internet Use Survey data cannot provide any qualitative insights into broader attitudes about Internet usage, or about motivations for conducting certain activities online, limiting the possibilities of developing detailed courses of action to address the needs of specific user groups. Supplementary qualitative analysis of motivations for Internet usage is desirable to fully understand the challenges of engaging all interested citizens in an information society[3].

The data in this paper come from the 2005 Canadian Internet Use Survey Public Use Master File[4]. Data used to analyze usage patterns are drawn from the subset of Canadians who used the Internet *at home* in the 12 months prior to the survey, and reported conducting at least one activity online[5].

The Internet is no longer a new technology for Canadians. At the time of the 2005 Canadian Internet Use Survey, more than 11.1 million Canadians (63% of those who had *ever used* the

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[3] This sort of analysis is conducted by community informatics researchers. The Canadian Research Alliance for Community Innovation and Networking has produced much valuable research in this area. (See http://www3.fis.utoronto.ca/research/iprp/cracin/publications/index.htm).

[4] (Statistics Canada, 2007a)

[5] With survey weights in place, this represents 14,985,473 Canadians.

Internet) had been using the Internet for five or more years[6]. While Internet use continues to

grow, new users now make up only a small proportion of total Internet users in Canada. In 2005,

fewer than one million Canadians (5.4% of Internet users) indicated they had used the Internet

for less than a year. Table 1 shows the percentage of users participating in each of the 21

recorded online activities, highlighting the differences in scope of usage among newer and more

experienced Internet users.

TABLE 1: PERCENTAGE OF INTERNET USERS PARTICIPATING IN ONLINE ACTIVITIES BY LONGEVITY OF INTERNET USE

| | Number of Years User Has Been Online | | | | All |
	<1 year	1-2 years	2-5 years	>5 years	Users
Mean # of Activities	**5.5**	**6.2**	**8.1**	**10.7**	**9.6**
Email	67.0%	79.0%	87.5%	95.7%	91.7%
General Browsing	68.7	69.5	79.7	88.3	84.3
Weather/Road Conditions	44.7	46.0	58.1	73.1	66.8
Travel	28.4	41.6	54.0	70.7	63.4
News or Sports	48.9	44.9	51.6	67.9	61.9
Medical/Health Info	39.0	41.7	52.4	62.8	58.1
Banking	16.7	30.9	47.9	66.4	58.0
Pay Bills	12.5^E	29.7	44.7	63.7	55.2
Government Information	24.0	27.7	42.5	59.5	52.2
Order Online	*10.2*	16.2	32.4	52.5	44.0
Education	16.0	26.0	35.2	48.9	43.0
Community Events	24.3	26.7	33.8	48.1	42.5
Games	35.8	34.2	36.0	40.4	38.8
Chat	24.4	25.9	34.4	41.2	38.0
Download Music	27.2	23.0	31.6	40.3	36.7
Download Software	16.9	16.2	22.3	37.6	32.0
Research Investments	*6.4*	*9.5*	17.7	32.0	26.3
Radio	18.5	15.8	19.6	30.0	26.2

[6] Table 1 and data that follow report on Canadians who used the Internet *from home* in the past 12 months, a subset of those who have *ever used* the Internet.

	Number of Years User Has Been Online				
	<1 year	**1-2 years**	**2-5 years**	**>5 years**	**All Users**
Communicate with Gov't	*9.1*	11.3	18.0	26.2	22.7
Download TV	*6.7*	*4.4*	4.5	10.4	8.5
Download Movies	*6.9*	*4.0*	5.4	9.8	8.3
Weighted Number of Users	557,169	971,761	3,432,542	10,015,628	14,977,100

[E]   Italicized numbers indicate estimates that should be used with caution. See the Microdata User Guide(Statistics Canada, 2007b) for details on this point.

Differences between new users and experienced users are identified by comparing the percentage of users in each category with the 'all users' category in the far right column. The 'all users' column shows the estimated average participation rates in online activities for all Canadians who used the Internet from home in the past 12 months. There are some instances where new users have higher usage of specific activities than slightly more experienced ones (e.g. downloading music and software, or listening to the radio), but in general we see that those who have been online for longer have higher scope of usage, with marked increases in some activities (e.g. financial transactions after a couple of years of Internet usage).

This list captures many important activities, but does not reflect a complete list of activities that can be conducted online. For instance, reading and writing blogs, sharing photographs or other "user-generated" content (OECD Directorate for Science Technology and Industry, 2007), contributing to knowledge-sharing sites like Wikipedia, and participating in social networking sites (e.g. Friendster, Myspace, LinkedIn) were not included in the 2005 survey. These activities were becoming important elements of how people used the Internet in 2005 (Boyd & Ellison, 2007; Rainie & Horrigan, 2005; Zamaria, Caron, & Fletcher, 2005). As such, it is important to recognize that potential scope of usage is broader than that which is captured in these data. Nevertheless, the data demonstrate that even among experienced Internet users, scope of usage

was fairly narrow in 2005 (only 10 of 21 activities were undertaken by more than 50% of experienced users), suggesting there is much opportunity for more extensive usage of the Internet in future.

To explore scope of usage further, we begin by collapsing the list of individual activities into broader groups of related activities, providing a more manageable list of activities that can be assessed in terms of demographic and usage variables. A logistic regression model is being developed to present at the conference, to identify the influences of individual demographic and usage variables on scope of usage. It is anticipated that the bivariate findings presented here would look different if they controlled for age, which is possible with logistic regression analysis.

Previous analyses of the 2005 CIUS data, including those presented at the 2007 Statistics Canada Socioeconomic Conference, show that a user's age, income level, education level and sex influence Internet adoption (Noce & McKeown, 2007), intensity of use (Middleton & Leith, 2007), and uptake of government online services (Underhill & Ladds, 2007). Other factors that are important are urban/rural status, language (determined using the language of interview as a proxy) and marital status (McKeown et al., 2007; Underhill & Ladds, 2007). Rurality and language are not considered in this analysis due to the limitations of data availability in the Public Use Microdata File. In the context of understanding how users' scope of activities might be better suited to their interests, marital status is not considered an important variable, as this is not likely an issue that policy initiatives could feasibly be directed toward.

Previous work has also sought to understand relationships between access to broadband Internet connections and intensity and scope of usage (see Middleton & Ellison, 2006, for an analysis of this issue using Household Internet Use Survey data), and to explore the social

impacts of Internet usage by examining time spent online (Veenhof, 2006). Underhill and Ladds (2007) considered users' online experience (as measured by number of years online), and their frequency and intensity of use when exploring characteristics associated with use of government online services. This paper considers how access to broadband connectivity, online experience, frequency and intensity of use are associated with scope of usage.

With the assistance of factor analysis techniques, we propose that the number of online activities be reduced from 21 individual activities to 5 groups of activities. These groups are shown in Table 2. Internet usage for education and for games do not appear to fit well into any of these categories. Educational usage is correlated with age, with the highest percentage of educational users being those who are likely to be students, in the 18-24 age group. As will be shown below, games are one of the few types of activities where usage is less predictable.

TABLE 2: GROUPED ONLINE ACTIVITIES

Search	Transactions	Downloads	Communication	Government
• General Browsing • Weather/Road Conditions • Travel • News or Sports • Medical/Health Info • Community Events • Investments	• Banking • Pay Bills • Order Online	• Music • Software • Radio • TV • Movies	• Email • Chat Groups/ Messenger	• Government Info Search • Communication with Government

As is shown in Table 3, there are big differences in the popularity of various types of online activities[7]. The percentage of users partaking in search activities is influenced by the large number of activities in this category, but it shows that almost all users engage in one or more

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[7] Unless otherwise indicated, all data comparisons presented are significant at the 0.05 level.

search activities when using the Internet. Communication activities are almost as popular, but the uptake of other activities is much less universal.

TABLE 3: DESCRIPTION OF GROUPED ONLINE ACTIVITIES

	% of Users Doing at Least One Activity in the Group	Minimum	Maximum # of Activities in the Category	Mean	Std. Deviation
		Descriptive Statistics			
Search	96.4	0	7	4.0	1.9
Communication	92.3	0	3	1.6	1.2
Transactions	70.6	0	3	1.6	1.2
Downloads	57.0	0	5	1.1	1.3
Government	54.8	0	2	.8	. 8
Education	43.0	0	1	.4	. 5
Games	38.8	0	1	.4	.5

Data Analysis

This section presents a series of tables and charts describing scope of usage according to demographic and user characteristics. Detailed data used to prepare the graphics is provided in Table 13. As has been noted previously, much of these data are predictable, showing the clearly established patterns that characterize the digital divide, i.e. older people are lower scope users than younger people and men do more online activities than women. As such, the discussion in this section focuses on patterns that are not expected, or on differences within demographic or usage characteristics that are particularly wide.

Table 4 shows the scope of activities by age. The differences in education usage are largely explained by age. Younger people are more likely to be formally involved in education. But the table does highlight the fact that there is much room for increased uptake of online educational activities by those over the age of 25. In a society where continuous learning is valued, much more use could be made of the Internet to deliver educational materials to a broader segment of the population.

TABLE 4: ONLINE ACTIVITIES BY AGE
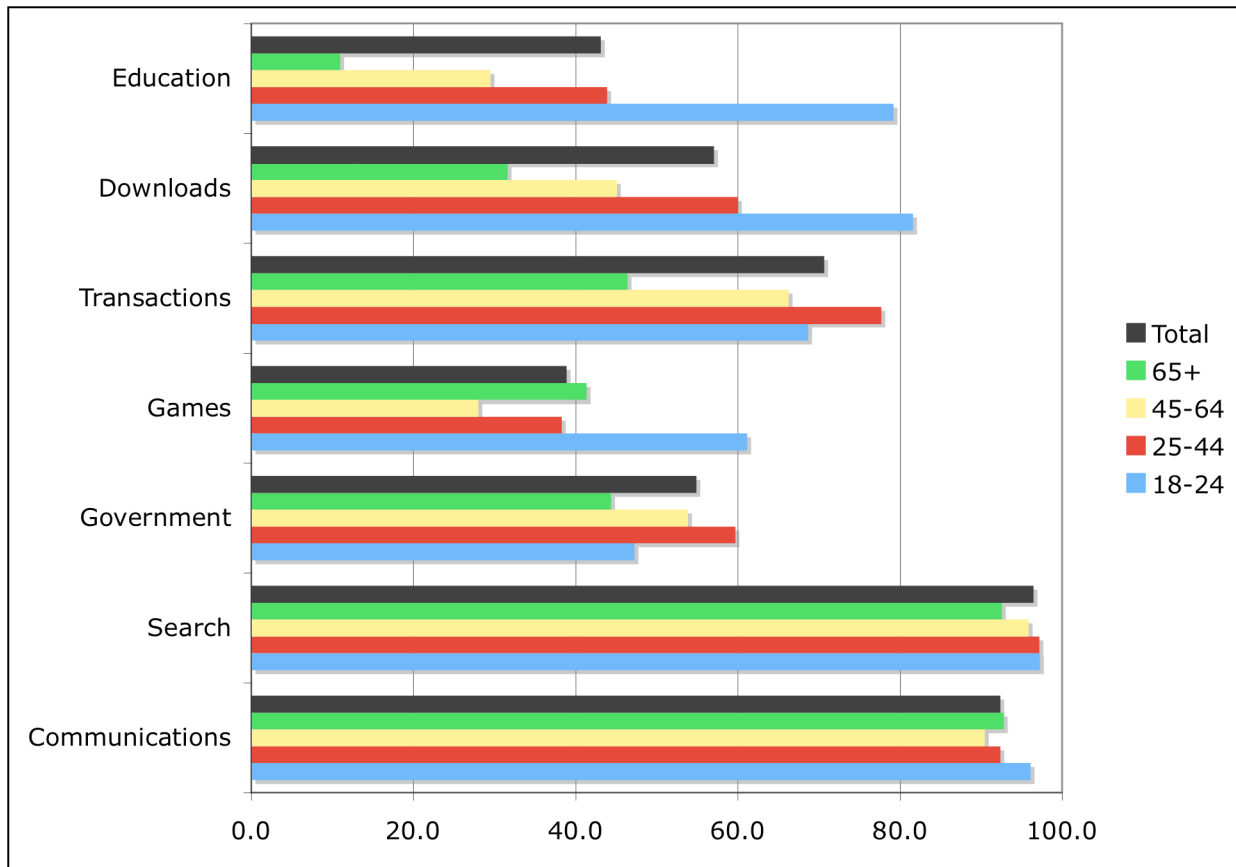
Another point of interest in the age breakdown is the participation in online games. Seniors are likely to have more time to play games than their counterparts in the 25-64 age groups, but the fact that seniors are playing games in large numbers indicates an interest in the Internet for purposes beyond basic communication and search activities.

It is also of note that the youngest age group has fewer people conducting online transactions than does the 25-44 group. Table 5 provides data to suggest that this is not due to lack of confidence in online transactions, as fewer than 35% of the 18-24 year old group indicates that they are 'very concerned' about conducting online banking or using credit cards. Instead, it likely suggests that the youngest age group simply makes less use of banking and credit card systems that their older counterparts.

TABLE 5: CONCERN ABOUT ONLINE BANKING AND USE OF CREDIT CARDS BY AGE

	18-24	25-44	45-64	65+
Not at all concerned	14.5	11.9	7.6	8.5^E
Somewhat concerned	50.6	48.4	44.4	37.4
Very concerned	34.9	39.7	48.0	54.1
Total	10.7	46.8	42.6	1.0

[E]Italicized numbers indicate estimates that should be used with caution.

When considering the sex of Internet users, differences in scope are statistically significant but generally quite small.
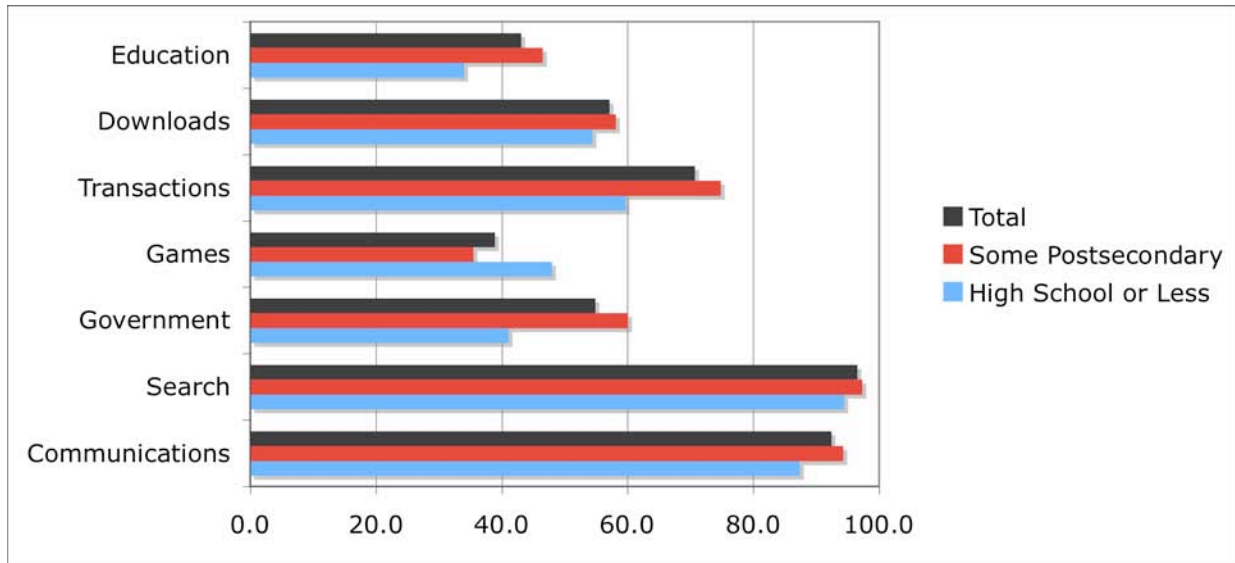
TABLE 6: ONLINE ACTIVITIES BY SEX
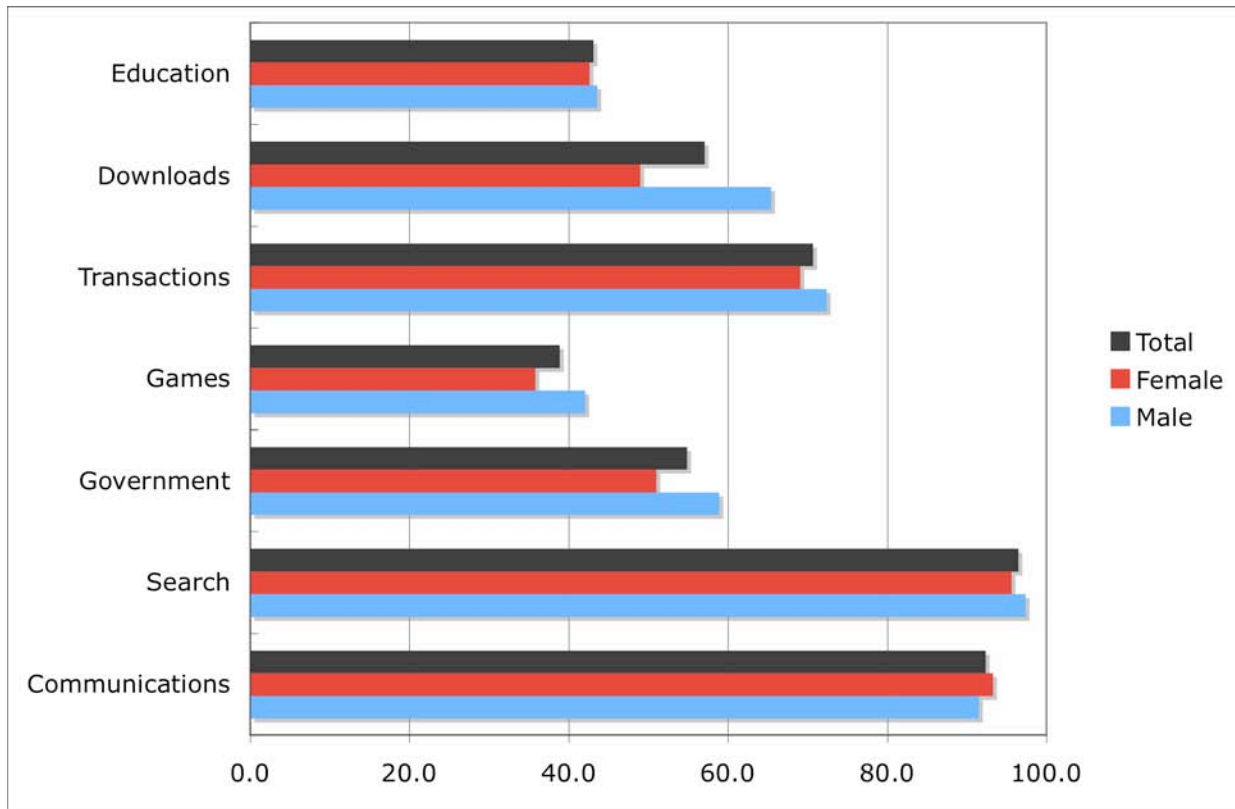
One point of note, shown in Table 6, is that fewer women than men are using the Internet for downloading purposes. Although the downloading activities captured in the CIUS are primarily entertainment-based, the ability to download files is a useful skill for all Internet users. These data cannot be used to explain whether women are doing less downloading because they are not interested in the available content, or whether they are less likely to know how to use the Internet

in this way. It is anticipated that downloading usage will be higher in the 2007 data, and there is no clear reason as to why women should engage in fewer downloading activities than men. If the differences persist, it is suggested that efforts could be made to increase women's comfort levels with the use of the Internet for downloading content of all types.

When considering level of education, users are categorized into those that have undertaken some tertiary education (including those who have completed university degrees) and those whose education does not include any tertiary education. Looking at the level of education of Internet users reveals differences in participation in online transactions and in games. A higher proportion of people with only a high school education participate in online games than of those with more education, but the opposite is true of online transactions. There are minimal differences between the two groups with respect to downloading. As online education activities are often at a tertiary level, it is not surprising that fewer people with no postsecondary education are engaged in educational activities. But these data do show that there is an opportunity for more people without postsecondary education to update their educational qualifications through online channels. This group of people does not appear to be averse to using the Internet for other purposes, thus appear to have the necessary skill to participate in online learning.

Income and education levels are correlated, and the online activity patterns are similar within both categories. Education levels are shown in Table 7, and income in Table 8.

TABLE 8: ONLINE ACTIVITIES BY INCOME
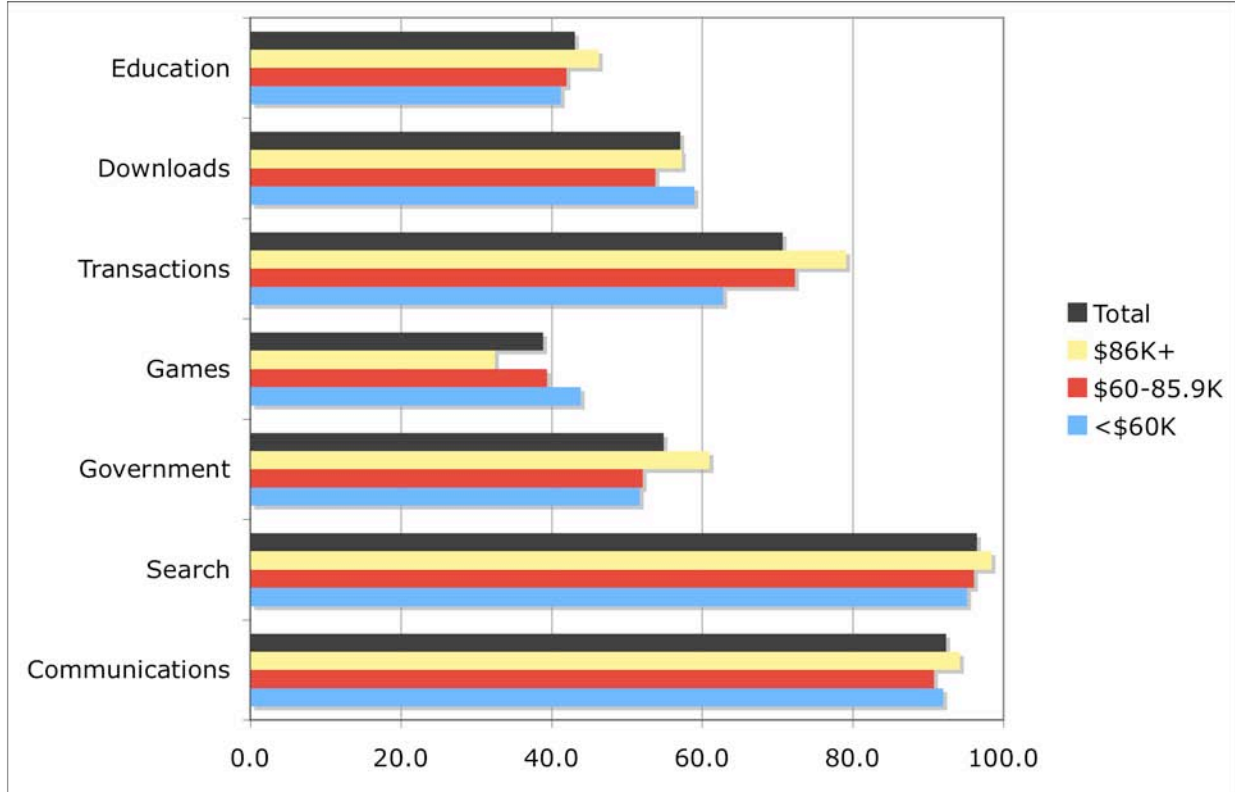
Looking at the characteristics of Internet users and their Internet connections provides additional perspectives on scope of usage. Table 9 shows the differences in scope of use between individuals with broadband connections and those without. As might be expected, a higher proportion of users with high speed connections are engaged in downloading content from the Internet. Speed of connection doesn't appear to make a big difference in communication and search participation rates. These are activities that work quite well with low speed connections – those with low speed connections have almost equal participation rates as their counterparts with broadband connectivity.

TABLE 9: ONLINE ACTIVITIES BY BROADBAND CONNECTION
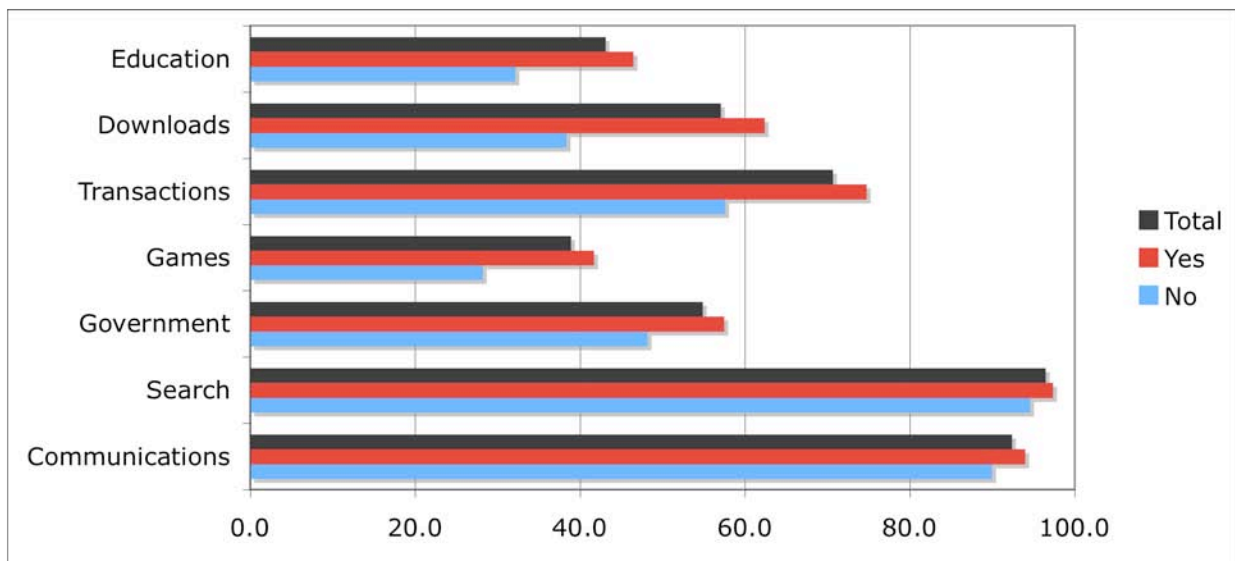
Frequency of usage is correlated with the hours a user spends online each week. Those who go online frequently also tend to spend more hours online than infrequent users. Both of these measures of online activity are related to scope in similar ways, with those spending more time on line (see Table 10), and more frequent users (see Table 11), participating at higher levels in all activity categories as compared to those who are online less frequently and for less time.

TABLE 10: ONLINE ACTIVITIES BY WEEKLY HOURS OF USE
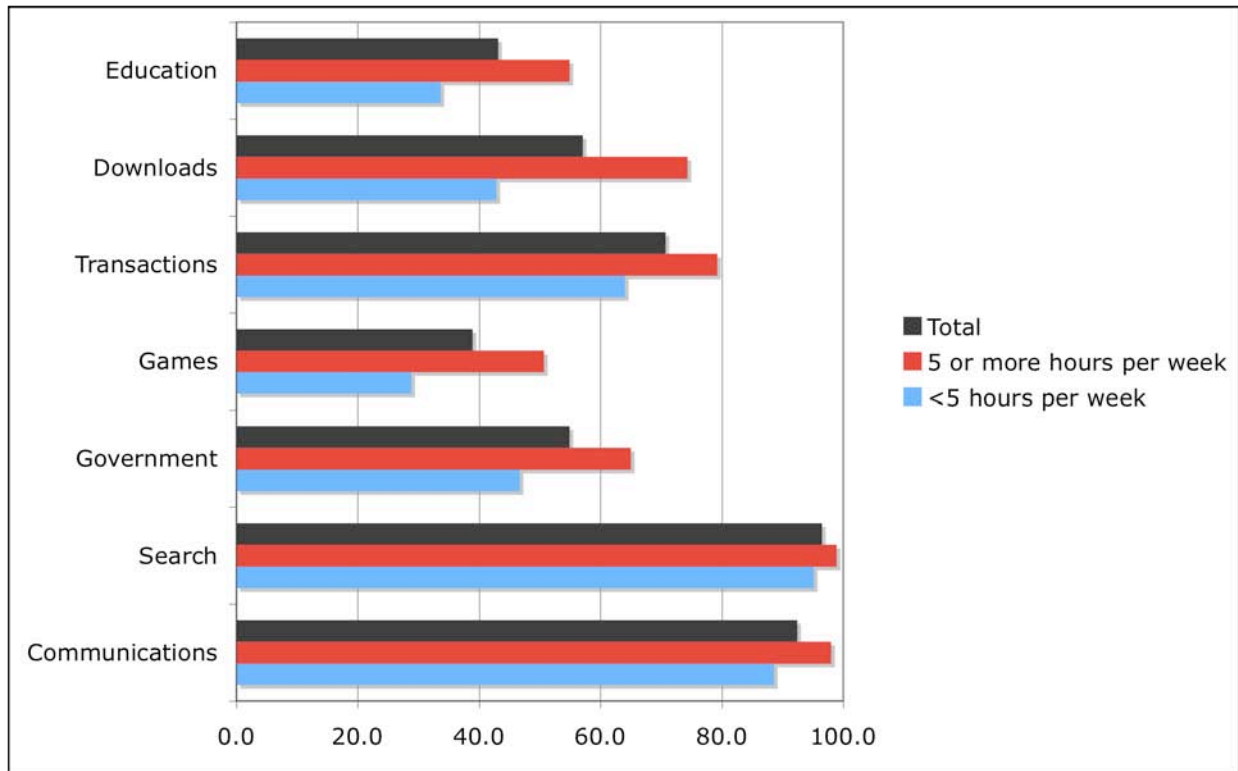
The data presented here cannot address causality in the relationship between scope and hours or frequency of use, but it is not surprising that people who spend less time on the Internet do fewer things online. Increasing scope of use would likely lead to more time spent online. But as low scope users may also be 'specialist' users, who spend a lot of time online but focus on just a few activities, encouraged increased time spent online would not necessary result in increased scope of use.
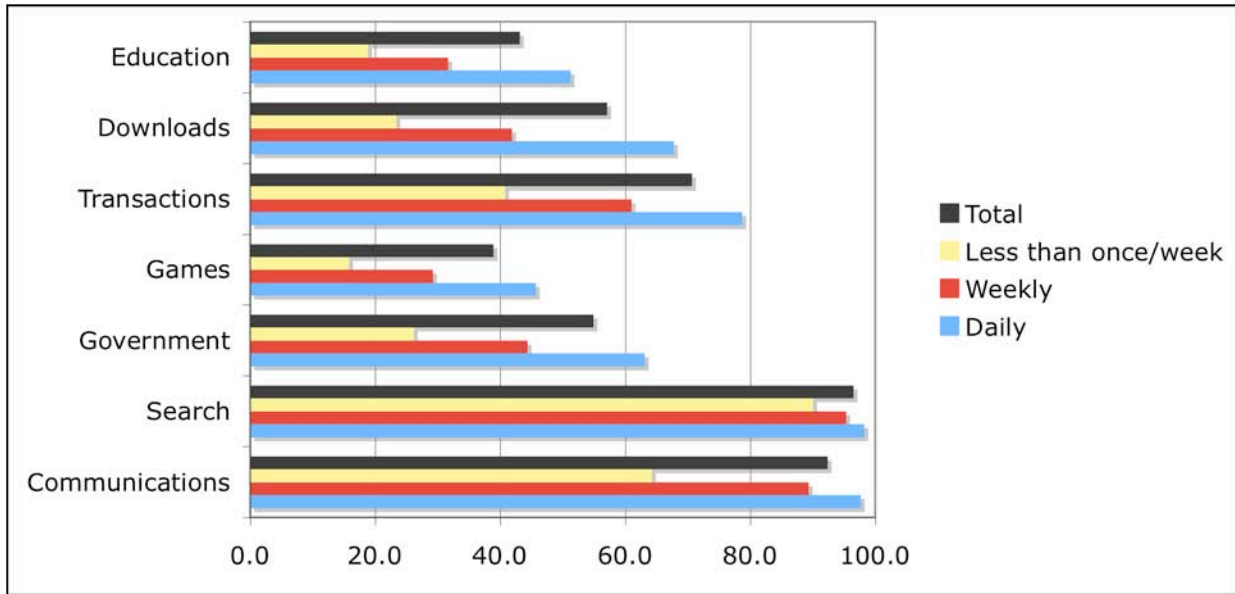
The final relationship explored here is that between scope and experience, shown in Table 12. Experience is measured in years online. The majority of Canadian Internet users have been online for more than 5 years, and these users participate in all of the activities listed here at much higher rates than novice Internet users. Close to 100% of experienced users engage in search and communication activities, close to 70% are downloading some kind of content, and almost 80% are doing online financial transactions.
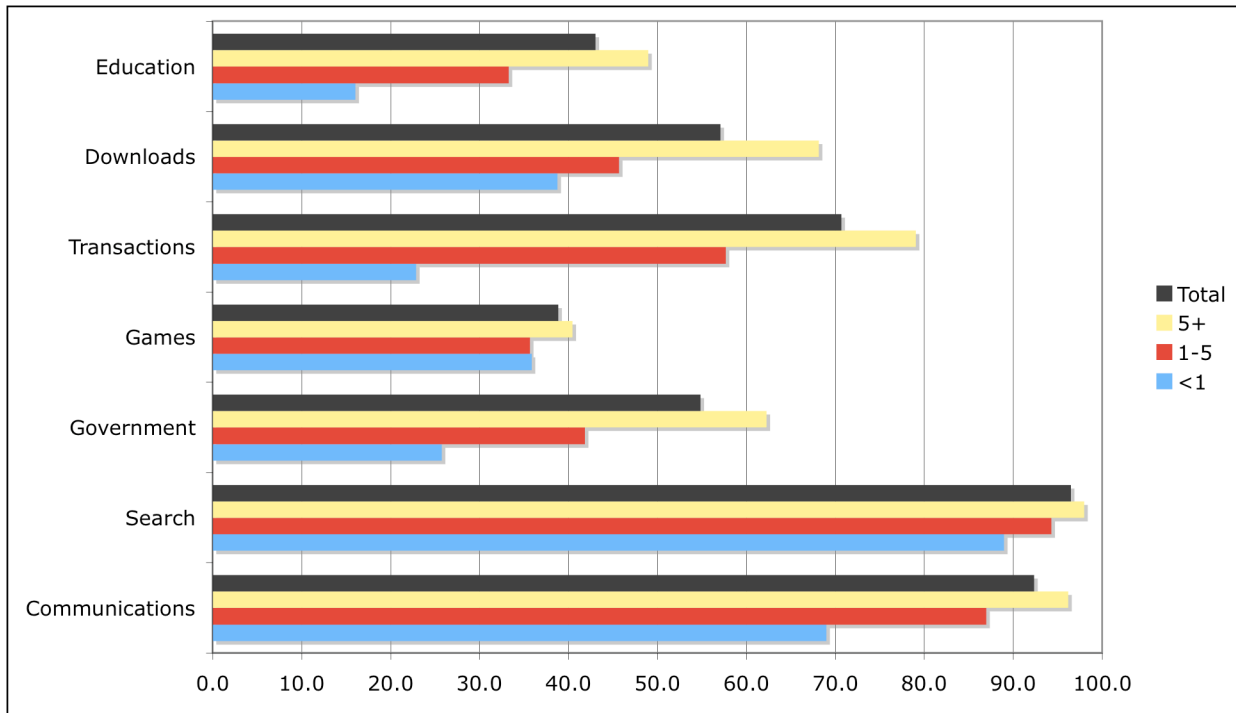
Table 13 provides a summary of the participation rates in each of the scope categories, broken down into the demographic and user characteristics discussed above. This table is of use in understanding the overall differences in scope among all types of users. The biggest difference in scope of use is in the Education category, with the youngest age group having the highest participant rate, and the oldest age group the lowest. There is also a large difference between the group that does the most downloading (also the 18-24 age group, with 81.5% engaging in this group of activities) and the group that does the least (infrequent users, with only 23.3% doing any downloading). The group that conducts the fewest online transactions is the novice users, those online for less than a year. The group with the highest participation in online transactions is the users who are online for the longest each week. These patterns also hold true for government online activities.

TABLE 13: SUMMARY OF ONLINE ACTIVITIES, BY DEMOGRAPHIC AND USER CHARACTERISTICS

The lowest number in each column is highlighted in *italics*, the highest in **bold**.

	Communications	Search	Government	Games	Transactions	Downloads	Education	#	%
Age 18-24	96.0	97.2	47.2	**61.1**	68.6	**81.5**	**79.1**	2,443,168	16.3
Age 25-44	92.3	97.1	59.6	38.2	77.6	59.9	43.8	6,873,550	45.9
Age 45-64	90.4	95.8	53.8	27.9	66.2	45.0	29.4	4,789,119	32.0
Age 65+	92.7	92.5	44.3	41.3	46.3	31.5	*10.9*	879,635	5.9
Sex - Male	91.4	97.3	58.8	42.0	72.3	65.3	43.5	7,432,004	49.6
Sex - Female	93.2	95.5	50.9	35.7	69.0	48.9	42.5	7,553,469	50.4
Education - High school or less	87.3	94.3	41.0	47.9	59.6	54.3	33.9	4,056,199	27.1
Education - Some Postsecondary	94.2	97.2	60.0	35.4	74.7	58.0	46.4	10,929,275	72.9
Income <$60,000	91.9	95.1	51.6	43.8	62.7	58.9	41.1	6,072,386	40.5
Income $60,000 - $85,999	90.7	96.0	52.0	39.3	72.2	53.7	41.9	3,874,213	25.9
Income $86,000+	94.1	98.3	60.9	32.4	79.0	57.2	46.2	5,038,875	33.6
Broadband - No	89.9	94.5	48.1	28.1	57.5	38.3	32.1	2,705,668	18.8
Broadband - Yes	93.9	97.3	57.4	41.6	74.7	62.3	46.4	11,693,271	81.2
Hours per week <5	88.5	95.0	46.6	28.7	63.9	42.7	33.5	7,737,952	53.2
Hours per week >=5	**97.9**	**98.8**	**64.9**	50.6	**79.1**	74.2	54.8	6,811,101	46.8

	Communications	Search	Government	Games	Transactions	Downloads	Education	#	%
Frequency - Daily	97.6	98.1	63.0	45.6	78.6	67.7	51.1	9,575,708	65.7
Frequency - Weekly	89.2	95.2	44.3	29.1	60.9	41.8	31.5	3,880,396	26.6
Frequency - Less than weekly	*64.2*	89.9	26.1	*15.7*	40.7	*23.3*	18.7	1,112,283	7.6
Years online <1	68.9	*88.9*	*25.7*	35.8	*22.8*	38.7	16.0	557,169	3.7
Years online 1-5	86.9	94.2	41.8	35.6	57.6	45.6	33.2	4,404,303	29.4
Years online 5+	96.1	97.9	62.2	40.4	79.0	68.1	48.9	10,015,628	66.9
Total	92.3	96.4	54.8	38.8	70.6	57.0	43.0		
Lowest	64.2	88.9	25.7	15.7	22.8	23.3	10.9		
Highest	97.9	98.8	64.9	61.1	79.1	81.5	79.1		

The uptake of online games is interesting because it is one activity where the usual patterns of declining use with increasing age do not hold. More people over the age of 65 report playing games on the Internet than do people between the ages of 45-64. This may be related to availability of time for gaming, and shows that there are online activities beyond search and communication that are appealing to seniors. Adoption of online games does not also increase much as users become more experienced.

96.4% of all Internet users engage in at least one online search activity. Even among the novice users, almost 90% use the Internet to conduct searches. If there is a 'killer application' (a single activity that drives usage) for the Internet, it is searching. Use of the Internet for communication is also very popular, with 92.3% either emailing or chatting online. However, those who are online only infrequently do not appear to value communication so highly, with only 64% using the Internet for this purpose.

Closing Comments

This study provides numerous insights into what different types of users are doing online. It reveals how patterns of use change over time, showing that scope of usage increases as people become more experienced Internet users. The shortcoming in the study at present is that it assesses the data using bivariate techniques only, making it difficult to understand the combined effects of characteristics like age, online experience and frequency of use on scope. Further work is being done in order to identify clusters of users based on their scope of use. This would allow more targeted, custom approaches for encouraging increased scope. For instance, older women who are new users might benefit from training to download audio and video content of interest, whereas low income novice users might benefit from assistance in accessing government services online. The present analysis does not allow for this level of granularity.

This investigation into scope of usage suggests that efforts to promote broader understanding of the value of the Internet as a communication and search tool could help to encourage non-users to become users. But it also highlights the fact that other categories of activities have not been so universally adopted, suggesting that there is still much room for the Internet to take a more central role in people's daily activities. As has been mentioned, it is likely that Canadians' scope of Internet usage has increased in the years since these data were collected, and the 2007 CIUS data may reveal new patterns of usage. However, given the adoption rates presented here, it is evident that the Internet has yet to become essential for facilitating e-learning, or to become the primary channel for communication and information sharing between governments and citizens. These are key elements of an Information Society. If the Internet does not gain wider use for these purposes in the next few years, steps could be taken to help individuals better understand the benefits of online activities, and to remove barriers for those who do want to engage in online activities but do lack the necessary skills or resources.

This analysis also suggests that there is a learning curve, or a period of familiarization and confidence building, experienced by new users. This is particularly evident in looking at online transactions, with new users taking several years to reach the participation rates demonstrated by experienced users. Given concerns about the security and privacy of online transactions, this hesitance among novices is understandable. Steps could be taken to educate new users about the risks of online transactions, with a view to increasing their comfort level for these activities early on.

One of the striking observations from the data presented here is that the users with the highest participation rates in many of the online activities are those who spend the most time online. This is understandable, because in spending extended periods of time online, users are

likely to explore new activities and gain a higher confidence level in using the Internet. But of

course, users are not likely to spend time online unless they find activities that they value. So an

important question for those trying to encourage broader scope of use is how to encourage a

culture of use. This is an issue that the Ontario government is investigating at present (Ontario

Ministry of Government Services, 2007).

The digital divide among users is narrowing, but there are still clear differences in scope of

usage observed with respect to user demographics. Any efforts to encourage uptake and usage of

the Internet should continue to address the questions as to why older, less well educated, lower

income Canadians use the Internet less than younger, more highly educated, higher income

Canadians. Governments are certainly aware of the persistence of this issue, but could do more

to address it directly[8].

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[8] The province of Ontario is commissioning research that will address this issue (Ontario
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