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User Preferences for Accessing Online Content through Desktop, Laptop, and Handheld Devices

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The Rochester Institute of Technology

Department of Communication

College of Liberal Arts

User Preferences for Accessing Online Content through Desktop, Laptop, and Handheld Devices

by

Abel B. Rondón López

A Thesis submitted

in partial fulfillment of the Master of Science degree

in Communication & Media Technologies

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USER PREFERENCES FOR ACCESSING ONLINE CONTENT THROUGH
DESKTOP, LAPTOP, AND HANDHELD DEVICES

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Abstract

This study determined which devices, hand held or desktop and laptop computers, users preferred to access specific types of Internet content and why they chose mobile apps or mobile websites. Significant differences were found in favor of using handheld devices for social networking, looking up directions, programing reminders, global positioning systems, playing games, and listening to music. Activities showed a significant difference in favor of using desktop and laptop computers to investigate topics of interest, watch videos, and manage finances. Users preferred the way mobile apps are presented over mobile websites, but no significant differences between devices were found for accessing information, using services, completeness of content, making purchases, advertising, or ease of use.

Keywords: Mobile, App, Web, smartphone, tablet, laptop, desktop

User Preferences for Accessing Online Content through Desktop, Laptop, and Handheld Devices

Mobile communication is advancing at a rapid pace. The number of devices, applications, and uses of handheld technology is constantly growing. What was once a portable and cordless device used only for talking to another individual at a distance has turned into a device with hardware comparable to the desktop and laptop computers from a few years ago. One could probably say that today the act of verbal communication is one of the less important functions of the cell phone. Based on data collected from two groups of users (Android and Windows Mobile) Falaki, Mahajan, Kanadula, Lymberopoulos, Govindan, and Estrin (2010) divided smartphone use into the following categories: communication, browsing, media, productivity, system, games, maps, and other. Android users use the phone for communication 44% of the time versus 49% for Windows Mobile. It must be pointed out that this category not only considers verbal communication but other means of exchanging messages such as emails, short message service (SMS), and instant messaging software. More than a medium of communication, smartphones have become portable assistants that remind, play music, create pictures and videos, tell the temperature, provide navigation support, and provide many more functions to support users' daily needs. When referring to mobile technology and the variety of services offered to users, Leung and Wei (2000) state that "It expands telephone services from an unmediated common carrier to multipurpose content services including paging, voice mail, fax, data transmission, news and weather updates, stock information, and Internet access, among others" (p. 309). Individuals can find an application to support virtually any need they can imagine.

Mobile Internet service was first launched in 1999 by the Japanese company NTT DOCOMO. This (and cellular phones in general) evolved into what has become a medium for directly accessing the World Wide Web through touch screen devices and/or mobile web modifications. These mobile web modifications provide users access to websites on devices of lesser software or hardware capability. With the ability to access the Internet through handheld devices, users are turning more and more toward mobile web browsing, and in many countries the number of mobile-only web users reaches 50% or more (On Device Research, December 2010).

To further accommodate mobile users, developers are creating apps that can be directly downloaded and installed on the devices to access one specific site's content in a more practical manner. For example, Rochester Institute of Technology (RIT) students can access the university's website through any handheld device, but RIT also has a mobile app that offers quick access to information such as news updates, bus schedules, lab hours, and dining services. Although some of these apps have functions that users can access without an Internet connection, many of these applications, just like their mobile web counterparts, need Internet connectivity to access the full content or at least the most updated information on the site.

Google & Ipsos OTX Media CT (2011) interviewed 5013 U.S. adults who identified themselves as users of smartphones for accessing the Internet. The results showed that 93% used their phones for accessing the service while at home, 81% used their phones for browsing on the Internet, and 68% used an app. Results also showed that 72% tended to use their smartphones while consuming other media. In a telephone survey of 2254 adults, the PEW Internet & American Life Project (2012) reported that out of the 88% of U.S. adults who own a cell phone,

17% do most of their online browsing through mobile phones. These studies indicate that mobile device use to access online content is growing rapidly, and that in some cases these devices are even replacing desktops and laptops for these purposes.

When individuals have to search for online content and have different options available for satisfying this need such as a computer, cell phone, tablet, or laptop, they must choose which they prefer. Shannon-Missal (2013) summarized the results of a recent Harris Poll comparing functions users can realize on their smartphones and computer. The function with the highest percentage on the smartphone was immediate communication with text or instant messages (87%). This was also the least used with computers (20%). Navigation and mapping assistance was a top use for smartphones (73%), but far less (56%) on computers. Reading and writing emails were most commonly done on computers (90%), but although ranked as the most common uses of smartphones, emailing only had 72% of use. It is important to point out that the percentage of writing emails on smartphones was much lower than that of reading emails.

Katz, Blumler, and Gurevitch (1973) group sources of media gratification into three categories: the content of given media, how the user is exposed to the media, and the social context that affects the user's exposure to different kind of media. The online content available on computers and laptops is not different from the content present in a mobile website, but the organization could suffer a change in the process of conversion. The content available can, however, be reduced or specifically selected when it comes to mobile apps. With the sources of gratification already defined, one can study the differences between users who prefer conventional web accessing devices (desktops and laptops) versus those who prefer handheld web-accessing devices (cell phones and tablets). Google & Ipsos OTX Media CT (2011)

collapsed smartphone use into five general categories. *Staying connected* was comprised of sending and receiving emails and the use of social networks. *Research and reading news* included activities such as looking up information of interest on different topics such as sports, health, school, and work, among others. *Navigation* covered the search of addresses and use of global positioning system (GPS) or online mapping services. *Entertainment* was comprised of listening to music, watching videos, and playing games. Finally, *managing or planning* incorporated activities such as making travel arrangements and reservations, and managing finances. Guided by this categorization, a study of user preference can be developed and applied to a specific target.

Review of Literature

Uses and Gratifications

When researchers started to examine theories based on effects of media on audiences, they focused on the reasons behind choice of media. Lowery and DeFleur (1995) explain that “The new theory addressed the important theoretical questions as to why audiences deliberately seek out some kinds of media content and completely ignore others” (p. 400). The uses and gratifications (U & G) approach (Katz, E., Blumler, J, & Gurevitch, M., 1973) asserts that audiences do not simply wait and absorb content placed in front or around them, they search for the content that will satisfy their needs most effectively.

A research tradition that began with a study of radio audiences of daily serials in the 1940s (Herzog, 1944) finally took shape in the hands of Katz, Blumler, and Gurevitch (1973). These researchers defined a model comprised of five general elements. The first explained that what was once considered a passive audience with no more participation in the media cycle than

that of a receiver was now considered an active audience. The second element stated that in the process of mass communication, the link between needs to be gratified and media choice initially lies in the hands of the audience. Another factor considered was that needs are not satisfied by the media alone; an individual can satisfy an entertainment need by watching a sporting event through television. This same need may be gratified by going to a stadium and watching the game live or even playing the sport. The fourth factor states that data on reasons for media selection and use can be acquired directly from individual media consumers. The final factor is best explained as follows:

Value judgments about the cultural significance of mass communication should be suspended while audience orientations are explored on their own terms. It is from the perspective of this assumption that certain affinities and contrasts between the uses and gratifications approach and much speculative writing about popular culture may be considered. (Katz, Blumler, & Gurevitch, 1973, p. 511)

These principles were applied by Toro (2002) when analyzing academic websites to find a way to project a positive image of educational institutions via the web. Toro put the previously stated principles in the context of web environments as follows:

For web sites, this means that people can feel satisfaction by absorbing information from a web site, visiting certain kinds of web sites (such as news web sites and online magazines), being able to spend time surfing the Web, and gathering and sharing information with other surfers via online interactive features such as message boards. (p. 4-5)

Uses and gratifications theory has often been criticized for not being a rigorous social science theory. In a study of its evolution, Ruggiero (2000) defended the validity and value that the theory offers for scholarly research. The introduction of new technologies brings with them new media, each of which contains unique elements that must be analyzed to understand the needs that the audience seeks to satisfy through them. “As new communication technologies rapidly materialize, the range of possible topics for U&G research also multiplies” (Chigona, Kamkwenda, & Manjoo, 2008, p. 4).

The first application of uses and gratifications theory to cellular technology was a study conducted in Hong Kong by Leung and Wei (2000) on the relationship between use of functionally enhanced services on cellular phones and level of cellular phone use. Results showed that in this new mobile territory, freedom of mobility and ease of access were the strongest sources of gratification and that the number of additional services users had on their phones was directly proportionate to the amount of time spent using the device. Stafford and Gillenson (2004) conducted the first study of uses and gratifications in mobile Internet by exploring differences in motivations behind mobile Internet usage and wire line Internet usage in business executives. Results showed that the main motivations for accessing the Internet through mobile devices were speed, ease of use, and convenience. The authors point out that the content is not of major influence in device selection. “The mobile device simply provides another process for gaining access to information already mediated by communications networks accessed by this particular group of users” (Stafford & Gillenson, 2004, p. 73).

Society and Handheld Technology

In comparing desktop, laptop, and handheld devices Xie (2010) claims that the stationary disadvantage of the desktop is overcome by the portability of laptops. However, laptops still have weak points such as short battery life and limited wireless access. Although it is smaller than a desktop computer, a laptop cannot be easily carried around in a pocket or purse. Modern handheld devices, however, overcome these obstacles: size, Internet connectivity, and battery life. Xie (2010) mentions a final advantage of handheld devices when compared to computers and desktops—*distance*:

Desktop computers are relatively “distant” and stationary in the same way television receivers are, laptop computers may be portable, but still somewhat awkward. But the distance between hand-held devices and the user is now functionally reduced to zero.... The mobile devices are ubiquitous, or just under our skin and always on, allowing for “no down time.” (p. 10)

Kim and Alber (2001) experimentally studied the advantages and disadvantages of handheld device use as a counterpart to conventional means of information acquisition. To examine the disadvantage that a smaller display poses to the user when searching for textual information on handheld devices, 28 users were provided a questionnaire that could be answered by the information available through a handheld device or a desktop computer. Their results showed that, while mobile device users needed more time to complete the task, accuracy across conditions was similar.

It must be pointed out that Kim and Alber’s study was conducted more than a decade ago, when the first monochromatic displays appeared. Cell phones and personal digital assistants

(PDAs) were inferior to today's devices. At the present time, the ease that handheld devices offer users with user-friendly operating systems, touch screen functions, and larger displays substantially minimizes the disadvantages posed when searching for information.

Buyukkokten, Garcia-Molina, Paepcke, and Winograd (1999) listed obstacles that limit handheld devices from becoming a greater part of users' lives: screen size, slow text input facilities, low bandwidth, small storage capacity, limited battery life, and slow central processing unit (CPU) speed. Today, such limitations are of less concern due to the increased hardware capacity and availability of Internet services for modern handheld devices.

In a study of the business implications of mobile Internet from a user's point of view, Chae and Kim (2003) viewed them from the perspective of the user, the environment, and the system. Mobile Internet connectivity is characterized as more personal than stationary Internet sources. The connection is generally instantaneous, enabling users to access the service constantly. The down side to these mobile Internet sources is mainly that available resources are significantly fewer than those of stationary Internet sources: smaller screen size, difficulties with input, and reduced hardware capabilities are all limitations of mobile devices compared to stationary Internet sources.

Nonetheless, although these mobile devices have limitations, when users incorporate these handheld assistants into their daily lives and learn to use the various functions offered, a previously nonexistent need starts to develop. The ease of accessing information anytime and anywhere makes these devices crucial in the users' daily lives.

Mobile access to information is a key to individual productivity. Small handheld computers are becoming more crucial in our daily lives. A handheld device

equipped with a browser and a wireless connection provides an opportunity to connect to the Internet at anytime from anywhere. (Buyukkoken, Garcia-Molina, Paepcke, & Winograd, 1999, p. 1)

Technological innovations in communication are bound to bring with them the development of new media. As new forms of media grow and are slowly incorporated into society, the scope of uses and gratifications studies can also be extended to understanding the audiences who have accepted this medium into their daily lives. Previous studies have shown the application of uses and gratifications to mass media such as radio, television, newspapers, and magazines. Based on the creation and constant growth of handheld technology and its uses for accessing online content, a study on motives for accessing content through different devices was conducted. The study also analyzed the uses of different means of accessing online content in mobile devices, specifically.

Research Questions

As previous studies have shown, a user's need can influence the selection of the medium used to fulfill it. The characteristics of handheld and stationary devices must be taken into account when identifying the user's selection process. Based on these observations, the first research question was posed:

RQ1: What are the differences between users who prefer handheld devices and users who prefer desktops and laptops regarding their self-reported reasons for accessing online content?

With the ability to choose between mobile websites and mobile apps that handheld devices offer, users are faced with preferential choices. Taking into account the similarities and differences of these tools for accessing online content our second research question emerged:

RQ2: What activities are conducted by users who prefer mobile websites and users who prefer mobile apps and what are their self-reported reasons for accessing online content?

Method

Participants

A convenience sample of students majoring in the College of Liberal Arts programs at the Rochester Institute of Technology was surveyed. As of fall 2012, this population was comprised of roughly 800 individuals. Students received an email linking to an online questionnaire available through the clipboard.rit.edu website. The survey was sent to 800 members of the college. It was anticipated that it would produce roughly 100 useful completions. The questionnaire is provided in Appendix A.

Survey Questionnaire

Open-ended and closed-ended questions with ordered and unordered responses were used in the online survey. The first elements of the questionnaire assessed the subject's knowledge and frequency of use of handheld devices for accessing online content. The fourth item on the survey was a table listing the main activities users may engage in on handheld devices and desktop and laptops. Users were then asked to select what device best suits each of these activities. The variables of handheld preference versus desktop and laptop preferences (*RQ1*) were measured by this question. The list of activities referred to user preferences based on categories resembling those used in Google and Ipsos OTX Media CT's Mobile Movement Study. Questions five and six served to identify participants who were familiar with the terms *mobile web* and *mobile apps*. If participants did not know what these terms were, they were prompted to skip to question 12. Questions seven through 11 used tables to have users indicate the functions mobile apps

performed better versus mobile web. Questions eight and nine were open-ended and offered participants the option of adding attributes that best fit each application. The final portion of the survey obtained demographic information from the participating sample.

Results

The survey instrument sent to College of Liberal Arts majors resulted in 117 complete surveys, a response rate of 14.6%. The resulting data showed the increased popularity of mobile devices in college students with 89.7% of smartphone owners having Internet access through these devices. When asked how often they use a handheld device with Internet connectivity, 85.5% answered daily, 3.4% answered 3 or more times a week, 4.3% stated once a week, 1.7% monthly and 5.1% never (see Figure 1).

When comparing handheld device use with that of desktop and laptop computers for accessing online content, 9.4% of the participants access through desktop and laptop computers exclusively. The self-reported data suggest that 31.6% of participants do most of their online accessing through desktop and laptop computers, and 39.3% divide their use of handheld and desktop and laptops in half. Only 17.9% of users indicated they do most of their Internet access on their handheld devices (see Figure 2). Although desktop and laptop devices are still more popular than mobile devices for accessing the Internet, mobiles are quite popular. It should be noted, however, that this sample of college students, with computers at their disposal in labs, classrooms, and the library, might be particularly likely to use these devices more frequently.

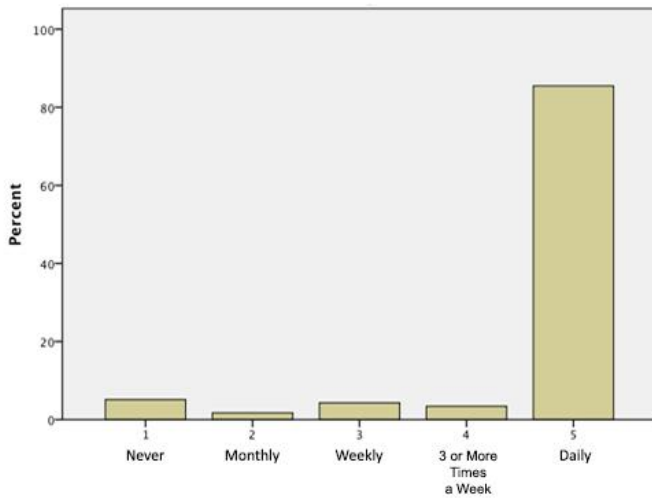


Figure 1. How frequently do you use a smartphone or handheld device with Internet connectivity?

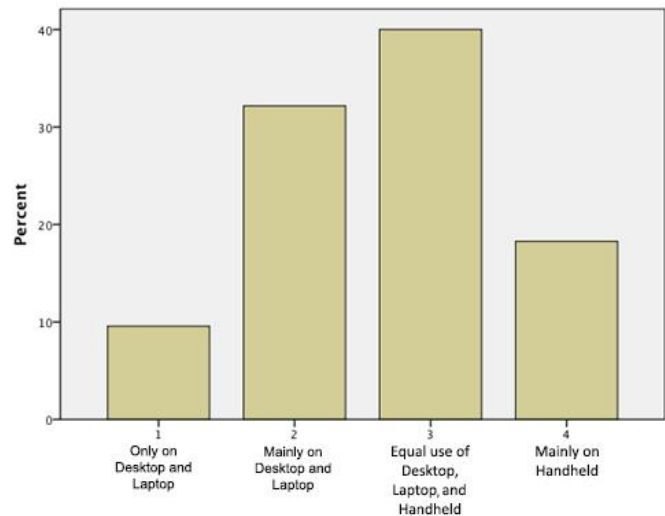


Figure 2. Comparing your use of handheld devices with that of desktop and laptop computers, how would you describe your use of the Internet?

To answer the first research question, “What are the differences between users who prefer handheld devices and users who prefer desktop and laptop computers regarding their self-reported reasons for accessing online content?” a test of difference (Chi Square) between preferred devices for accessing online content and specific types of content was conducted. There was a significant difference in favor of handheld device use for social networking, looking up directions, programming reminders, GPS, playing games, and listening to music. Of these activities, strong differences emerged for social networking ($\chi^2 = 28.15, p = .000$), looking up directions ($\chi^2 = 20.95, p = .000$), GPS ($\chi^2 = 19.84, p = .000$), and program reminders ($\chi^2 = 19.31, p = .000$; see Table 1). Looking up directions, programming reminders, and GPS use are all activities that are needed when on the go, and accessing updated information at any given moment is preferred. As Xie (2010) points out, the stationary aspect of desktop computers along with the size and speed of laptop computers, favors handheld devices for on-the-go activities. Although not statistically significant ($p = .064$), making reservations favored handheld devices. These results support the Google and IPSOS OTX Media CT’s mobile device use poll that

reported 20% of users make dinner reservations and 19% make travel reservations when asked “What internet activities do you use your smartphone for?” (p. 12).

Faced with the same question, the activities that showed a significant difference in favor of desktop and laptop computers use were investigate topics of interest ($\chi^2 = 20.95, p = .000$), watching videos ($\chi^2 = 10.69, p = .014$), and managing finances ($\chi^2 = 8.48, p = .037$). This group of activities is understandable given the larger resolution that these devices offer, and the fact that users also devote more time and concentration to these activities. Although not statistically significant, accessing emails and news content were also favored by desktop and laptop computers, perhaps to avoid eye strain. Similar results were obtained by the Harris Interactive (2013) online survey of different priorities in smartphone versus computer use. Participants indicated that one of the top uses on computers was sending and receiving emails; while emailing was noted as a highly utilized feature of the smartphones, reading emails was much more relevant than writing emails on these handheld devices.

Table 1

Differences between Users of Handheld Devices versus Desktops and Laptops by Type of Content

Type of Content	χ^2	<i>df</i>	<i>p</i>
Social Networking	28.15	3	.000
Investigate Topic of Interest	20.95	3	.000
Look up Directions	21.87	3	.000
GPS	19.84	3	.000
Program Reminders	19.31	3	.000
Watching Videos	10.69	3	0.14*
Listening to Music	10.48	3	.015
Manage Finances	8.48	3	.037
Playing Games	8.27	3	.041

Note. * denotes nonsignificant

To answer the second research question, “What activities are conducted by users who prefer mobile websites and users who prefer mobile apps and what their self-reported reasons for accessing online content?” a test of difference (Chi Square) between users was conducted for the following uses: access information, use services provided, completeness of content, make purchases, presentation, advertising, and easy to use. Presentation was the only use found to be statistically significant ($\chi^2 = 9.42, p = .024$). When accessing content through a device, and having more than one option to view given content, mobile apps tend to be preferred for specific operating systems or devices, making them more attractive and simple to navigate than the web version of a specific site used on a mobile device. Although users might find mobile apps to be more comfortable for accessing content on a mobile device, mobile websites have the advantage of showing 100% of the created content. Occasionally, the content on mobile apps is reduced to the most useful or relevant.

In search of demographic differences related to user preference for accessing online content, a comparison was made between a user’s device preference for accessing online content and the academic degree they were pursuing. Using a Mann-Whitney U test, 78.5% of graduate students preferred mobile devices to desktop or laptops for accessing the Internet ($U = 889.0, p = .029$) compared to 63.6% of undergraduate students. However, the number of graduate students was much smaller than undergraduates (28 and 86, respectively). Since graduate students tend to balance their time between work and study, handheld devices might be preferred due to the ease of access that they offer to satisfy their online needs when sitting behind a computer is not an option.

Conclusion

Technological advances allow users to stay connected to the Internet as much as they desire. Individuals can access information from desktop computers at home, school, or work. The same information can be accessed through laptops, which add mobility to the user experience. With handheld devices such as PDAs, tablets, and smartphones users can keep up to date with news and information. All these devices have advantages and disadvantages which influence preferences among them. Individuals seek to gratify a variety of needs: social networking, playing games, accessing news, shopping, communicating, and investigating information of interest. The frequency with which users want to be exposed to a specific service can influence their selection of a medium to satisfy their needs. Uses and gratifications theory allows further investigation of the individual characteristics of these users and what makes them prefer one device over another.

One of the main limitations encountered in the process of completing this study was the limited sample. Although they may be more representative of the growing market than their counterparts majoring in technical subjects, Liberal Arts majors may not represent the entire public using these products. Another limitation is that when comparing user preferences between mobile apps and mobile websites, the examples used, although very popular and known, do not cover all content. News websites are a case in point.

Based on the results obtained and the limitations previously stated, further replication of the study could be applied to a general public or to different segmentation of the population. Further research could also extend uses and gratifications theory to other areas of

communication, such as an analysis of uses for non-native citizens when accessing news from their country of origin.

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Appendix A: Survey

1. Do you own a smartphone or a handheld device with Internet connectivity?
 - a) Yes
 - b) No

2. How frequently do you use a smartphone or handheld device with Internet connectivity?
 - a) Daily
 - b) Three or more times a week
 - c) Weekly
 - d) Monthly
 - e) Never

3. Comparing your use of handheld devices with that of desktop and laptop computers, how would you describe your use of the Internet?
 - a) Always on desktop and laptop computers.
 - b) Most of the time on desktop and laptop computers.
 - c) Half of the time on desktop and computers, the other half on smartphones and handheld devices.
 - d) Most of the time on smartphones and handheld devices.
 - e) Always on smartphones and handheld devices.

4. In the table below, mark the device you prefer using for the given activities.

	Desktops or Laptops	Handheld devices
Access email		
Social Networking		
Investigate topics of interest		
Access News content		
Look up directions		
GPS		
Playing games		
Watching videos		
Listening to music		
Program reminders		
Make reservations		
Manage Finances		

5. Have you used mobile websites and mobile applications (apps)?

- a) Yes
- b) No

6. Do you know the difference between a mobile website and a mobile app? (If the answer is no proceed to question 12)

- a) Yes
- b) No

7. In the following table mark which attributes favor mobile apps and which attributes favor mobile websites:

	Mobile App	Mobile Web
Access Information		
Use services provided		
Quickness of access		
Completeness of content		
Make purchases		
Presentation		
Advertising		

Easy to use		
--------------------	--	--

8. Please list any attribute that favors mobile apps that was not covered in number 7:

9. Please list any attribute that favors mobile web that was not covered in number 7:

10. In the following table are listed some examples of websites that have a mobile app and a mobile web, please point out which you prefer:

	Mobile App	Mobile Web
RIT		
Facebook		
The Weather Channel		
Google Maps		

Amazon		
Twitter		
You Tube		
Ted		
Gmail		
Pandora		
Spotify		

11. In the following table are listed some examples of websites that have a mobile app and a mobile web, please point out which you use most:

	Mobile App	Mobile Web
RIT		
Facebook		
The Weather Channel		
Google Maps		
Amazon		

Twitter		
YouTube		
Ted		
Gmail		
Pandora		
Spotify		

12. What type of degree are you currently pursuing?

- a) Undergraduate
- b) Graduate

13. Gender:

- a) Male
- b) Female

14. Work Status:

- a) Full-time employee
- b) Part-time employee
- c) Unemployed

Appendix B: Cover Letter for Survey

Greetings dear RIT student or Faculty member,

At the present handheld devices such as smartphones and tablets are growing in popularity and being adapted by users that long to satisfy their specific communication needs at any given time. These devices, in some cases, become the main source of online connectivity of users that struggle finding time to sit in front of a computer more than once or twice a day. Based on these facts a question comes to mind. Are these handheld devices taking the place of computers and laptops when the need of accessing online content is in question? In search of an answer to this and more questions Abel B. Rondón, a graduate student in Communication & Media Technology is performing a study and would be grateful if you would take no more than 8 minutes of your time to fill out a short survey about your use of computers and handheld devices.

By clicking the link below you may access the mentioned survey:

Thank you for your time,

Abel B. Rondón