

Skimming the Surface: Understanding Real World Mobile Internet Use

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ABSTRACT

In this position paper we discuss the findings so far from an ongoing diary study examining current mobile Internet usage in the United States. Our study addresses these two questions for U.S. mobile phone users: 1) What motivations lead people to access the Internet on their mobile phones?; 2) What do they do?; and 3) Where do they do it? In the first part of the ongoing study, we examined a group of active US mobile Internet users via questionnaires, semi-structured interviews, and a voicemail recording system through which participants recorded each instance of mobile Internet use. Based on the qualitative data analysis, we constructed a framework for understanding mobile Internet motivations and behaviors. By the time of the workshop we will also be able to discuss the validation study now under way. Based on our preliminary findings, however, mobile internet usage by this audience is seamless and superficial: users constantly skim along the surface of Internet information, monitoring and sampling information opportunistically to meet unfolding needs and impulses. Information needs of any depth or complexity, on the other hand, drive these users to the stationary Internet.

Keywords

Mobile Internet, mobile Web, mobile usage, user behavior, user motivation, field studies, semi structured interviews.

1. INTRODUCTION

Why do people access the Internet on mobile phones? What Internet information do people access and where do these behaviors take place? Understanding the answers to these questions is important for understanding how mobile Internet services can be made more useful and accessible in people's everyday lives.

U.S. carriers are looking to mobile Web browsing and other data services for future growth. In Japan, mobile internet users accounted for 88.3% of mobile phone users by October 2005 [1]. Chinese WAP (Wireless Application

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Protocol) users increased by five times from 9 million to 26 million during the year 2004, and by 2006, users increased to 120 million [2]. However, in the U.S., Jupiter Research predicts Mobile Web browsing will increase only from 15 % adoption in 2007 to 21 % in 2011 [3]. The lagging U.S. mobile Internet market calls for an in-depth look at mobile Internet patterns of use to better inform design.

In the first part of our study, now completed, we tracked a group of 11 active mobile Internet users over a period of 5 days. Data was collected via questionnaires, semi-structured interviews, and user voicemail recordings documenting each instance of mobile Internet use. Our research team then examined and coded the data and constructed a framework for understanding mobile Internet motivations and behaviors, which we present here. The second part of the study is now under way and can be discussed in the workshop.

2. RESEARCH BACKGROUND

To inform our research we reviewed past studies of mobile and stationary Internet use. Because of space constraints, we will not include a full literature review here, but focus on a few highly relevant studies (we will share a more complete bibliography with workshop attendees).

Ishii and Miami examined factors influencing mobile Internet adoption: the context of use (home, at work, on the street); differences in the types and number of sites accessed; and preferences for where to access different types of content (lifestyle vs. business) [4]. They found that people reported increased sociability from Internet use on mobile compared with the stationary Internet.

Kim et al. conducted a study of mobile Internet use in [5] examining personal use (standing/moving/sitting) vs. environmental use (alone/with people), as well utilitarian vs. hedonic intentions, and high vs. low emotions. The results showed that people used mobile Internet most frequently when they felt joyful and when they were in a calm and quiet environment. A second study [6] found that the mobile Internet was low-risk commercial activity, synchronous communications, low-intensity information, and less resource-intensive applications. The stationary

Internet, on the other hand, was associated with higher-risk commercial activity, asynchronous communication (e.g., email) high-intensity information (e.g., online games), and more processor-intensive applications. Our findings are consistent with this study.

Turning to methods employed in earlier studies, mobile voice-mail diary studies have proven to be a successful method of capturing rich contextual information in mobile settings [7]. We used this basic method and applied it to active mobile Internet users using their own phones.

Our method was also informed by a qualitative study of the use of video content in a broad range of portable devices [9]. This study demonstrates how diary studies can be combined with ethnographic interviews to bring a richer understanding of the motivations for mobile use. Drawing on reported episodes of mobile video behavior, the study identifies the social motivations and values underpinning these behaviors that help characterize mobile video consumption beyond the simplistic notion of viewing TV to kill time wherever you may be.

3. RESEARCH METHODOLOGY

In this section, we first define our research questions, then describe the participant profile and strategy we used to recruit participants, and then discuss the methods we used to collect and analyze data.

3.1 Research Questions

This research was motivated by the lack of qualitative data for understanding how and why people are using the Internet on their phones. We investigated: 1) When and in what context do personal mobile Internet users access Internet information on a mobile device in their daily lives? And 2) What are the behaviors and underlying motivations for mobile Internet data access?

3.2 Participant Profile

Our target users are aged between 18-34, are active mobile data users (2-3 times a day), and subscribe to an unlimited data plan with their service provider for personal use only. We recruited from a population that had already actively incorporated mobile Internet use into their daily lives. Our 11 subjects, ranged in age from 20-33 (see Table 1) and were nearly equally divided between regular and smart phones with full keyboards. Users subscribed to data plans from all 4 major U.S. cell phone carriers.

Table 1. Participant Age, Gender, and Phone Type

Age	M/F	Phone	Age	M/F	Phone
20	F	Smart	25	M	Smart
22	M	Regular	27	M	Regular
22	M	Smart	27	M	Smart
23	F	Regular	29	F	Regular
23	M	Regular	33	M	Regular
24	F	Smart			

3.4 Data Collection Method

Participants completed a brief questionnaire about their mobile data usage at the start of the study. They use a voice mail system to record details of each use over a 5-day period: what information was accessed, why, where, for how long, and whether they were alone. Participants then took part in a 75 minute retrospective interview.

3.5 Data Analysis Method

For our data analysis we used the constant comparison methodology taken from Glaser's grounded theory of qualitative analysis [9]. An initial team of 4 researchers collectively analyzed the data and derived an initial coding scheme and set of classification rules; a second team of six researchers then re-analyzed the data through eight rounds of cross comparisons and concurrently made revisions to the scheme and coding to arrive at 100% agreement amongst all researchers for all participants.

4. FINDINGS

We first describe the framework of motivations, behaviors, and physical settings that gave us a framework for understanding mobile Internet use by this audience. We then discuss patterns relating motivations to behaviors and relationships between motivations and settings.

4.1 A framework for understanding use

Our analysis uncovered a set of distinct motivations and behaviors in mobile Internet use.

4.1.1 Classification of Motivational Data

For classification of motivational data, we expanded the broad characterizations of Utilitarian and Hedonic identified by Kim et al [6] as follows: under Utilitarian, we identified the motivations of Awareness and Time Management, and under Hedonic, we identified the motivations of Curiosity, Diversion, Social Connection, and Social Avoidance.

Motivation 1. Awareness: The desire to stay current, to keep oneself informed in general. Examples: scanning email and checking news sites.

Motivation 2. Time Management: The desire to be efficient, to manage projects, or get things done. Examples: looking up an address; checking traffic maps; looking for supplies/ jobs/ roommates; getting instructions for a class assignment.

Motivation 3. Curiosity: The interest in an unfamiliar topic, often based on a tip or chance encounter. Examples: looking up information about a country of interest; looking up information to settle a friendly bet in a bar.

Motivation 4. Diversion: The desire to kill time or alleviate boredom. Examples: browsing favorite sites; checking social networking sites.

Motivation 5. Social Connection: The desire to engage with other people. Examples: arranging to get together;

sending email; posting to social networking sites; seeking information as a group.

Motivation 6. Social Avoidance: The desire to separate oneself from others, to appear occupied so as not to be bothered. Examples: using cell phone activity as a “cover” to prevent others from striking up a conversation.

4.1.2 Classification of Behavioral Data

Our analysis of Web information usage agreed with the following categories identified by Kellar et al [10]: Information Seeking (fact finding, information gathering, and browsing); and Information Exchange (transaction and communication). In addition we observed status checking, action support/in-the-moment, and action support/planning behaviors. Our final behavior categories were as follows:

Behavior 1. Status Checking: Checking a specific piece of non-static information. Examples: weather; news; sports scores (during a game); email/Facebook for a new message; a repeat visit to the same site to see what’s changed.

Behavior 2. Browsing: Trolling for new information of interest without any apparent goal. Examples: following site links selected on the fly.

Behavior 3. Information Gathering: Looking up information about a particular topic. Examples: searching multiple sources about a band; finding information about a news topic or a country; seeking information for the common interests of a social group.

Behavior 4. Fact Checking: Checking a specific piece of static information. Examples: who starred in a movie; the definition of a word; sports scores (after the game is over).

Behavior 5. Action Support/In-the-Moment: Seeking information to aid the immediate course of action. Examples: checking to see the movies/times while walking to the local theater; looking up the driving directions for a business to run the next errand.

Behavior 6. Action Support/Planning: Seeking information to support future action. Examples: picking a movie to attend tomorrow; checking the weather for a weekend trip; planning a social event with others.

Behavior 7. Transaction: Exchanging information with another person or an institution to conduct an exchange of financial resources, goods, or services. Examples: an e-commerce purchase or bank transfer.

Behavior 8. Communication: Engaging in a two-way sharing of information with another person or group. Examples: communicating through email; using social networking sites to respond to others’ posts; posting pictures/text with the expectation of sharing.

4.1.3 Classification of Physical Settings

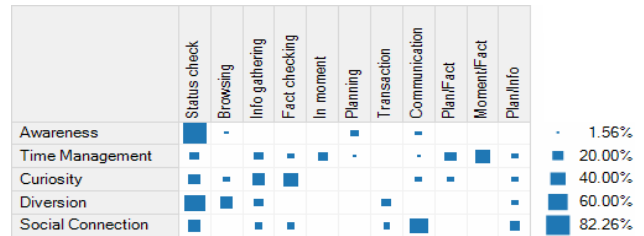
Participants used the mobile Internet in 10 distinct physical settings: on transit (in or waiting for bus, taxi); walking; work; service facility (restaurant, bar); store; recreation site

(bowling alley, park bench); home; other’s home; car driver (stopped or moving); and car passenger.

4.2 Patterns of Motivations and Behaviors

We found patterns of motivations and behaviors exhibited across all participants (see Figure 1). (Social avoidance was omitted from the figure because it was rarely reported.)

Figure 1. Percentage of behaviors exhibited by motivation



Awareness was the most frequent motivation, usually satisfied with Status Checking behavior. Participants used a support aura of information – such as email, news, and MySpace -- to maintain a sense of broader connection to the facets of the world most important to their lives.

Time Management was primarily satisfied by two similar pairs of behaviors: In-Moment/ Fact Checking or Planning- / Info Gathering. Participants made remarkably efficient use of time to support the decisions affecting daily actions. *...on the way to the movies and we didn't know which movie theater we had to go to....*” (Participant 4)

Curiosity was satisfied through a range of different Info Seeking behaviors that varied depending on the scope of the topic of curiosity. *”I really like being able to, when I ...want to know more about it, just picking up my phone and finding out immediately”* (Participant 2).

Diversion was satisfied with a broad range of behaviors. It was typically exhibited by a habitual use of the mobile Internet to fill idle time. *“Any time where I'm just like waiting for someone to finish up or I've got 10 minutes to spare.”* (Participant 2)

Social Connection was satisfied through Info Gathering and Communication behaviors, typically by sharing information with friends via email or social networking site posts, and sometimes in person as a means to enliven the group experience. *“Just to see if anyone has invited me to anything ...write to somebody...see what other people are up to, how their lives are going.”* (Participant 5)

Social Avoidance, while rarely reported explicitly, was exhibited by participants as an exclusionary tactic for those riding public transit or in public service facilities. *“There was a guy next to me who...and I just pretty much used my phone as a buffer.”* (Participant 8)

Across all of these motivations and behaviors, we observed two key cross-cutting patterns:

Wandering eye. Participants would start out with one motivation and wander in one or more others (e.g. Awareness leading to Time Management). *“As I was*

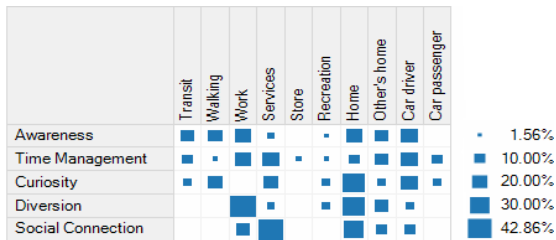
walking I remembered I had to look on eBay, and then looking at one thing led to another.” (Participant 5)

Opportunistic access. Mobile Internet sessions are frequently short, conducted in between, around, and sometimes in conjunction with the many activities of people’s daily lives (even driving).

5 Relationships Between Motivations and Settings

We examined the relationship between the session motivations and their physical settings (see Figure 2). A great amount of activity took place at work, home, and alarmingly while acting as the driver of a car. People used their phone frequently even when a computer or laptop was available because of comfort and convenience. “it sounds pretty lazy, but instead of having to get up off the couch...I just did that thing and got the sports score.” (Participant 1) Most participants indicated that they read email and blog postings on their phone but wait to respond until at a PC unless it is something really urgent.

Figure 2. Percentage of settings for each motivation



6. DISCUSSION

Based on our preliminary findings, mobile Internet usage by this audience is seamless and superficial: users constantly skim along the surface of Internet information, monitoring and sampling information opportunistically to meet unfolding needs and impulses.

Participants showed a strong need to maintain an ongoing **situational awareness** through a support aura of information and connection each had constructed for themselves.

Participants were also making remarkably **efficient use of time** by utilizing information from the mobile Internet to inform and support active decision-making

Participants made active use of the mobile Internet to **locate and access maps** for directions for Action Support both in advance and en route.

We observed a fairly sizeable portion of people’s mobile Internet time was occupied by **distraction during idle time** to relieve boredom through monitoring a wide variety of information.

We also observed people “**side-barring**”-- accessing the mobile Internet while with other people because they were not interested or participating in the particular event taking

place (watching a movie, playing a basketball game, practicing with a band).

We also observed was people using the phone as a means to **enliven the group experience** and connect with other people in person.

In addition, we saw the mobile Internet being used in a social context as a tool for **supporting group discussion** (e.g., settling a factual argument in a bar with friends). “The truth is right here. I got the truth right here in my hand, buddy.” (Participant 13))

The cell phone is a **supplement to the stationary Internet** when access is either restricted or inconvenient. With mobile Internet access, people stay continuously connected to the information most important to them, providing flexibility in how and where they consume content. People value quick, short bursts of information on the mobile Internet and are willing to wait for the stationary Internet to access lengthy or complicated content.

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