
A Framework for Understanding Mobile Internet Motivations and Behaviors

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Abstract

Why do people access information via the mobile Internet? This qualitative study examines a group of active users and proposes a new preliminary framework for understanding their motivations and behaviors.

Keywords

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

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

What makes people access the Internet on their mobile phones? What would improve their experience? The mobile industry is seeking answers to help improve the ease of mobile services and speed adoption of mobile Internet services (only 15% of U.S. users accessed mobile data services in 2007, Jupiter Research) [4].

Past research on mobile Internet use focuses mainly on *what* and *how* people access. Understanding the *why* requires a deeper picture of what drives people to incorporate mobile Internet access into their daily lives. This study examines an active group of mobile Internet users and, through rigorous analysis of qualitative data, derives a preliminary behavioral and motivational framework for understanding mobile Internet use.

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Figure 1. Participant's personal mobile phones

This detailed classification scheme will help the mobile design and development community, as well as the research community, by offering a greater understanding of the complex motivations and patterns of current mobile Internet user experience. This will help us improve the user experience and create more relevant, tailored and useful services for the future.

Previous Research

We reviewed past studies of mobile Internet use and adoption, as well as qualitative studies of mobile technology and stationary Internet use, to illuminate our research question. Studies investigating the use of mobile Internet have been primarily quantitative and conducted outside of the U.S. (i.e., in Asia and Europe).

A Korean study examined personal use (standing/ moving/ sitting) vs. environmental use (alone/ with people), as well as utilitarian vs. hedonic intentions, and high vs. low emotions [6]. The results showed that people used mobile Internet most often when they felt joyful and were in a calm and quiet environment.

A study in Japan examined factors influencing mobile adoption: context of use (home, 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) [3]. Participants reported an increased level of sociability from mobile use compared to stationary Internet.

A study of information access via the stationary Internet provided classifications of Internet behavior exhibited in stationary Internet usage [5]. These researchers made use of semi-structured interviews to

better understand the types of information users monitor and the characteristics of different activities.

Drawing on reported episodes of mobile video behavior, a study of mobile video use identified the social motivations and values underpinning those behaviors [7]. The findings characterize mobile video consumption beyond the simplistic notion of viewing TV to kill time and identify possible innovations to better serve those activities.

Mobile voice-mail diary studies have proven successful in capturing richer contextual information in mobile settings [1]. Our qualitative study demonstrates how diary studies can be combined with retrospective interviews to bring a richer understanding of the motivations for mobile Internet use.

Study Method

We tracked 11 early U.S. mobile Internet adopters who have actively incorporated the mobile Internet into their personal (rather than business) lives using their own personal phones (see Figure 1). Participants included an approximately equal number of males/females, 18-24/25-34 year olds, and smart phone/regular phone users from the four major U.S. carriers. Over a five-day period, participants recorded brief voice-mail messages describing their Internet access sessions immediately following use, and then completed a 90-minute retrospective interview.

For our data analysis we used the constant comparison methodology taken from Glaser's grounded theory of qualitative analysis [2]. A team of six researchers each analyzed data from a subset of participants. The team then collectively devised the classification scheme

based on the motivations and behaviors observed from the voice-mail entries and interview sessions, coded their participant's data using the agreed upon scheme, conducted a cross comparison with two other researchers' data sets, and collectively revised the scheme. We conducted eight rounds of cross comparison and concurrently made revisions to the scheme and coding to arrive at 100% agreement amongst the researchers.

A Framework for Understanding Use

Through careful analysis of each session, we uncovered distinct motivations and behaviors and frequent combinations to derive our proposed scheme.

Classification of Motivational Data

For classification of motivational data, we explored the broad characterizations of Utilitarian and Hedonic identified by Kim et al [6] and determined the need to define finer classifications to accommodate the complex patterns of motivation we observed (see Table 1).

Utilitarian

1. Awareness
2. Time Management

Hedonic

3. Curiosity
4. Diversion
5. Social Connection
6. Social Avoidance

Table 1. Motivational classifications

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.

Classification of Behavioral Data

We adopted several Web information classifications from Kellar et al [5]: Information Seeking (fact finding, info gathering, and browsing); and Information Exchange (transaction and communication). In addition we observed Status Checking, AS/Planning and AS/In-the-Moment behaviors (see Table 2).

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, Craigslist for updated information; 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 or validating a specific piece of static information. Examples: who starred in a movie; the definition of a word; sports scores (after the game is over); business address or phone number; and map or directions to a location.

Behavior 5. 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. Planning: Seeking information to aid events beyond the immediate course of action. Examples: picking a movie to attend tomorrow that night; checking the weather for a weekend trip; collectively 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 that it will be shared.

Info Seeking

1. Status Checking
2. Browsing
3. Information Gathering
4. Fact Checking

Action Support

5. In-the-Moment
6. Planning

Info Exchange

7. Transaction
8. Communication

Table 2. Behavioral classifications

Classification of Physical Settings

Our participants used the mobile Internet in 10 distinct different physical settings (see Table 3).

Findings

Patterns of Motivations and Behaviors

Common patterns of motivations and behaviors exhibited themselves across all participants (see Figure 2). Social avoidance was omitted because it was rare.

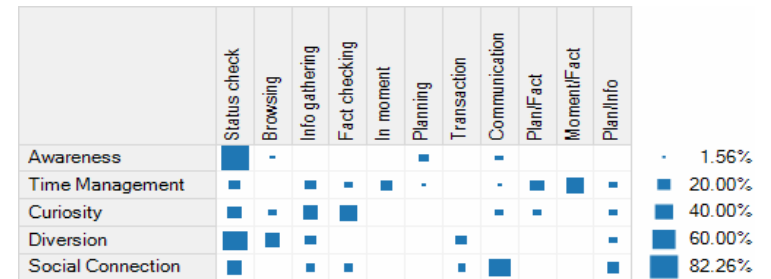


Figure 2. Percentage of behaviors exhibited for each motivation

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. "...to figure out the local weather, as well as the local news...checking my e-mail." (Participant 12)

Time Management was primarily satisfied by two similar pairs of behaviors: In-Moment/Fact Checking or Planning/Fact Checking. 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...we were in the car." (Participant 4)

1. On Transit (in or waiting for bus, taxi)
2. Walking
3. Work
4. Service Facility (restaurant, bar)
5. Store
6. Recreation Site (bowling alley, park bench)
7. Home
8. Other's Home
9. Car Driver (stopped or moving)
10. Car Passenger

Table 3. Classifications of physical settings

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 am interested in something and I want to know more about it, just picking up my phone and finding out immediately. I love that."* (Participant 2)

Diversion was satisfied with a broad range of behaviors. It was typically exhibited, though not always reported, 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 Status Checking 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)

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).

Relationships Between Motivations and Settings

We examined the relationship between the session motivations and the physical settings in which they took place (see Figure 3). A surprising 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. *"I mean it sounds pretty lazy, but instead of having to get up off the couch, or off the edge of the chair, I just did that thing and got the sports score."* (Participant 1)

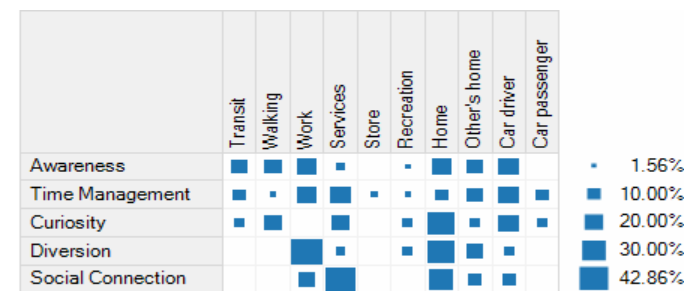


Figure 3. Percentage of settings for each motivation

Study Implications

Personas. Understanding how motivations translate into behaviors provides a deeper understanding of user goals and allows designers to create real-world user scenarios tied directly to those goals. The data from this study will allow the creation of detailed mobile Internet user personas situated in realistic contexts to help inform better design.

Non-mobile services. Much recent mobile product design has focused on location-aware applications for use on the go. Since people are frequently using mobile Internet in non-mobile settings, more valuable mobile Internet services can be targeted to stationary settings.

Custom content aggregation. Our early adopters reported combining a host of different browsing and searching interfaces, showing a willingness to piece together a patchwork of information that fits their complex and multi-motivational goals. The effort required for this re-articulation of technology has been a major deterrent in the mass adoption of mobile Internet services. Aggregating content of interest from multiple sources, and for use in specific settings (e.g., home, work, transit) into a single location with a consistent interface would provide tremendous value.

CONCLUSION/FUTURE WORK

Our proposed framework provides the mobile design, development, and research communities with a valuable tool for further study of mobile Internet use and for creating product and services that improve the mobile Internet user experience.

Our team plans to conduct a follow up qualitative study of a similar size to validate the motivations and behaviors and to enhance our classification scheme. Our interview protocol will be refined to elicit more detail about context and the outcomes for each behavior. We are reviewing the use of mobile survey tools to help capture additional detail on context and user intent. We are also considering the domain of mobile content beyond mobile Internet information, as well as design explorations of new product design concepts and a parallel study in another country.

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