EXPLORING THE MOMENT OF CONSUMPTION USING CELL PHONES

Satoshi Hosoe
Keio University Graduate School of Media and Governance
sat@sfc.keio.ac.jp

ABSTRACT

Most mobile commerce strategies focus on "pushing" information onto consumers through wireless media devices such as cell phones. However, if marketing or consumer researchers direct their attention toward the latest developments in cell phone technology, such as internet accessibility and built-in digital cameras, they may discover its potential for "pulling" information from consumers. This paper introduces an alternative use of cell phones—the capturing of scenes of ongoing consumption moments by using a Web-based database system, which could lead to a better understanding of consumer behavior. Inspired by a unique data collecting process termed as the Experience Sampling Method, the study succeeds in developing a system for recording its informants' consumption as "data in progress." Text and image data are recorded with internet accessible cell phones, wirelessly transmitted to a database, and used for real-time analysis by an observer group. The paper presents several case studies from Japan in order to prove that the cell phone is a powerful tool for gathering micro-ethnographic data of the daily experiences of consumers.

Keywords: Experience sampling method; Mobile technology; Postmodern consumer behavior research

1. Introduction

This paper proposes and illustrates a new approach to marketing or consumer research directed toward exploring the moment of consumption by using mobile communication media such as cell phones, which are used widely by the Japanese.

In the past decades, consumer researchers have broadened the definition of "consumption" beyond a simple process of choosing products; it now includes the entire experience of selecting, using, and disposing products. With increasing awareness and acceptance of the concept of "postmodern marketing" [Holbrook, Hirschman, Belk, et al., 1991], qualitative research methods have come to the fore to explore the consumption phenomena that people encounter every day. Research methods from other disciplines such as sociology and anthropology have been introduced to interpret these phenomena. However, in many cases, commonly used qualitative research methods such as questionnaire inquiry, in-depth interview, and participant observation remain stranded in old media environments, thus restricting the process of capturing the real life activities of consumers. For instance, questionnaire surveys and interviews often take place in a social or cultural vacuum (e.g., meeting rooms and laboratories), where it is difficult to observe ordinary human behavior. Similarly, these methods are usually designed to gather data before or after an action occurs and not while it is occurring. Thus, traditional research methods lack the ability to capture the consumption experience as it happens in the real world. One of the reasons for this deficiency is related to the functionality of the media being used for the research. The primary process of data collection and analysis is limited by the mediocre questionnaires used for the surveys.

2. Research Questions

The abovementioned trends in postmodern consumer behavior studies and the deficiencies in traditional qualitative research tools gives rise to the following questions:

1. Can consumer researchers develop an alternate approach to better explore consumption phenomena by adopting new media such as mobile communication technology?
2. If yes, what types of media systems should be designed for effective data collection?
3. What research strategies should be put into practice to observe consumption phenomena as it happens in the real world?
4. What are the pros and cons of using mobile technology to capture the daily consumption experience of an informant?
5. How will this approach impact those engaged in mobile marketing services and enhance their business opportunities?

3. Conceptual Framework

3.1 Mobile Communication Environment

Over the years, the communication style of the Japanese has changed drastically due to the broad diffusion of cell phones. Statistical reports show that more than 60% of the Japanese use multipurpose cell phones on a daily basis (2003). Today's typical cell phone comes equipped with Internet applications, a built-in digital camera, and a colored LCD. These features enable users to exchange not only text messages using SMS (short message service) but also e-mails with attached digital image files. For the younger generation in particular, the mobile phone has become the fundamental mode of communication and is used on a daily basis.

From the viewpoint of marketing or consumer researchers, this widespread use of cell phones indicates a possible alternate research style that will utilize the mobile media environment as an interface to capture human behavior. For all practical purposes, mobile communication technology is already being used in other disciplines. For example, fieldworkers are aided by handheld computing devices and GPS [Pascoe, Morse, and Ryan, 1998]. Since these devices are portable, they enable researchers to exchange data under any circumstances, thus freeing the research scheme from the constraints of time and space. If an appropriate system is designed, intriguing data on human behavior could be collected, which is not possible with the traditional approaches.

Unfortunately, recent mainstream developments in the field of mobile marketing focus either on ways to compel consumers to spend more money via their cell phones (mobile commerce) or on ways to push information onto consumers through cell phones (mobile advertising). Very few examples that illustrate the use of the cell phone as a tool for exploring the daily activities of consumers can be found.

3.2. Experience Sampling Method

The Experience Sampling Method (ESM) is a unique research procedure that was originally designed by Mihaly Csikszentmihalyi (1975) in his pursuit of "optimal experience" (better known as "flow experience"). The ESM is a quasi-naturalistic method that involves signaling informants at random intervals throughout the day, often for a week or two, requesting them to report the nature and quality of their experience.

In a typical ESM procedure, informants carry a set of survey sheets and beeping devices (pagers) during the entire research period. The pager is programmed to beep at random; whenever it beeps, informants fill out the survey sheet, briefly describing their activities and emotions at that moment. The unpredictability of the intervals between the answering cues forces the informants to go about their usual daily routines.

The most important aspect of the ESM is that it urges informants to keep a short record of their actions and emotional states while the actual activity is still in progress. As Russell T. Hurlburt and Christopher L. Heavey (1996) point out, the significance of the ESM lies in "freezing informants' ongoing experience and writing a brief description of the moment." This method enables the exploration and recording of the informants' daily activities and the fluctuation of their emotions from a micro-ethnographic perspective. It enables the collection of clusters of vivid live recorded "situations" that informants encounter in their daily environments.

This approach has been applied to various IT development activities and is commonly used to measure user experience by tracking the users' longitudinal interaction with media systems. The ESM was originally developed for the measurement of "flow experience"; Chen and Nilan (1998) used it to study how a user's flow experience is evoked while browsing Web sites on the Internet. Henderson et al. (2005) used the ESM to remotely survey network users and to collect data that could not be provided by ordinary network monitoring. It is also practical to use the method to gather qualitative user feedback during the engineering of a prototype system by checking process conformance, understanding problem-solving processes, identifying problems, and understanding the users' perception of the prototype experiments in real time [Karahasanoviæ et al., 2005]. "Experience Clip (2004)" and "Moment: MObile Messaging and EvalutioN Tool (2005)" are good examples of how the ESM was implemented to evaluate mobile services used in real-world environments. Consolvo et al. (2005) used the ESM to study the privacy concerns of location-based services and explored how users were willing to disclose their location information. The aim of the study was to discover the rules of managing privacy issues. The results revealed that the most important factors were as follows: who was requesting for the information, why the participant's location was required, and what level of detail would be most useful to the agency that was making the request.

From these studies, it can be inferred that the recent ESM approach has been used for the assessment and identification of problems in the early stages of prototyping mobile systems or services, and it is easy to predict that it will continue to be used for the testing and implementation of these services. However, these precedent studies focus on the use of the ESM only as a "media system evaluation"; there are surprisingly few examples where it has been adopted to explore consumer behavior.

4. Development of a Data Collecting System

The system introduced in this section integrates cell phone messaging services and Web-based databases with

the aim of using the ESM approach. The system is designed for the following purposes:

- "Barge in" inquiry messages to the informants' cell phone (as was done in the original ESM studies) enquiring into the nature and quality of their ongoing experience at the moment
- Capture the informants' situation as qualitative data by engaging them to report what they are doing and how they are feeling at the moment by using text messages and digital images
- Store these data into the database in real time so that the observer group can practice instant or temporal analysis

The basic architecture of this method requires the following media systems:

- Compact wireless communication devices (such as cell phones) to be used as data collecting interfaces for the informants to input and transmit their data
- Internet servers (such as mail and Web servers) to be used to establish communication between the observer groups and the informants
- Web-based RDBS required for storing, organizing, browsing, and sorting of collected data, enabling the observer group to view and discuss them

The following technologies were used for the development of the prototype system:

- Cell phones with built-in digital cameras and Internet access that enable the direct exchanging of e-mails
- File Maker Pro 5 Unlimited version (with RDBMS and HTTPD) as the database server
- CDML (Claris Dynamic Markup Language) for designing the user interface

Figure 1 presents an overview of the system.

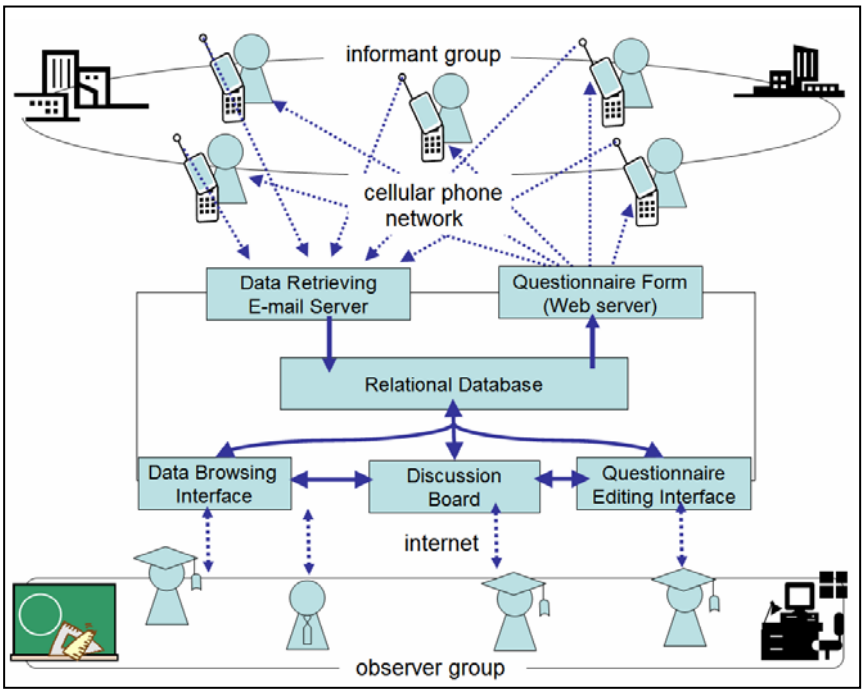
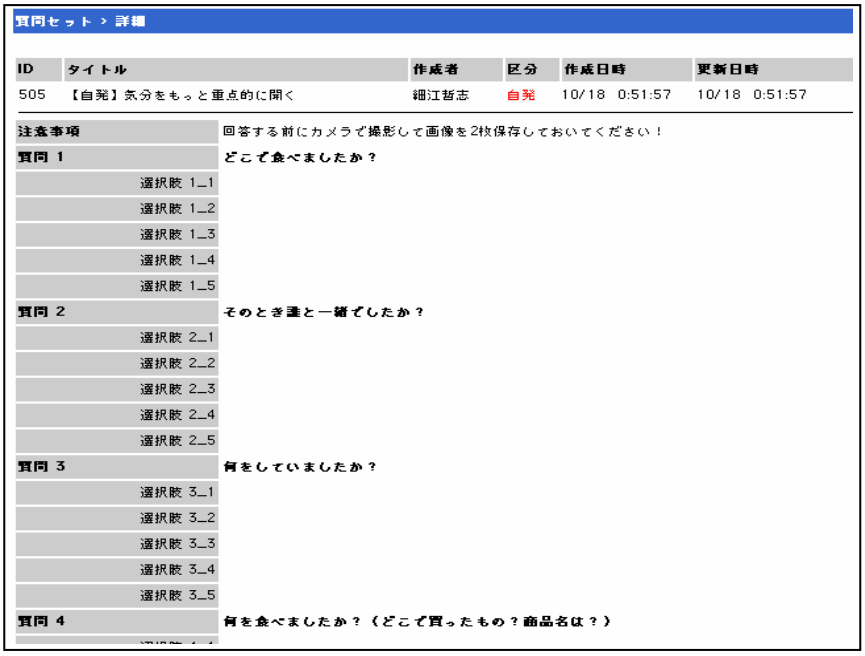


Figure 1. Overview of the system.

Figure 2 is an illustration of the questionnaire Web page displayed on an informant's cell phone. Each informant is provided with unique URL for accessing the Web page. The informant is instructed to access his/her page (ordinarily by using the bookmark function on the cell phone's Web browser), and input the required information each time s/he receives a request signal transmitted from the observer group.

The questionnaire Web pages (which informants access to input their data) are created using the questionnaire editing screen shown in Figure 3. This screen is generated by the Web-based database server. The members of the observer group can access this page from their PCs to edit initial questionnaire sets and modify them anytime during the research period. Whenever the observer group modifies the new questionnaire set, the questionnaire items are dynamically rendered into C-HTML Web pages so that the latest updates are always displayed on the informants' cell phones. The observer group can also schedule the intervals between the request signals using this screen.

Figure 2. An example of a questionnaire displayed on an informant's cell phone.



質問セット > 詳細

ID	タイトル	作成者	区分	作成日時	更新日時
505	【自発】気分をもっと重点的に聞く	細江哲志	自発	10/18 0:51:57	10/18 0:51:57

注意事項	回答する前にカメラで撮影して画像を2枚保存しておいてください！
質問 1	どこで食べましたか？
選択肢 1_1	
選択肢 1_2	
選択肢 1_3	
選択肢 1_4	
選択肢 1_5	
質問 2	そのとき誰と一緒でしたか？
選択肢 2_1	
選択肢 2_2	
選択肢 2_3	
選択肢 2_4	
選択肢 2_5	
質問 3	何をしていましたか？
選択肢 3_1	
選択肢 3_2	
選択肢 3_3	
選択肢 3_4	
選択肢 3_5	
質問 4	何を食べましたか？（どこで買ったもの？商品名は？）

Figure 3. Questionnaire editing page

When the informants submit data from their cell phones, the data are immediately transmitted and stored in the database for the observer group to view. Shown in Figure 4 is the main console of the system, where the observer group views the collected data in real time.

The default screen of this interface shows a digest of the collected data, aligned in chronological order. The pull-down menus on the left frame are used to sort the data by name of informant, date and time, or questionnaire item. The questionnaire sets and the informants' submitted data are automatically linked in the database, enabling the observer group to conduct tentative qualitative analyses. This data browsing page can be viewed from ordinary Web browsers, which implies that the members of the observer group do not have to be in the same laboratory room; they can collaborate from remotely separate locations.

Since the collected data comprise a large number of texts and images, the system is designed to assist the observers in interpreting and analyzing these qualitative data. For example, by clicking each data button in the default console screen, observers can view further details, as shown in Figure 5. In addition, the observer group can pick out specific data sets by using key words and add comments on each data, which are useful during lateral

analysis.

Figure 4. Main console of the system.

The system also includes an online discussion board (Figure 6). This feature enables the observer group to discuss the larger issues concerning the proceeding research: members can exchange opinions or consult each other about plans for the next questionnaire. The informants' data can be quoted so that the observer group can easily understand which particular data set is being discussed.

Figure 5. Details of a single data set.

What is Strategy," *Harvard Business Review*, What is Strategy," *Harvard Business Review*,

Figure 6. Online discussion board

5. Exploring the Moment of Consumption

Using the system described in the previous section, this section examines some case studies that were conducted between 2000 and 2005 in Japan. Due to space limitations, only partial data have been presented. The data were originally written in Japanese; therefore, the author has translated them into English.

5.1. Preparation

In each of the case studies, the informants were recruited informally from Keio University, Japan. All of them are undergraduate students between 19 and 23 of years of age. An even number of male and female informants participated in most of the case studies. The research period of each study varied from 7 to 14 days, depending on the topic of research.

The informants were given simple instructions; they were to spend their days routinely during the research period; however, whenever they received a request signal or encountered a targeted experience related to the research, they were required to answer the questions displayed on their cell phones.

To capture the informants' situation as accurately as possible, the following questionnaire items were transmitted to their cell phones. The date and time were automatically logged in by the system.

- Place, a description of where the informant was at that moment.
- Who the informant was with.
- Brief description of what the informant was doing
- Subjective quality of the experience at the moment

Following up the above basic information, the observer group sometimes added extra questions based on the theme of the research.

The informants were also requested to take two pictures with the digital camera installed in the cell phone at the time of recording the data: one of their facial expression and another representing their situation.

The instruction on each study was given carefully at the briefing session, which took place two days before the actual research period, thus allowing the informants sufficient time for learning the cell phone manipulation procedure.

In most of the case studies, an observer group that included members of a marketing company and consumer researchers from Keio University was organized. During the research period, the role of this observer group was to examine the collected data constantly and provide temporal interpretation comments from each perspective. Since the members of this group were located across the Greater Tokyo Metropolitan Area, they constantly exchanged information through the system's online discussion board.

5.2 Case Study #1: Convenience Stores and University Students (2000)

Convenience stores are popular with the Japanese youth and can be seen on any street block. However, market expansion began to weaken around the year 2000. At that time, the planners were beginning to feel that convenience

stores should be more than "just convenient" and were seeking a new marketing concept. While commonly used statistic research approaches such as POS analysis may provide objective answers to questions like "Who buys what," marketers were seeking answers to questions like "What do consumers expect convenience stores to be like?"

To widely explore the consumers' expectations of convenience stores, the observer group sent 5-8 request signals a day to 10 informants for a period of 7 days. In addition to the four basic questionnaire items, the observer group supplied questions such as "What do you think about convenience stores?" and "What kind of convenience stores would you wish to visit if you were to shop at the moment?" Figure 7-Figure 10 show example data from this research.

2000/04/21(Fri) 12:26
At my part- time job
With my friends from work
Having lunch
I want to eat now!
Food sold the convenience store appears to be unhealthy.


Figure 7. "Convenience Store Research" – Example 1

2000/04/22(Sat) 18:27
At home
Alone
Reading a book
Awake, and beginning to feel motivated
Convenience stores don't sell decent stuff


Figure 8. "Convenience Store Research" – Example 2

2000/04/24(Mon) 11:14
In Shin-Yokohama
With my boyfriend
I feel "fresh"
We are going to eat, but we will not drop by at the convenience store.


Figure 8. "Convenience Store Research" – Example 3

2000/04/21(Fri) 22:38
At the subway station
Alone
Buying a ticket
Tired, disgusted
Convenience stores are stereotypical and boring


Figure 10. "Convenience Store Research" – Example 4

Unfortunately, since the observer group simply sent request signals at random intervals throughout the research period, they failed to capture the actual scenes of the informants in their role as consumers at the convenience stores. (There were many other scenes where the informants were shopping at different types of stores, such as supermarkets and coffee shops.) However, browsing of the collected data led to a stimulated discussion among the marketing researchers because it was their first opportunity to monitor the vivid illustrations of the lifestyles of the informants (consumers) in this manner. For example, the tendency of the informants to think that a convenience store is an "unhealthy place" came as a surprise to some marketing researchers because most advertising campaigns

had emphasized the energetic and brisk atmosphere of the stores. The informants disliked the junk food sold at the stores, and some thought that the "shiny fluorescent lights in the store were too intense" as compared to "healthy daylight." A number of informants commented that 24-hour convenience stores are strongly related to their "nocturnal activities."

Another interesting discussion took place when the observer group looked into scenes of the informants returning home, such as those shown in Figure 11-Figure 13.

2000/04/22(Sat) 21:44
In Seijo
Hurrying back home
Introspecting. Thinking about what I have been doing lately.
I wonder why the convenience stores redecorate the interiors so often. The previous one was better.


Figure 11. Scene of informant returning home – Example 1

2000/04/22(Sat) 18:21
On the street
Alone
Walking
Tired
I feel like going to the convenience store to buy sweets.


Figure 12. Scene of informant returning home – Example 2

2000/04/25(Tue) 21:14
Near the local train station
Alone
Refreshed
I want to go to the convenience store.
I'd like to go to CVS, where the shop attendants do not bother you, and which is not a hangout for bikers.


Figure 13. Scene of informant returning home – Example 3

These scenes are very familiar to the Japanese because the transportation system relies heavily on trains; many people walk back home from the train stations. Figure 13 gave one market researcher the impression that "the convenience signboard" appears to serve as a "beacon to guide informants back home."

These discussions and interpretations gave a marketer the idea that convenience stores, instead of being "just convenient," should incorporate more of a healing (or mending) function for customers who are weary after long and busy days.

5.3. Case study #2: Capturing Meal and Snack Consumption Scenes (2001)

"Capturing Meal and Snack Consumption Scenes among Japanese Female University Students," a study conducted in 2001, is a good example of the successful use of cell phones in collecting data. The purpose of this study was to determine if marketers could find a new niche market by closely observing the daily food choices (such as meals, desserts, and between-meal snacks) of female consumers. In fact, the theme of the research originated as a result of discussions during case study #1. When the project members closely compared the food consumption scenes of female and male students in that case study, they noticed that the "eating scenes" were slightly different—the scenes of food consumption of the female students appeared to be much more colorful and fancy than those of the male students.

Figure 14. A comparison of food consumption scenes between female and male students.

Inspired by these findings, the observer group conducted a study by asking another set of 16 female students to document their experience whenever they ate or drank. The observer group did not send out request signals at random intervals in this study, since its theme was exclusively the food consumption experience. This study continued for 14 days.

The observer group was able to view different types of "food consumption scenes." Figure 15-Figure 18 show the examples. Some girls ate alone in their apartments, while the others attempted to "gang up and conquer the Italian restaurant" with friends. Sometimes, they ate traditional Japanese meals; at other times, they ate Western ones. Many of the students spent busy days in school, which forced them to eat while walking to the university, or inside a crowded train.

2001/10/12 21:38:45
Alone at home
Cooking and having dinner by myself
Mackerel grilled with sweet Japanese rice wine
Delicious!

Figure 15. Eating alone at home

2001/10/15 15:11:31
In front of a pond on campus
Chatting with a friend
Fun
Ice cream

Figure 16. Eating outside with friends

2001/10/19 23:11:30
Italian restaurant in Yokohama
Celebrating my birthday with friends
Having Italian dinner. Salad, pasta, pizza, risotto, Bavarian cream cake.
We wanted to conquer Italy! It feels great to be surrounded by friends


Figure 17. Ganging up to conquer the Italian restaurant

2001/10/17 16:07:58
On the train by myself
Eating Bean-jam bun, drinking oolong tea
Tired


Figure 18. Eating inside a crowded train

This study began with no detailed instructions on what objects should be pictured in each digital image. As the study progressed, a market researcher complained that the data would be worthless if the actual product package or the brand name could not be viewed. After this discussion, which was conducted using the system's online bulletin board, the observer group decided to alter the questionnaire and request informants to take pictures of the actual product, if possible. This adjustment of the questionnaire sets resulted in the capturing of scenes where the informants consumed various branded food products such as instant Chinese food, Doritos, Banana-milk, etc. The examples are shown in Figure 19-Figure 21.

2001/10/24 21:10:33
In my room
Alone
Having dinner
Hoi-Ko-Ro (Chinese food)
I felt like eating Chinese food.
Delicious! I'm feeling sleepy.
It was a tough day.

Figure 19. A scene with a picture of the actual product (instant Chinese food)

2001/10/21 22:06:19
Home
With my family
Browsing Web sites
Cheese Doritos and raisin cinnamon donuts.
Sleepy
I was tired all day.


Figure 20. A scene with a picture of the actual product (Doritos)

2001/10/16 11:487:35
At the school cafeteria
With my school friends
Wasting time
Fun
Bread, Banana-milk

Figure 21. A scene with a picture of the actual product (Banana-milk)

By observing these "moments of food consumption," the market researchers came up with several interesting marketing ideas. For example, when the group browsed for scenes related to "eating and studying," they found that much of the image data showed informants sitting in front of their PCs, working on their term papers, exchanging e-mails, and accessing Web sites. Based on this observation, a market researcher proposed an advertising campaign that linked Web banners and product package design.

Another interesting finding was made when the observer group focused on yogurt consumption scenes. The group noticed that much of the data showed informants "eating alone" (for example, Figure 22-Figure 23). Perhaps one of the reasons for this is that yogurt is generally eaten as part of breakfast, and many of the informants lived alone. Based on this observation, the group inferred that yogurt relieves dullness and might be thought of as "healing food" or "comfort food."

2001/10/16 12:18:19
Home
Alone
Having breakfast
Feeling Sad
Salad, bread, and yogurt

Figure 22. Yogurt consumption scene – Example 1

2001/10/23 11:26:22
Alone at the campus cafeteria
Eating lunch in my spare time
Ham and egg sandwich, yogurt purchased from the campus store
This is brunch. I chose something gentle for my stomach.
Relaxed
The weather is good; it makes me sleepy.

Figure 23. Yogurt consumption scene – Example 2

5.4. Case study #3: Comfortable Place for Me (2003)

The purpose of this research was to investigate which places in the Tokyo metropolitan area are frequently visited by young residents of the city during weekdays, and the kind of subjective emotional experiences they encounter in each of these places. A researcher added a simple question to the four basic questions of the ESM: "How comfortable is the place for you at the moment?" The informants answered using 5-point scales. Eighteen informants participated in this study. They were sent a random request signal 5 times a day for 7 days. The examples are shown in Figure 24-Figure 27.

The informants moved from place to place in Tokyo, and their subjective scales of comfort did not appear to be affected by the physical aspects of each place. Rather, "the comfort of the place" appears to be influenced more by "who they are with," and "what activity they are engaged in." The researcher group observed a subtle tendency when they examined scenes where the informants used the public transportation system (Figure 26-Figure 27). Many of the collected scenes showed informants in transit via public transport systems such as trains and buses. In several such scenes, the informants recorded a low degree of comfort. This observation led to one researcher raising the following question: If the transportation system can afford better "comfort" to passengers, will the entire

"comfort" of the day improve, since they spend so many hours in these vehicles? This is a question to be explored in future studies.

2003/04/26 18:20:00
Roppongi Academy Hills (a famous building in Tokyo)
Seminar class of Takagi
Visiting an open class
Comfort: 5
The architectural design of this building is relaxing.

Figure 24. "Comfortable Place for Me" – Example 1

2003/04/26 13:58:00
A bank near the Hutagotamagawa River
With my friends from work
Taking a break
Comfort: 5
The weather is fine and feels good!

Figure 25. "Comfortable Place for Me" – Example 2

2003/04/23 13:35:00
In Seijo
With my friends
Waiting for a bus
Comfort: 1
My bags are heavy and it is raining.

Figure 26. "Comfortable Place for Me" – Example 3

2003/04/28 11:29:00
Shinjuku Station
Alone
On my way to school
Comfort: 1
It is noisy.

Figure 27. "Comfortable Place for Me" – Example 4

5.5 Case study # 4: Borrowing a DVD (2005)

The purpose of this study was to test whether the observer group could monitor the all-inclusive processes of "before, moment of, and after" the target consumption. We asked 5 informants to rent a video or DVD at a local store during the 3 days of the study. During this period, the observer group randomly sent request signals 3 times a day to capture the various aspects of the informants' lifestyle. The group also requested the informants to spontaneously report their data when inside the store and while actually watching the video or DVD, with brief comments on their emotions at the moment. The following figures (Figure 28-Figure 31) are examples from one of the informants' data.

This case study is based on a small trial project, but it succeeds in tracking the all-inclusive process of "before, moment of, and after" the target consumption (the borrowing and watching of the DVD). It is interesting to discover that although the informant thoroughly enjoyed selecting and viewing the product, these consumption experiences faded easily from his memory the next day.

Sat, 15 Jan 2005 22:55:18
Home
Alone
I did not go outside today; I feel unhealthy.
I think tomorrow will be a fine day, so I might as well as go outside in the afternoon.
I don't feel like watching a long DVD, so I might get something with short episodes, like a TV drama.


Figure 28. Before renting the DVD

Sun, 16 Jan 2005 12:56:10
Shonandi GEO (video rental shop)
Alone
I found the video that I was looking for.
I was looking around for a different video for about 10 minutes. Then, I realized that I had other things to do, so I borrowed the last episode of "GOKUSEN" (a Japanese TV show).
Its new season began recently, so I wanted to see it. I was lucky because this was the only one available.


Figure 29. While renting the DVD

Sun, 16 Jan 2005 21:07:44
At home
Alone
Watching the video
Since the DVD contains several short episodes, it is convenient; I can watch one at a time. Watch an episode, study for the exam, and then watch a different episode.
It's good for changing my mood, and I am enjoying it


Figure 30. While viewing the DVD

Mon, 17 Jan 2005 19:24:55
At the library in my university
Alone
Doing homework
It is really dark outside. I should go home now.
(About the video I rented) It was okay, but when I think about it now, for some reason I feel like I watched it a long time ago, not yesterday.


Figure 31. After viewing the DVD

At the interview session, which took place after the 3 days of the study, one informant made the following comments:

> *"On the first day of the study, I was worried about receiving request signals when I looked sloppy. But on the last day of the study, I felt a little sad because I would not be receiving any more signals, and I felt I could continue this for about a week. When borrowing a video (at the store), I was conscious about which video to search for because I had to take photos and record data. I ended up discovering more interesting stuff than usual. Maybe the next time I go shopping, I should carry a*

digital camera."

Many of the informants who had participated in previous case studies also had similar comments to offer. Surprisingly, for many informants, keeping a brief record of their daily activities in this manner was a "fun" activity and motivated them to continue participating in the study.

6. General Discussion

(1) The case studies presented in this paper demonstrate that mobile communication media such as cell phones can serve as powerful tools for observing and understanding a wide range of consumption phenomena as they occur in the daily lives of individuals. The sets of text messages and digital images recorded via Japanese multipurpose cell phones succeed in "pulling out" micro-ethnographic data of the everyday experiences of the informants.

(2) A combination of Internet accessible cell phones with digital cameras and Web-based databases enables researchers to question the informants from a remote location, even as the latter go about their daily routines. The informants document the nature and quality of their experience at the moment of consumption and transmit the data wirelessly to the database on the Internet, thus enabling researchers to observe these data from remote locations. Designing a media system that allows real-time browsing of these collected data creates a situation very similar to conducting in depth interviews, where the members of the target informant group go about their ordinary lives in their real environments instead of in laboratory rooms.

(3) Basing the research strategy on the original ESM, the case studies in this paper used three different strategies for data collection: random experience sampling, targeted experience sampling, and a combination of the two. Random experience sampling, such as was used in case study #1, is an appropriate strategy for problem-finding. If the researchers do not have a concrete idea of the research topic, this strategy should be employed to explore the various aspects of the informants' daily lives. Targeted experience sampling, such as was employed in case study #2, is used when the aim of the research is to capture specific actions or events. This strategy is appropriate if, for example, marketing or consumer researchers are interested in discovering the "pattern of listening to music," the "use of community facilities," or the "most attractive advertisement on the streets." The merit of this strategy is that the researchers can collect the specific scenes of a particular consumption moment. The "mixed strategy," which was employed in case study #4, may be used to monitor the all-inclusive process of "before, moment of, and after" the target consumption.

(4) The merits of the proposed alternative research approaches in this paper are as follows: First, the research scheme is unstrained by time and space, since the mobile media is used as the interface for data collection. Cell phones are personal media, especially in contemporary Japan, and are carried along everywhere, at all times. This provides the researchers with more opportunities to collect data as compared to traditional paper surveys and indoor interviews. Since the data is documented shortly after the targeted moment, there is less bias due to time as compared to similar approaches such as the diary method. Second, unlike traditional research methods with traditional research tools, a combination of cell phones and a Web-based database system enables the recording and monitoring of the activities of consumers as "data in progress," leading the research activity to evolve as it is carried out. The data captured in real time generates completely new representations of the consumption phenomena, and the researcher's interpretative analysis is stimulated by browsing, comparing, and rearranging of these data. Throughout the research, the observer group can repeatedly modify the questionnaire sets according to the significance of the data stored in the database to streamline their research interest. Finally, unlike text-only qualitative data, the photographic images taken with digital cameras on cell phones enhance the interpretation process. The informants' snapshots of their daily activities provide the researchers with vivid impressions and have a strong emotional or cognitive impact, leading to deeper interpretation and analysis.

The demerits of the research approach proposed in this paper are as follows: first, the study has only achieved success in data collection, and no significance has been observed in research results as compared to the results derived from traditional qualitative approaches. The exploration of the consumption experience via cell phones may have inspired many marketing researchers during the case studies; however, the same inspiration could have been generated by conducting traditional interviews and surveys. If so, the traditional method is sufficient for many researchers, since it is less expensive. An objective comparison between traditional methods is essential for further development of this approach. Additionally, a better approach is needed for analyzing the great amount of micro-ethnographic data collected. During the case studies, the basic approach of the researchers toward the analysis of the data was to browse and categorize data by key words and then to interpret it during an online discussion. These interpretations do lead to interesting findings; however, if the researchers are required to derive a theoretical construction from the data, a systematic analysis procedure must be established.

(5) In order to discuss the impact of this methodology in the area of mobile services, especially in the area of mobile commerce and marketing, this section illustrates how the marketers actually used their interpretation

procedure in case studies #1 and #2. The basic aim of these two case studies was to investigate how marketers can utilize multipurpose cell phones for qualitative research. Therefore, they basically utilized the collected data only to browse, add comments, and discuss matters that were in accordance with their interests. The following are some comments by marketers during the interpretation process:

> *"I know this is not a proper thing to say, but I feel like I'm looking through a peep-hole to deepen my insights into the lifestyles of the informants. The first thing I do in office is to launch my Internet browser and check the newly stored data in the database. Basically, I enjoy viewing what the informants were doing and thinking."*
>
> *"After all, in my opinion, the ultimate aim of marketing is to re-experience the other person's life in order to predict how s/he would react to certain products or advertisements."*
>
> *"Some of the images and comments sent by the informants had such a vivid impact that I thought I could use them while brainstorming with advertising copywriters."*

People working in advertising agencies or marketing companies do not necessarily have the opportunity to get close to their marketing targets. Most of them are usually busy at their desks. When engaged in the cell phone ESM, these office workers had a new opportunity, via their desktop PCs, to "peep" into the lifestyles of the distanced young informants. The informants required no tools other than familiarly used media, the cell phone; and the nature of the experiences of the younger generation was successfully captured.

In addition to these interpretations and analyses, the group of marketers also performed a brief text mining analysis of the collected data. They organized certain key words (mainly with regard to where the informants were, who they were with, what they were doing, and how they were feeling) according to the frequency of the terms being used, and then categorized them into clusters. After the rough categories were created, they searched for representative photographs of each category so that they could comprehend each grouping in a more realistic manner.

As can be seen, the case studies show that the researchers carried out only simple interpretations and analyses that could prove useful for preliminary brainstorming or problem-finding. It is obvious that this is because the purpose of the examples presented in the research was the "exploring and understanding of consumers" based on the postmodern consumer study approach. Therefore, knowledge that connects directly to managerial decisions was not constructed in these cases. In such a scenario, how can this methodology be put to better practical use to enhance mobile commerce or mobile marketing in general?

One of the answers to this can be found in the applications of "context-aware" technologies. This approach redefines computer-human interaction based on "what we do, what we have done, where we are and how we feel about it, in order to interact with the environment around us."[1] By applying the cell phone ESM approach to context-aware technologies, it is can be predicted that those engaged in mobile commerce or mobile marketing may expand the scope of their business beyond the cell phone. For example, the "MIT Home of the Future" project has developed an image-based experience sampling environment to identify and rank user needs in order to redesign home environments (2002). In this challenging case study, the project uses a combination of image-based experience sampling and conjoint analysis to measure the preferences of regular users, so that the study team can capture and prioritize their needs in redesigning the kitchen. This is an example of applying the ESM approach to investigate the designing needs that emerge in indoor environments. In accordance with the technological development of wireless mobile devices, a similar approach can be adopted in outdoor environments. For example, marketers can evaluate the satisfaction rating of an event by randomly requesting informants to record the quality of their experience while they are involved in that particular event. Travel agencies and transportation services could conduct follow-up care services via cell phones for travelers in transit. Since many informants in the case studies said that it was fun to record their own experiences, marketers of amusement parks and mobile marketing companies could jointly launch a Web site, where "fun and exciting scenes" would continuously be uploaded from the customers' cell phones. This would enable customers to share these excitements with those in front of their PCs. The above suggestions are just possibilities based on an optimistic vision of this approach of data collection, and they require further consideration before being applied. The key concept is to collect lively data from distributed informants in real-life environments while they are performing an activity, and display the data in a manner that appeals to remote observers.

7. Future Research Directions

Although the prototype system succeeds in gathering micro-ethnographic data of the informants' diverse consumption experiences, it requires both technological and methodological improvements. The user interface of

[1] Context-Aware Computing, MIT Media Lab: http://www.media.mit.edu/context/

media devices must be improved in order to make the system more practical; moreover, a quicker data transmitting process must be established for in order to illustrate the natural consumption situation more effectively. In addition to improving the current prototype system based on the off-the-shelf platform, the application of cutting edge technologies such as XML should be considered seriously in order to assist the qualitative analysis. When conducting qualitative research, coding (such as categorization and labeling) of the data is inevitable. This coding analysis could be accomplished with greater flexibility if the collected consumption scenes were organized in the XML format; this would enable them to be viewed in other information processing systems. There are several open source context-aware experience sampling programs available on the Internet.[2] Therefore, future developments should also be shared widely to aid researchers interested in the ESM approach.

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[2] for examples, see http://web.media.mit.edu/~intille/caes/ and https://sourceforge.net/projects/caes/