Interpreting interpersonal regularities in the use of mobile phones

Dimitris NATHANAEL
Tryfon ARVANITIS
Nicolas MARMARAS
National Technical University of Athens, School of Mechanical Engineering
GR- 15780, Zografou, GREECE
dnathan@central.ntua.gr mc97047@central.ntua.gr marmaras@central.ntua.gr

ABSTRACT
The proposed paper deals with some insights from an ethnographically inspired study of mobile phone use patterns. During this study, we conducted observations of 10 experienced mobile phone users in semi-natural settings, ran subsequent interviews and thoroughly analyzed the hard data history on their phones. At a second stage we also conducted a questionnaire survey that provided with some additional data mostly for validation purposes. Our analysis shows a number of interpersonal use-patterns some independent of and some influenced by the particular phones used. A general outcome of the analysis is that users have the tendency to achieve the most objectives out of the least possible functions. To explain these regularities, we attempt a functional interpretation based on a tentative model of "personal economy".

Keywords
Mobile phones, ethnographic analysis, use-patterns, personal economy.

INTRODUCTION
The mobile phone is one of the most rapidly and widely spread technological artifacts in recent years. It has evolved in not just a means of communication through voice call or Short Message Service (SMS). It has been transformed to a multi-tool which is used for many other purposes (e.g., clock, alarm clock, note book, game console, and agenda). New models appear on the market everyday offering a great variety of different functions that are meant to support both communication and non communication needs.

Usually, there are more than one ways to meet specific objectives through a mobile phone. A number of these ways are the result of the designers’ effort to provide new functionalities and improve usability while others have emerged out of the collective experience of users. For example one can initiate a voice call by dialing a number, through pronouncing the persons’ name, through selection from the call list etc. In addition, one can store a telephone number in the phone book directly, in the unsaved numbers list by performing an unanswered call or temporarily write it down on paper until, at a later moment, he deals with the procedure of storing it permanently in the phone book.

The study presented in this paper has been triggered by the observation that in spite of this multiplicity of ways to meet certain objectives, there are significant interpersonal regularities of use-patterns. To explain these regularities, we attempt a functional model of “personal economy” based on the notion of “tension equilibrium” (Dreyfus, 1996). We may define this personal economy as the maintenance of “tension equilibrium” at any particular moment in people’s dealings within the world. This equilibrium depends both on the immediate socio-physical situation and on the appropriation history of a particular person with the mobile device/s (i.e. the acquired skills).

More specifically, the use-pattern a person adopts to meet a certain objective is the one that seems to be more convenient for the user at the moment he acts, i.e., the one that optimizes his personal economy. This personal economy is the result of an interplay of both physical and cognitive effort. The physical - cognitive effort is in turn determined by the personal appropriation history of the user with particular device/s and its/their constraints and affordances.

Consequently, traditional task analysis is not sufficient to determine/predict the ways users adopt to perform actions. As we shall see, phone users do not always prefer use-patterns that minimize an objectively measured physical effort (e.g. the number of key strokes), nor its cognitive counterpart (e.g. perception-action acts or micro-decisions). The convenient use-patterns depend on the users’ history of repetitions, the embodied physical – cognitive skills people develop historically through interaction with particular phones. To this we should also add the circumstances at the moment a user needs to meet an objective, i.e. "what is convenient here and now".

If we adopt as basic unit of analysis the “what is convenient here and now” and we couple it with the appropriation history of every specific person, we can make fairly good predictions of what he will actually do in a specific moment. But is that really interesting for design? We tend to say yes, since although idiosyncrasies of each person cannot be treated statistically, what was made apparent during this study was the number of common patterns of behaviour and
common unofficial strategies (i.e. interpersonal use-patterns).

THE METHOD

The analysis for each user was carried out in two steps: to study the use-patterns of mobile phones we adopted a mixture of ethno-methodology and ergonomic work analysis. Given the particularities of the adopted method, at a fist phase, we restricted our study to ten users (Table I). Half of them currently use a Nokia phone and half of them an Ericsson one. We chose these two companies because their phones are used by a large amount of users (at least in Europe) and because they represent two different dialogue style philosophies.

Table I: Demographic characteristics of the detailed study participants

<table>
<thead>
<tr>
<th>User</th>
<th>Model</th>
<th>Period of Use of present model (months)</th>
<th>Previous phones Number (Company)**</th>
<th>Total period of Use (years)</th>
<th>Sex</th>
<th>Age</th>
<th>Occupation</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>3410</td>
<td>4</td>
<td>1(N)</td>
<td>1,5</td>
<td>M</td>
<td>25</td>
<td>Unemployed</td>
<td>Higher</td>
</tr>
<tr>
<td>N2</td>
<td>3210</td>
<td>3</td>
<td>1(N) + 1(E)</td>
<td>2,5</td>
<td>F</td>
<td>25</td>
<td>Employee</td>
<td>Higher</td>
</tr>
<tr>
<td>N3</td>
<td>3310</td>
<td>24</td>
<td>(-)</td>
<td>2</td>
<td>F</td>
<td>26</td>
<td>Student</td>
<td>Higher</td>
</tr>
<tr>
<td>N4</td>
<td>6510</td>
<td>6</td>
<td>7(N)</td>
<td>5</td>
<td>F</td>
<td>18</td>
<td>Student</td>
<td>High school</td>
</tr>
<tr>
<td></td>
<td>7650</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N5</td>
<td>6310i</td>
<td>5</td>
<td>2(N)</td>
<td>6</td>
<td>M</td>
<td>55</td>
<td>Freelance</td>
<td>High school</td>
</tr>
<tr>
<td>E6</td>
<td>T65</td>
<td>3</td>
<td>1(N) + 1(E)</td>
<td>7</td>
<td>F</td>
<td>48</td>
<td>Employee</td>
<td>Higher</td>
</tr>
<tr>
<td>E7</td>
<td>T65</td>
<td>7</td>
<td>2(N)</td>
<td>4</td>
<td>M</td>
<td>30</td>
<td>Employee</td>
<td>Higher</td>
</tr>
<tr>
<td>E8</td>
<td>T39m</td>
<td>12</td>
<td>(-)</td>
<td>1</td>
<td>M</td>
<td>26</td>
<td>Student</td>
<td>High school</td>
</tr>
<tr>
<td>E9</td>
<td>T39m</td>
<td>12</td>
<td>2(E)</td>
<td>4</td>
<td>M</td>
<td>24</td>
<td>Freelance</td>
<td>. Higher</td>
</tr>
<tr>
<td>E10</td>
<td>T39m</td>
<td>14</td>
<td>(-)</td>
<td>1,15</td>
<td>M</td>
<td>18</td>
<td>Freelance</td>
<td>High</td>
</tr>
</tbody>
</table>

* : User N4 uses two phones  
**: Number of previous phones + The company ("N" for Nokia , “E” for Ericsson)

Before starting the main analysis with the users, we studied the technological evolution of the user interface of Nokia’s and Ericsson’s phones and the evolution of the supported functions, in order to form a good idea about the architecture of their software and the opportunities they offer to their users.

The analysis for each user was carried out in two steps:

- First we examined each user’s phone without his participation, in order to gather information about the functions that are used, the communication style of each user (e.g. frequency of received and performed calls, frequency of use of SMS messages etc., specific telephone numbers in the call history, phonebook organization, use of calendar etc.). In this way we were able to obtain a first set of “hard” data in order to set the basis for the subsequent observations of actual use and the semi-structured interviews.

- Then we analyzed the use of the phone with the user, by questioning him on the use of various functions, and asking him to perform a number of typical operations. These operations were based on assumptions that were formed studying the history of his phone, during the first step of the analysis. The conditions of phone use during the analysis were by no means realistic, but nevertheless care was taken to condition the user in such a way that he would act as naturally as possible, that is, making him perform the tasks in the way that he would, without the presence of the analyst (e.g. secretly calling the user and hanging up during the session, asking him to call a person that we knew was frequent in his phone’s call history, sending an SMS etc.).

A particularity of our analysis is that the users were chosen amongst the analysts’ immediate social environment. Thus the participants who took part in the study were not selected to be representative in any statistical sense. Although care was taken to include users from a range of ages, social life styles and professions, the participants group is definitely biased. Albeit this shortcoming, there were good reasons for choosing among people from the analysts’ immediate social environment both from a practical and from a methodological perspective. On the practical side, this particularity provided unconstrained access to the users’ phone data. In general, getting this kind of information is always a bit tricky because thorough examination of people’s phones involves intruding into their privacy. Because our users came from the immediate environment of the analysts, they were less reserved in letting a trusted person get hold of such information. On
the methodological side, (i) it provided rich data on the participants’ everyday life in the sense that the analysts already possessed a background knowledge of what the participants habits but also, (ii) due to the social proximity between users and analysts, the latter were able to extend the observations of phone use long after the formal analyses, in totally natural settings, and for a period of around 3 months.

The adopted analysis method intended to alleviate the problem that arises in interviews concerning users’ actions, as users tend to act and reply in a way that they think it would please the analyst, most frequently following the “correct way” of doing things provided by the instructions.

At a latter phase, we also conducted a survey with 127 mobile phone users, with the aid of an open questionnaire. In this survey we retained only questions that could give us some insight on the already formed hypotheses of the first phase of the analysis. In this way we were able to partly extend our observation sample.

RESULTS

The data gathered from both the detailed analysis and the questionnaire survey are too rich to present in this paper and many are still at the process of being treated. Here we concentrate on a limited number of specific examples regarding the different use-patterns people adopt for meeting habitual objectives. The first set of examples demonstrate some regularities observed among users irrespective of phone brand used, while the second set tends to show how specific design solutions affect what functions are experienced as basic or routine by Nokia and Ericsson users respectively. Participants of the detailed study were hereafter referred to as N1 to N5 for the Nokia users and E6 to E10 for Ericsson users.

Example 1: Calling frequently contacted people

All phones provide some fast dialing function for the most frequently dialed numbers. Typical fast dialing functions are Speed Dialing\(^1\) or Voice Calling\(^2\). All participants in the study except E6, knew that their phones supported Speed dialing and N1, N4 and E7 had even assigned the speed dial keys to the most frequent numbers. Nevertheless, the analysis revealed that none of the participants were actually using them. Furthermore, the questionnaire results showed that, although all 127 phones supported the Speed Dial function and 105 of these phones users were aware of speed dialing, only 22 reported using it on a regular basis.

The same goes for the Voice calling. Most study participants were familiar with the function, and N1, N2, N4, N5, E7 and E9 had already assigned Voice Tags to frequently used phone numbers either on their present or previous phone. Nevertheless, the analysis showed that none of them actually uses the function. These findings are also supported by the questionnaire results. Out of the 127 phones, 103 supported the function, 80 users reported being aware of it but only one reported using it on a regular basis.

This is not to say that phone users do not have the need for dial accelerators for frequently called numbers. On the contrary, the detailed study showed that in order to do just that, N2, N3 and E7 had specifically added the letter “A” in front of the most frequently called names so that even if such names start with an X or a W, because of this “A” prefix they jump up on top of the Phonebook list. In the interviews the common answer was that they had done that because “it is easier than speed dialing”.

According to a classic task analysis, once the configuration work has been done, there is no reason for not using Speed Dialing or Voice Calling, since these paths are faster than going through the Phonebook List even for top of the list numbers. The explanation we give for not using these specialized functions is that although they are faster (in objective time) than other ways to place a call, they usually require at least some reflection (i.e. a decision to use speed dialing and to remember the correspondence between name and button). Since for the great majority of people the rehearsed way of accessing a phone number is through the phonebook, people will automatically follow that path even if it requires more button pressing than Speed Dialing or Voice Call. This is because it involves almost no reflection and does not break the well rehearsed direct intention to action link.

Another strategy widely used for fast dialing among the detailed study participants was that of calling people through the various call history lists. This strategy is interesting because it does not presuppose a fixed set of frequently called numbers. Since the call history lists are dynamic and depend on time proximity as well as frequency of call, they provide an “ecological proximal number list” which ubiquitously takes into consideration the particular circumstances (e.g. an old friend visits from abroad and although he is not frequently called, during his stay he temporarily becomes the most frequent contact). Thus a lot of people use these lists for placing a call on a permanent basis. The various call history functions are discussed in more detail in Example 9.

Example 2: Note taking, codes and pins

Most mobile phones provide specific functions that support keeping notes and storing permanently needed codes such as social security numbers, credit card pins etc. (e.g. Nokia “Wallet”, Ericsson “Code Memo”). Users do have the need to keep this kind of information in their phones but what the detailed analysis of their phones revealed is that none of them were actually using the specific functions. The most common practice was to store such information as a contact’s name in the

\(^1\) Speed dialing is the assigning of one stored phone number to one key (1-9) for quick calling

\(^2\) Voice calling is the retrieval of a stored phone number through the spelling a specific phrase
Phonebook List (N1, E7, E9) or as a SMS message in the SMS Outbox (Nokia) and the Unsent Items (Ericsson) (N1, N2, N3, N4, E7, E8). In sum, 7 of the 10 participants used the SMS or phonebook functions as a means to store personal notes. Also, the questionnaire results show that out of the 127 phones studied in total, traces of such information were found in 42 phones, mostly in the Phonebook Lists.

**Example 3: Reminders**

All phones provide some kind of specialized reminder feature such as To do List (Nokia) and Calendar (Ericsson). These functions are either at the first or second level of hierarchical menus and all the participants with the exception of E10 reported they were aware of their existence. The analysis revealed that only N4 actually uses the specific function (plus N1 in his previous phone) both for one particular reason, as a reminder of birthday dates. N2, N5, E8 and E9 do use their mobile phone as a reminder tool but not through the specific functions provided by the phones. All of them produce reminders through the Alarm Clock function. Actually the phone analysis showed that all except N4 and E10 use the Alarm Clock function on a frequent or daily basis (that is as a wake up alarm).

The above two examples suggest that most people persist in utilizing “basic functions” as much as possible even if the phone provides specialized functions for various non routine objectives. Mobile phone designers have correctly identified the need people have to use their mobile phone as a note keeping and as a reminder device and subsequently provided them with specialized functions. But do people write or consult memos or place reminders everyday? Some may do, but as a general rule these things are not in the daily routine of most mobile phone users. On the contrary, accessing the Phonebook List or setting the Alarm Clock is part of their daily or habitual routines (or action paths). So once one thinks (or learns the practice from somebody else) of putting a code in the phonebook list or reminding of the dentist appointment by using the Alarm Clock, then these ways of meeting such objectives become very fast familiar. Consulting the credit card code suddenly becomes as habitual as calling “Bob” or “Jenny”. Accordingly, placing a reminder for the dentist becomes habitual as setting the alarm clock which you do every night.

This common attitude is neither the result of a button pressing economy nor of a classic cognitive effort economy. It is both and more. It is the result of a physical – cognitive economy as it evolves with the historical skill building and the subsequent daily rehearsal of habitual paths of action for each person. It is the result of what we call “personal economy”.

---

**Example 4: Silencing the Phone**

An extreme of this attitude towards using only simple generic operations was observed in two of the detailed study participants (E10, E6) concerning the widely used function of Silent Operation. These two study participants were not using the Silent Operation function, but each time they wanted to turn their phone silent, they would go through the telephone menu to the Settings and change the Ring volume to Zero. In both cases the users did not know of the existence of the Silent Operation function. Although it may well be a coincidence, both E6 and E10 are Ericsson users. Ericsson provides a very fast way of turning a mobile phone silent. The user has just to press the “c” button continuously for 1 sec. and it’s done. The problem is that unless the user takes the time to read this in the instructions manual or ask some other Ericsson user, he will never know. In contrast, Nokia has integrated the Silent Profile as an option every time a user tries to turn off his phone. Since turning off the phone is one of the basic functions for most people, Nokia users quickly spot the option. Contrarily to Ericsson users, the Silent Profile in Nokia appears as an option in the users’ “habitual whereabouts inside their phone”, it easily becomes proximal.

**Example 5: Use or not of the 1 to many contact format in the Phonebook List**

The phonebook functions provided by recent models of both companies support the assignment of more than one phone numbers to a contact name (1 to many format). This was not the case for many previous models, especially for Nokia. In Nokia phones that support the 1 to many format, the creation of a contact consists of two steps: The first step resembles to a 1 to 1 format i.e. [input name] → [input phone number] and [save]. At a second step the user has to specifically select [add number] or [add detail] in order to enter more telephone numbers, e-mail or other info. If he does not specifically select the second step the procedure stops at the first step.

In Ericsson phones, all contact fields (e.g. the person’s identity, extra information and telephone numbers) are all stored in the same step. The process is [input last name] → [input first name] → [input company] → [input title] → [input home number] → [input mobile number]... etc. and [save]. Thus the user typically has to go through the whole process in order to finish the new contact routine.

From the quantitative study that we performed 68 out of 127 phones supported the 1 to many format. The following table (II) summarizes the results of actual use of the 1 to many format for Nokia and Ericsson users respectively.

---

3 In the questionnaire survey, it was not possible to thoroughly search the SMS history of each phone.

4 All the other study participants were both familiar and were using the specialized Silent Operation function with no difficulties. Here, going to the movies with your study participants really helps the ecological validity of the observations.
Table II: Actual use of the 1 to many format in the phonebook for Nokia and Ericsson users.

<table>
<thead>
<tr>
<th>Company</th>
<th>Support the 1 to many format</th>
<th>Actual use the 1 to many format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nokia</td>
<td>46</td>
<td>33</td>
</tr>
<tr>
<td>Ericsson</td>
<td>22</td>
<td>22</td>
</tr>
</tbody>
</table>

From the results it becomes obvious that the different input processes applied by the two manufactures significantly affects the actual phonebook style that people use. In the Ericsson case, the “wizard like” serial input process explicitly favors the 1 to many format prompting the users to add as much information as possible while adding a new contact. This is well reflected in the quantitative results since all Ericsson users adopt the format. On the contrary, in the case of Nokia, the two step approach does not explicitly favor the 1 to many format. Therefore, there is a significant percentage of Nokia users who although their phones support the function, they do not use it. That does not mean that the function is not interesting or helpful for these users.

For example, the analysis showed that three of the detailed study participants (N1, N2, N3) discriminate the numbers which refer to the same person by forming as many contacts as the amount of numbers and diversifying the name of each contact. They fill in the person’s identity (name or surname or both) followed by some attribute (e.g. John Smith work, John Smith mobile, or Mom w, Mom m, etc.). This way they end up with all “John Smith” telephone numbers together (one next to the other). These people are used to the fast first step of the Nokia New Contact procedure. Although their phones support the 1 to many format, they keep their old input style but organize their phonebook in such a way that the final result resembles the one name - many telephone numbers (1 to many) format. This was a lot less so with Ericsson Users. E6, E7, E8, E9 and E10 all use the 1 to many format.

Example 6: Asking for a person’s phone number in face to face contact
In face to face contact, all users may ask for a person’s number orally and then store it at the same time in the Phonebook’s List, through an Options List from the incoming SMS. They fill in the number in a piece of paper and go through the whole New Contact process even in the most convenient moment, they can store the number in the Phonebook’s List, through an Options List from the Dialed Numbers List. This practice is common among Nokia users because they can store a number immediately from the Dialed Numbers List to the phonebook, while in the case of Ericsson, users find themselves in the embarrassing situation explained above.

Actually Ericsson phones support both of the above routines. The reason Ericsson users do not use them is because the great majority (including all 5 participants of the detailed study) ignores a specific feature of Ericsson phones, the Unsaved Numbers List; a somewhat hidden feature that does not appear in any selection menu.

Example 7: Sharing a stored number.
During an active call, it is common for people to ask for a number stored in the Phonebook’s List of the other person’s phone. Most users typically receive the number orally and they type it in idle mode (N2, N4, N5, E9) or write it down on a piece of paper (E6, E7, E8, E10), following the same practice as above when they receive a number orally in a face to face contact.

Some Nokia users ask to receive a 3rd person’s number in the content of an SMS (N1, N3). (e.g., “can you send me John’s number?”). They can store these numbers easily through the Options List of the incoming SMS. Ericsson users don’t use this practice, because they find difficulty in storing this kind of numbers even if they can readily see them on their phones’ screen. This is a funny situation because for example, a Nokia youngster cannot understand why his Ericsson friend does not want him to send a telephone number through an SMS preferring to write it down on paper or go through the whole New Contact process even in the most convenient.

---

5 In order to save such a number, the user has to exit the Call List menu. He has to navigate to the Phonebook Menu, select New Contact or Edit Contact and then if he presses the “left arrow” the phone presents a hidden list, the Unsaved Numbers List out of which he can choose which of the unknown numbers he wants to assign to the contact he has created.

6 E9 actually dials the orally received number in idle mode and once the call ends, he deliberatively produces an unanswered call to the newly received number. This way he places it to the Call List for later manipulation when convenient.
inoportunute moments. Actually both companies have
developed specialized Send Business Card functions for
sharing such stored information. Although most manufactures offer an equivalent feature, the encodings
of each brand are not compatible with one another (at
least up to the near past). For the above reasons the
Send Business Card function never really made it in
becoming part of the collective accepted practice of
mobile phone users.

The above examples point at how the two different
dialog styles of typical Nokia and Ericsson phones influence the emergence of habitual use-patterns on
their respective users.

A typical Ericsson user when typing a telephone
number in his phone in idle mode, he does that only
to place a call, or at least that is the idea most Ericsson
users have, based on historically built experience with
phones of the specific company. On the other hand,
when a typical Nokia user types a telephone number on
his phone in idle mode, he knows he can choose from a
number of options (e.g. Call, Save, Add to Name, Send
SMS, but also, Count Down Timer etc.). The same goes
for the various call history lists. When an Ericsson user
reaches an unknown number in his Call List, the only
thing he can do from that place is call it back. In
contrast, a typical Nokia user has acquired the habit of
being able to choose from a number of options for this
“object”, e.g. call it, save it, delete it etc. This is
because, the basic Ericsson interface philosophy is a
dialogue style of the type “I want to do this action to
this object”. Now the user has to navigate through a
hierarchical set of action categories and actions, select
the appropriate action, and then select the object he
wants to manipulate (this is not strict but nevertheless
reflects the basic design philosophy). On the contrary
Nokia adopted from its early models a double dialogue
style. Along with supporting the hierarchical action
selection style seen in Ericsson phones, in many cases
Nokia also provides an alternative dialogue style “this
object I want to manipulate it in that way”. Thus, when
a Nokia user sees an object on his screen, such as a
contact, a telephone number or an SMS, he knows that
this object readily supports a number of manipulations
through the Options List.

**Example 8: Editing contacts**

All phones provide some routine in order to change the
contact details of an already existing contact in the
phonebook list. This routine is rather easy to find in the
phonebook menu of both Nokia and Ericsson phones.
Nevertheless, because of the strict “I want to do this
action to this object” dialog style in Ericsson, two of the
detailed study participants (E6, E10) do not know the
way to correctly edit an already existing contact.
When asked to perform such an action, they navigate all
the way to the contact they want to edit and try various
buttons. But this is a dead end. What E6 and E10
actually do in practice to achieve the objective of
correcting a contact, is to go the “dump way”. They
delete the contact altogether and then go through the
nominal New Contact routine. Although the New
Contact routine requires a lot more button pressing,
remembering or writing down phone numbers in order
to re-enter them in the new contact, people who opt for
this report that “it is easier that way”. Actually deleting
a contact is straight forward in Ericsson phone, by
pressing the “c” button directly while having on the
screen the concerned contact. On the contrary, in order
to edit the same contact, Ericsson users have to leave
the concerned object, navigate to the central Phonebook
Menu and select near the bottom of the list, the Edit
Contact action. Only after they have specified the action
can they assign the object of their concern.

**Example 9: The use of call history in Nokia and Ericsson**

A strategy widely used among the detailed study participants was that of accessing recently contacted
people through the various call history lists. All phones provide some sort of call history function. The detailed
analysis showed that all users were aware of this feature
but some use it more regularly than others. Most users
seem to recognize this call history as a memory device
for recent communication instances. Specifically, E6,
E7, E8, E9 and E10 use the call history function on a
permanent basis to access the telephone numbers of
recently contacted people (with an average of 5-6 last
calls) both received and dialed ones. N1, N4 and N5
also use the call history but in a more restrictive sense.
They use it to communicate only with recently dialed
numbers (with an average of 2 or 3 last dialed numbers).

In Nokia phones, the call history is divided in different
lists according to the type of call. These lists are: Dialed
Numbers List, Received Calls List and Missed Calls
List. Access to all three lists occurs through the Call
Register Menu inside the Main Menu of the phone.
Each entry (call) in all three lists supports typical
actions the user might want to perform to the call
through an Options List. For example through the
Options List, a new number may be stored in the
Phonebook’s List, may be deleted, initiate an SMS to
that number etc. Nokia phones provide a hotkey for
immediate access only to the Dialed Numbers List from
the idle mode. The two other lists are accessible only
through the hierarchical menu.

In Ericsson phones, all types of calls, i.e. dialed,
received and missed, are presented in a unique Call List.
This Call List is accessed directly from idle state but
also through the Call Menu inside the Main Menu of
the phone. Through this Call List, the Ericsson user can
consult all the details of a call i.e. telephone number,
contact name, date and time of call etc., but as explained
above, contrarily to Nokia, he has very limited
possibilities for further manipulation.

In fact the call history function can serve as a kind of
memory of events, e.g. “I called john, then he called me
back, and then there is a missed call…. at about
23:30…. It must be Jenny from the local bar…. ” etc.
The detailed analysis revealed that design differences
between the two manufactures profoundly affect the
users shape their regular skilled use of the phone. For example the scattered call history in Nokia phones discourages people to use it as a general memory of events. Nokia users cannot easily construct this kind of story as above, since the mentioned three calls would be presented in three different lists. On the contrary, Ericsson users access the unique Call List on a more frequent basis. This also makes them use it more regularly for calling someone instead of going through the phonebook list. For example, the 10 detailed study participants were asked in a random moment to call a person that the analyst had previously found to be in the participants recent call history more than once (either dialed or received call). E6, E7, E9 and E10 all went without hesitation through the Call List. On the contrary, only N1 of the Nokia users went through this path, and this for a call he had dialed himself one hour ago. All other Nokia users chose to either go through the Phonebook List or dial the number manually (e.g. when this was a call from home). In subsequent interviews and tests we got more evidence that Nokia users do use the call history as a re-calling tool but tend to do so only for the last 2-3 dialed calls and almost never for received calls. If asked why, they mention that it is more time consuming to access the Received Calls List that go through the Phonebook List. But this is only partly true. Depending on the name they want to access and the length of their phonebook, calling through the Phonebook List may take more keystrokes, thus more costly if judged only according to a physical task measurement. What actually happens is that since the Received calls list is not visited on a regular basis, it is not integrated as part of the “basic functions” for most Nokia users. As an intention to call back, it is not the first thing that comes to mind and as a physical action it has not been transformed into a sensori-motor skill. Indeed, since the call history is scattered, it does not emerge in the Nokia users’ world as an integrated tool. Each one of the three lists tends to be used for very different purposes. The Dialed Calls List is used as a re-call function and the Missed Call List as an informing function. On the contrary, the integrated Call List in Ericsson phones makes Ericsson users visit it a lot more frequently. The effect of visit frequency works as a positive feedback loop, progressively making the Ericsson Call List one of the basic calling and informing tools for Ericsson users.

DISCUSSION
A general outcome of the analysis is that users have the tendency to achieve the most objectives out of the least possible functions. For example, although phones provide a number of specialized functions such as speed or voice dialing, note taking, specialized codes and pins archive, calendars and reminders, most people do not use them. This is not to say that they do not have the need for fast calls nether that they do not write down notes or credit card codes on their phones. What usually happens is that people find ways to satisfy such needs through manipulation of more “basic functions” of their phones, even to the detriment of objectively measured effort. Indeed, if measured from a strict cognitive or physical task perspective, this common tendency towards maximizing the use of “basic functions” will be evaluated as a lot more costly than spending the time in front of learning the more specialized and thus more performant functions of the phone. However, most people do not work with the phone per se. They are engaged in a myriad of preoccupations and will exploit the opportunities of each moment according to a general sense of resource economy rather that a fragmented device specific optimization. Nevertheless, mobile phone use-patterns are not random or totally dependent on the circumstances of each moment. People, through common repetitions, build habits which tend to intensify the more they are repeated. In this way each person historically embodies some functions of his phone with which he feels comfortable. As a consequence he tends to achieve his diversified objectives mostly through these “basic functions”. Such “basic functions” require less reflection and thus provide a sense of personal economy.

The term “basic function” is not to be considered in a strict objective sense. What plays the role of “basic function” for each mobile phone user is at least partially relative. Various functions may be experienced as “basic” if and when they are used on a permanent basis, depending on the personal history of each user. For example SMS messaging can be considered as a basic function for one user and marginal for another. Nevertheless, since the great majority of users do present regularities in the type of functions they use on a permanent basis, a number of common strategies were identified that demonstrate this trend towards using “good old basic functions” instead of more elaborated specific ones.

Engaged in the world as people find themselves in their daily whereabouts, they dynamically allocate their resources (either physical-cognitive or social-emotional) according to this “personal economy” applied to the specific situation. For example, in moments of temporal tension, or when the object of their attention lies elsewhere, people tend to apply the most familiar routines of engagement with the phone. In other times when idle, the situation is reversed, the tension is lower than desired. In order to fill up the time, people may take the time to explore, try out new possibilities etc. Nevertheless what seems to be common in most everyday situations is the tendency people have to decrease the perceived complexity of their whereabouts inside their phone.

It is a common observation that when people take hold of a new phone, at first they are happy to spend time to navigate through the various possibilities that their new “toy” has to offer. Some even read the instructions manual and go all the way configuring the device, assigning speed dial numbers, voice tags and the like. But when it comes back to everyday life, the new phone loses its toy character; suddenly people are again in a hurry, preoccupied with what is important, they want to
learn if mom is O.K or if their stock held their price, they don’t merely want to use the phone. If something does not come naturally, if an action path is not habitual or it has not been voluntarily rehearsed again and again for an adequate amount of time, they will not opt for that way. Their immediate reaction usually is to get over with it, even though the habitual way may take more time, it doesn’t take their mind.

The notion of personal economy shares common ground with the notion of “ontological security” as exemplified by Giddens, (1984). People will more often than not try to manipulate the functions they are feeling comfortable with for as many actions as possible rather than going through the mentally and time costly process of having to learn a new feature (and eventually turn it into a new tool). This observation may have a more general validity but in the case of mobile telephone use it becomes particularly important. This is because the use of mobile phones tends to be less planned in comparison to the use of other technological devices. Since it is carried around all the time, instead of being just a device to perform a set of specified tasks, it intrudes in even the most inopportune moments. People receive phone-calls while totally engaged in other activities or use their phone as part of other activities (note taking, reminder etc.); so using it tends to become an integrated part of the person’s ecology (Dix, 2002).

If one adopts a positivist perspective he might interpret the results of the present study as findings that support a minimalist design philosophy. However providing fewer functions restricts people’s freedom to authentically built and evolve their personal habits. This freedom, although a confusion factor, is at the same time the major driver towards the enrichment and evolution of habits. And it is habit evolution that leads to improvisations, catachreses (Béguin & Rabardel, 2000) and finally informs a new circle of design. This view is very close to what is actually happening in the fast evolving world of consumer digital devices. Studies as the one presented in the present paper can play a catalyst role to this evolutionary design cycle, first by acknowledging this evolutionary process and second by identifying the persistent interpersonal use-patterns. Furthermore, as the examples regarding use-pattern differences among Nokia and Ericsson users have shown, identifying the influence of different design solutions on the emergence of particular use-patterns may provide valuable insights for the future design cycles.

REFERENCES

