

Can Your Smartphone Do This: A New Methodology For Advancing Digital Ethnography

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Abstract

A recent report revealed that the number of smartphone users in the United States has grown 82% in the last 2 years (Mintel, 2010). This meteoric rise in the popularity of mobile smartphones also gives rise to a new tool for measuring people in their everyday lives. Smartphones provide portable access to “on-the-go” behaviors in previously unexplored ways. The ability to subtly intrude on the daily lives of people provides access to rich data in a relatively unobtrusive way.

Building on previous work at Nielsen (Lai et al., 2009), we used mobile smartphones to survey 428 South Africans over a 5-week period during the 2010 soccer World Cup. The objective of the research was to assess the impact of the world’s largest sporting event on residents of the host country. Respondents received five questionnaires throughout each day. Questions were directed towards both in-the-moment and in-the-near-past behaviors, as well as general questions about mood and engagement. As a result, panelists provided Nielsen with robust quantitative and qualitative data in which the event’s influence could be measured.

A further advantage of this research tool is the ability to tell a story through digital pictures taken on the smartphone. At the end of each survey, panelists were asked to take a picture of their current activity and given the option of captioning the photo. Using innovative software, we used the images to analyze behavior over the course of the World Cup. In addition, using metatags, we assessed general changes in comfort levels using the smartphone across time, such as how personalized the pictures became as the participant adjusted to the survey tool.

Lastly, we summarize implications for this research tool and possible future areas of research that could be explored.

Keywords: ethnography, mobile phones, panel research

1.0 Introduction

It's no secret that smartphones, mobile phones with built in operating systems, are growing in popularity among global consumers. In the US, smart phone penetration has recently been reported by Nielsen to be around 23% in early 2010, while some have shown growth as high as 36% early in 2011 (Phillips and Enser). Among people 25-34, smartphone use is even higher (51% according to Phillips & Enser, 2011). The astronomical rise in smartphone usage is expected to continue, with Nielsen (2010) expecting smartphones to overtake feature phones, those without an operating system or mobile web browser, by the third quarter of 2011. This exponential increase in the popularity and demand for smartphones is at once exciting and daunting for survey researchers.

Just as with the meteoric rise of online usage in the late 1990s, smartphones represent the next wave in communication. Now, more than ever, people are connected all day, every day. Smartphones allow users to have instant access to information, and users are taking full advantage. Despite this, survey research seems relatively slow to adapt to smartphones as survey tools. As others have noted, this is especially problematic when users complete surveys intended for online consumption on a mobile device (Callegaro, 2010; Peytchev & Hill, 2008; 2010). While the percentage of respondents who switch modes like this is estimated at only about 1-4%, this number is likely to rise as more people adapt to using smartphones and tablets as a replacement to their traditional laptop computer. Users attempting to complete surveys intended for desktops on mobile devices encounter issues with readability, resolution, and usability, all of which could negatively impact data quality and compliance. For example, Callegaro (2010) recently showed an increase in breakoffs from 8% for desktop users and 24% for mobile web users on a customer satisfaction study in the US.

Given the difficulties mobile users face while completing an online survey, these results are not surprising. It takes longer and requires more concentration and motivation on the part of the respondent to complete the survey on a screen too small to fit the entire question. Thus, researchers should take care to proactively resolve issues that could arise as respondents move to the mobile web platform. Further, researchers need to fully understand when and how to use mobile devices as survey tools.

In this paper we will discuss the advantages and disadvantages to the smartphone platform for conducting mobile research. We will examine the current literature, as well as discuss in detail Nielsen's "Life360" smartphone methodology, which asks users to participate in a panel using smartphones. Through six tests over a span of three years, we have identified some limitations to smartphone research that should be considered as we move forward. Additionally, we have enhanced our methods based on our findings. Despite this, completion rates have remained consistently high regardless of survey topic, so we discuss the formula we use to keep respondents engaged and motivated to participate. Lastly, we conclude with future directions for the Life360 program at Nielsen.

2.0 The Uniqueness of Smartphones

Other modes of questionnaire administration—online, telephone, mail, face-to-face—all rely on contact with the respondent when the respondent has time to participate. In the

mail mode, we reach out to potential respondents, hope they open the mail and then proceed to respond to our questions. Similarly, online panelists are typically invited to complete a survey through an email or banner ad, meaning they need to be in front of a computer and have the time to complete the survey. The same for telephone sampling—it's fully contingent on the respondent being at home or by their phone and able to answer it and talk to the interviewer. However, mobile phones, and to a greater extent specifically smartphones, have a different niche.

Surveys administered as a mobile application or on a mobile browser profoundly impact the respondent in the following ways.

- 1) People use smartphones all day. Whereas other modes are likely to be used only during certain periods of the day (i.e., when we're home, or in front of a computer, or near our phones), smartphone users multitask with them while travelling, eating, shopping, and most importantly, while waiting. Smartphone users are always connected—at home, at the store, on-the-go, at work, virtually everywhere (Google/Ipsos, 2011).
- 2) Smartphones are “time-fillers”. Since smartphone users are always connected, a world of information is available quickly and easily with the touch of a few buttons. Because of this, “filling the void” is commonplace for smartphone users. They can use the five minutes waiting in line at their favorite coffee shop to check the Facebook or Twitter newsfeed, to use the location-based capabilities of their phones to “check in” to their location on Foursquare or Yelp, to water their plants in the virtual world of Farmville, or to quickly get score updates on sports they are interested in. With smartphones, it's about filling in the downtime with stimulating, meaningful activity that could not previously have been achieved. It's not mindless time-wasting, it's meaningful time-filling, a key point that survey researchers should note when creating smartphone surveys.
- 3) Smartphones are trendy. It's no surprise that smartphone penetration is highest among 18-24 year olds, those who are trying to latch on to trends, to be a part of the next big thing. Just as with the Internet in the late 1990s and early 2000s, mobile smartphones and tablets (to a lesser extent) are in high demand. The freshness of smartphones, especially in markets previously underexposed to the Internet and mobile phones (i.e., emerging regions such as Africa and Latin America), increases the desire of individuals to use them. As survey researchers, this “novelty effect” can be leveraged to encourage participation and compliance, but should be carefully monitored. As the novelty of the device erodes, it's likely survey response rates will fall accordingly. This similar effect was observed in reviews of response rates to e-mail surveys over time (Sheehan, 2001).

Taking these factors into account, we can get clearer picture of how and when to use smartphones for conducting research, and when we should consider one of the more “traditional” modes. As in vogue as smartphones are, we can't just take a mail or Internet survey and wholly transfer it to a mobile device, especially given the uniqueness of smartphones to fill the downtime in our days.

3.0 Surveying on Smartphones

Given that smartphones are used in short segments, all day, and constantly connect users to an entire universe of information, smartphone surveys have certain advantages and limitations that should be considered. At the highest level, we should no longer consider

the optimal length of online surveys to apply for mobile surveys. As previous researchers have noted (Berndt et al, 2007; Galesic and Bosnjak, 2009), online Internet surveys can achieve acceptable response rates when they are kept to a reasonable length in the eyes of the survey-taker. While the specific optimal time is debatable and contingent on factors such as interest and incentives (Baker et al, 2010), most research reports acceptable response rates for surveys as long as 30 minutes.

However, when considering the length of survey factor for mobile devices, we must also consider how they are used, as noted above. Instead of a focused respondent who is sitting in front of a computer, mobile survey-takers are likely on-the-go, multi-tasking or waiting for something, and thus not able to commit a large chunk of time to survey completion. Therefore, we should strive to keep survey length short and questions to a minimum when conducting research on a mobile device. Otherwise, we increase the likelihood of respondents breaking off early or speeding through the survey to completion (Callegaro, 2010).

We must also weigh the advantages of surveying on a mobile device. If we're interested in recall data or events that have happened in the past, for example, the mobile platform might not be the most appropriate simply because we can ask this type of information using other modes. Instead, focus should be on in-the-moment data, what the person is experiencing in real-time, which both increases interest in the survey and likely improves response quality.

Lastly, we much match the mode in the way surveys are designed. Smartphone apps and browsing are heavily-focused on social experience and interactivity. These elements should be incorporated into mobile research in order to keep the interest of the respondent.

4.0 Smartphone Surveying at Nielsen

4.1 Background

The factors of survey length, subject matter, and social experience drive the mobile research that Nielsen conducted over the past three years. Using a methodology known with a foundation in time-use surveys and ethnography, Nielsen has conducted a series of studies tapping into the immediate, in-the-moment nature of mobile phones. Past studies have sought to understand how people behave in daily, routine activities. The goal of time-use studies is to understand how often and how much people are doing certain activities, in order to understand a typical day-in-the-life of the respondent (Stinson, 1999). This could provide researchers with insights into differences between groups, such as how men and women spend time differently (Joyce and Stewart, 1999). Previously, this data was collected either in self-response format such as paper diaries or through phone or even face-to-face follow up with the respondents. While this type of data collection proved worthwhile for researchers, biases such as social desirability and reporting errors were abundant (Stinson, 1999).

In order to combat such errors in response, past researchers developed creative methods to force more randomized reporting. One method, known as the Experience Sampling Method (ESM; Lee and Waite, 2005), involved respondents wearing specially-designed wristwatches that would alarm randomly during a two-hour block throughout the day. Upon beeping, respondents were asked to report what they were doing and who they were with, as well as other questions such what they were thinking about. By

randomizing the alarming of the wristwatches for each household member, the researchers showed that social desirability factors could be somewhat mitigated.

Building on many of the principles of time-use data capturing, Nielsen has sought to leverage mobile phone technology to capture in-the-moment data on a variety of day-in-the-life activities, as well as exceptional, out-of-the-ordinary events, both with the goal of understanding the behaviors, feelings, and motivations of panelists who were experiencing the events. Through this research, we have uncovered some of the nuances of mobile research, as well as identifying the best ways to leverage smartphones to conduct research. Our methodology has followed two basic paths, one involving prompted response, the other involving self-initiated response.

4.2 Prompted Response

The prompted response method closely follows the ESM approach first developed by Csikszentmihalyi (cf. 1997). For prompted response, the method is typically as follows: Participants are recruited for a time-use panel in order to assess what they are experiencing throughout their day. The time of the study has run as short as 10 days in our first study (Lai et al., 2009) to as many as 33 days in our FIFA World Cup study (Link et al., 2011). In all cases, panelists were given smartphones pre-loaded with the SODA® (Survey On Demand App) app, developed by Techneos. This is done to overcome coverage error and selection bias that would likely result if we selected only from a sample of smartphone owners. Additionally, using an app pre-installed on the phones and designed specifically for the mobile device resolved any potential survey design issues that could arise when a survey designed for a desktop computer is transferred to a mobile device. Factors such as screen size, resolution, and question design could be controlled during programming of the app on the device. The SODA app is programmed so that the phone's alarm goes off on a set schedule. The schedule can be event-based (such as during a time when a sporting event is scheduled) or time-based (set to go off the same time each day). The number of surveys per day varies based on the topic and need. The initial study was sent 10 times per day, but this has since decreased to as few as five per day.

Once the alarm goes off to prompt the respondent to take the next survey, they simply open the SODA app on the smartphone and begin completing the questions. All surveys are designed to be short in order to keep the interest of respondents and optimize the mobile platform. The goal of each is to ask in-the-moment questions, such as "What are you currently doing?" and "Where are you right now?" Depending on the responses and subject of the research, more detailed questions are asked. For example, in one study we sought to learn about the eating and drinking behaviors of our respondents, so whenever they told us they were eating we would go into detail to ask them what they were eating, how they liked it, etc. in order to gain a full understanding of their consumption behaviors. We also typically ask mood questions, having respondents provide a scaled response to whether they are happy/sad, excited/calm, etc.

Lastly, we end each survey by utilizing the camera feature of the smart phone. Each respondent is asked to take a photo of what they are currently focused on. This touches on the ethnographic nature of the research by capturing a snapshot of what the person is doing throughout the day. The photos aid in telling a story about the panelist along with the time-use data. In more recent studies, based on qualitative feedback from our respondents, we added in the option of captioning the photo, giving the panelists the ability to further communicate their thoughts about what they were focused on.

The data for each survey is then submitted by the respondent and received in real-time via the mobile device. This enables Nielsen to have instant access to panelist data, which has been valuable for reporting live events such as the World Cup. Our support team monitors the data to identify non-respondents over a period of time. If a panelist is identified as a non-responder, the support team attempts to contact them via phone to encourage further participation or understand why they have stopped participating.

4.3 Self-initiated response

The self-initiated response approach is treated the same as the prompted response with the exception of how often the survey is completed. For the self-initiated, the surveys are taken after the user performs a certain event, such as eats a meal or buys a product from a store. The panel length has extended as long as three months for this type of study, mainly because the frequency of survey completion is substantially less than compared to the prompted surveying. For example, we asked respondents in one study to complete a survey each time they used a coupon. Since this occurs at the most one time a day for even heavy mobile users, surveys are completed much less frequently and therefore respondent burden is less.

However, in order to keep in contact with the respondents, reminders are triggered based on a reasonable expectation for completion. In other words, if we have not received a survey from a respondent in an expected amount of time (to be determined based on the particular subject of the survey), then we send a reminder or prompt to the mobile device just as in the prompting approach.

4.4 Choosing an approach

The selected method, prompted or self-initiated, is based on the needs of the particular study and which method makes the most sense for the respondent. Throughout the six studies we have done using the Life360 methodology, three have used the prompted approach and three have used the self-initiated, with studies reflecting purchasing behaviors the number factor for selecting the self-initiated approach. At a high-level, the advantages to the prompted approach are that researchers have a greater amount of control over when the survey is scheduled and overall response rates can be easily determined. For the latter, because of the control we can place on the number of surveys administered, determining completion rate is a matter of dividing completed surveys by surveys administered.

The calculation is not as straightforward for the self-initiated approach, as we only know the number completed, not the number that should have been completed. Still, determinations can be made using a “reasonableness factor”. For example, in conducting a study that asks respondents to log a survey after each meal they eat, it is reasonable to assume most people eat 2-3 meals per day, so this can be factored into measurements of response. Further, during the initial screener, we can ask respondents their typical eating habits in order to understand how many meals they typically eat each day. Both factors can be used to trigger an alarm for respondents who have not completed a survey in a reasonable amount of time.

The self-initiated approach is more suitable for the respondent, because they don't have to be burdened with alarms throughout the day, but also requires more focus and engagement from panelists to remember to complete the survey at each requested time. In sum, both approaches can be effective, and should be considered based on the

objectives of the test. The next section focuses on our response rates across the six studies we've conducted and a comparison of each approach.

5.0 Comparison of Life360 Tests

Given that mobile phone surveying is a relatively new concept and that there are many questions still to be answered regarding best practices for designing and implementing surveys on a smartphone, we wanted to combine the results of each of our tests. This would aid in gleaning information towards successful surveying on mobile devices. First, we wanted to better understand how response of the panelists held up across all six studies, from the first in 2008 up to the last in early 2011. We expect that the “novelty effect”—that is, the trendiness and appeal of smartphones—will eventually wear off, leading to a decline in response and motivation from panelists, much like what was observed with Internet surveys in the late 1990s (Sheehan, 2001). We also wanted to compare the completion rates between the two approaches to see if one led to better overall compliance than the other. While each approach has advantages, how is completion rate affected?

Table 1 shows a breakdown of the response rates for each of the six tests conducted at Nielsen using the Life360 methodology from 2008 to early 2011. Note that most of the studies were US-based, with the exception of the recent South African World Cup study reported by Link et al. (2011). Of note in this table is that completion rates have remained consistently high for all six studies, with a range of between 70-80%. If the hypothesis is true that mobile phone surveying will decline as the novelty of smartphones subsides, this has not yet occurred, most likely because smartphones are still considered relatively new and novel.

Secondly, there is little difference in the completion rates between the two Life360 approaches, prompted vs. self-initiated. This is a promising finding to note that, when the study objectives fit, either prompted or self-initiated surveys will lead to equally high completion rates. One final note regarding this table is how the completion rates were calculated for the self-initiated studies. As mentioned previously, for each study, a “reasonableness quotient” was calculated based on information provided by the respondents in their screener and logical frequency of the activity for each study.

6.0 Lessons Learned

Throughout our testing using the Life360 method and the smartphone surveying for time-use data, we have been able to uncover several limitations and points to consider as we continue to improve the methodology. While respondents have been receptive to completing surveys on their smartphones, we hope to increase or maintain these completion rates in the future.

The first consideration is to reduce anticipation bias. Other researchers (Lee and Waite, 2005; Peters, 2000) have found that time-use surveys suffer from respondents changing their behavior as a type of social desirability. That is, panelists will sometimes alter their behaviors in order to make themselves look more interesting and exciting. Given the patterned schedules of time-use panels, respondents could more easily anticipate when they will be asked to respond to a survey and thus change their behaviors.

Table 1: Comparison on Life360 studies from 2008-2011

Test	Year	Approach	Complete Rate	N	Time Length	Avg. Resp/Day
Media Consumption	2008	Prompted	92.9%	112	10 days	8.0
Eating & Drinking	2009	Self-Initiated	87.7% ¹	65	7 days	3.56
Share of Wallet	2009	Self-initiated	97.4% ¹	56	7 days	1.63
World Cup	2010	Prompted	76.7%	422	33 days	4.42
Purchase Behaviors	2011	Self-Initiated	97.6% ¹	42	3 months	0.31

In our initial Life360 study that looked media consumption over a 10-day period, we sent hourly surveys to our respondents' smartphones. Since they received the prompts for survey completion at the same time each hour, survey times became predictable for respondents. At the conclusion of the study we conducted qualitative interviews with a subset of respondents. They revealed that it was possible the anticipation bias was a factor in their responses—that they would prepare for the next survey by doing something different or out of their routine in order to appear more interesting. Because we didn't want to influence behavior in future studies, we altered our method so that alarms were triggered randomly, or during a random time within a particular window. As with the Experience Sampling Method used by Lee and Waite (2005), we feel this mitigates anticipation bias by making it less predictable to respondents as to when they will receive their next survey.

A second lesson learned for us, based on respondent feedback at the end of the study, is the annoyance of the alarms in the prompted approach. We program the phones so that the alarm sounds to prompt users to take the next survey. Because we do not want users to disable or silence the alarms (thus defeating the purpose of them), we program them to sound with each new survey. Not surprisingly, respondents in our qualitative interviews at the end of studies have suggested that we give users the option of silencing the alarms during times when it would be inappropriate to have the alarm sound. At this point, we have not provided this option because users would likely not remember to take the survey if the alarm didn't sound as a reminder. Despite this, we are considering this option for future studies to see how completion rates will be affected.

Other considerations should be made for handling safety and security issues. Just as has been reported with calling people on a mobile phone (Lavrakas et al, 2007), the same considerations should be made for asking respondents to complete surveys on a mobile

¹ The denominator for the self-initiated approach was estimated based on a reasonableness factor and based on the baseline indicated by each panelist at the beginning of the study. For example, if the person told us they ate three times a day, that was used as the denominator for the eating and drinking study.

device. Our training and recruitment materials stress to respondents that they should not complete the survey in a place they feel is unsafe, including driving a car, operating machinery, or standing in an area where there is a risk of theft or harm because of the phone. This language safeguards the researcher and the respondent during their time in the panel. In our research in South Africa, special considerations were made to ensure that respondents completed the surveys in safe areas. The same precautions should be made in all studies such as this so that the respondents do not endanger themselves while completing the surveys.

Lastly, we have gotten feedback from respondents regarding the incentives. In early studies, we provided cash as incentive and then retrieved the phones as the conclusion of the test. However, respondents commented to us that they would have much preferred to keep the phones instead. To test this, we did an initial 2-week pilot test in South Africa and gave respondents the option of either keeping the Blackberry Curve smartphone or the equivalent amount in cash. Out of our 40 pilot respondents, all but one elected to keep the phone as opposed to the cash, confirming for us that respondents did value the phone more than cash in this study. Whether these results are generalizable to other populations and over time is unknown, but we plan to continue to offer the phones as incentives when possible. As an alternative, minutes could be added to a user's current mobile plan in return for participation. This would be especially easy to provide in countries with prepaid minute plans as opposed to contractual 1- or 2-year plans.

7.0 Next Steps

Given our previous successes with the use of mobile smartphones to conduct in-the-moment survey research, we plan to continue our Life360 work in the future. As noted above, considerations need to be taken to avoid respondent fatigue and burnout, so we plan to incorporate advances in technology into our methodology when possible. As smartphone technology develops further, several new concepts can be added to the Life360 methodology. As with the FIFA World Cup in South Africa last summer we plan to continue our research at the London Olympic games in the summer of 2012. Among the new concepts we hope to build in are geofencing, breadcrumbing, and barcode scanning.

- 1) Geofencing: In this approach, a virtual fence is built around a specific location using GPS coordinates. When a panelist enters into the virtual space defined by the fence, a survey can be pushed to the respondent and in-the-moment data captured. For example, we could create a geofence around the Olympic Stadium in London and send surveys whenever one of our respondents entered in, asking questions about their excitement level, what they were doing, who they were with, or what they were focused on.
- 2) Breadcrumbing: This term originally derives from the Internet and is the process of leaving a hierarchical path of usage for an internet user, in which virtual "breadcrumbs" are left at websites so that a person can track their history on a webpage (Lida, Hull, and Pilcher, 2003). However, when applied to location-based services, breadcrumbing refers to the trail of GPS coordinates left by a user in a given time period. This could be useful when understanding where a panelist has travelled throughout the day, such as what stores they visited or Olympic events they attended.

- 3) Barcode Scanning: Any camera-equipped smartphone should also have the capability of scanning both 1-d and 2-d barcodes. The product information contained on the barcodes could become part of the survey so that the panelist can tell us what products they purchased. The survey could also ask about the individuals thoughts and feelings about the purchase to gain a better understanding of consumer behavior, especially during sporting events such as the Olympics.

8.0 Conclusion

Smartphones are quickly gaining in popularity worldwide. Nielsen reports that, by the 3rd Quarter of 2011, more people will own a smartphone than a feature phone (2010). Given the astronomical rise of smartphones into the consumer market, researchers should look to leverage these devices as valuable survey tools. As our research has shown, however, how and when to use mobile smartphones to conduct survey research is important in obtaining high rates of compliance and cooperation from respondents. Further, learning how to correctly leverage smartphones can aid in sustained positive results for survey researchers.

As Nielsen's Life360 methodology has demonstrated, smartphones are a useful tool for polling respondents about in-the-moment and on-the-go behaviors. Smartphones are used by their owners throughout the day, during downtime, and while multi-tasking with other activities. Because of this, user attention-spans are shorter and more divided. Thus, care must be taken to create short, meaningful surveys that can be split throughout the day. Lengthy questionnaires are likely to be unfinished by respondents. Still, high completion rates among Nielsen panelists leave it show a promising future for smartphones a survey research tool.

Despite this, work still needs to be done to develop industry standards and benchmarks for surveys designed for mobile devices. Issues such as optimal panel length, optimal number of surveys per day, and time length of each survey should be better defined so users don't face burnout or an inundation of surveys pushed to their mobile devices. Other questions remain, too, such as whether potential respondents will continue to participate at high levels even after smartphones become more "commonplace" in our society. Nielsen's current methodology is to provide panelists with a smartphone, but will this still be effective if most panelists already have a smartphone? Will they find value in a second phone if they already have one, or will it be better, in this case, to install the survey app directly onto their phone? How will incentives change as smartphones become more conventional? While we feel we have a good start on understanding how people have embraced smartphones, we need to continue answering these questions and anticipating trends.

Lastly, we should learn from the previous pattern that occurred with Online survey research. The novelty of the Internet was enough to drive response rates in the nascency of the Internet, but because of survey saturation, among other overuses, Online survey response rates are now in decline. While it might be impossible to avoid this same phenomenon for mobile surveying, it's important to consider which survey mode will produce the best results and which makes the most sense to use given the study objectives. If asking about recall data from the past few months, perhaps it makes less sense to ask these questions on a mobile device than it would if asking about day-in-the-

life questions. Researchers should do their part to keep survey completion rates high among mobile users, so making the surveys relevant and meaningful are a big part of this.

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