Making it fit: how survey technology providers are responding to the challenges of handling web surveys on mobile devices

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Abstract

While Mobile Research may always remain a niche survey mode, it is one that survey researchers ignore at their peril. Even if a web survey has not specifically been designed for engagement via mobile devices, a growing share of survey-takers are using their smartphones to respond to web surveys. Survey tools need to be re-engineered to cope with the constraints of the web-enabled mobile device, whether mobile participation is an intended objective or an unintended consequence of the research design.

Surveys designed for mobile access require a different mindset, not only in the researcher but also in the technology provider and implementer. There are some unexpected effects in deploying web surveys to mobile devices which go beyond the obvious limitations of screen size. If the technology used to deploy these surveys does not recognise and allow for these effects, they can introduce both coverage and measurement error into surveys, as participants either fail to participate, or provide inaccurate results.

Yet little is known about the technology requirements or what constitutes a core set of features for executing Mobile Research safely and with ease. This paper identifies a number of issues and constraints in deploying survey from the limited range of literature published on this subject to date, and then, in a piece of original research undertaken among specialist software developers active in this field, analyses the extent to which developers are providing tools that are fit for the medium of Mobile Research though the features they offer. The research shows that currently, all research platforms researched offer better support than generic web survey tools, but few Mobile Research software products meet the majority of requirements identified. Only a few support all the most commonly found mobile devices in use today, and many currently ignore activities where mobile participation can be an advantage, such as diary surveys

Keywords: **Mobile Research, Internet research, survey methods**

1. Introduction

Mobile research, or more precisely, self-completion surveys taken on mobile devices such as smartphones represent two distinct opportunities or challenges to the survey researcher. The more obvious is the opportunity to sample people while on the move, specifically targeting mobile users; the other arises as a consequence of people using web-enabled tablets and smartphones to access the internet as a matter of preference, and attempting to respond to a survey invitation on a device with a very compact screen and without a mouse or keyboard. Whether the survey presents itself in an accessible way or not on such devices is entirely dependent on the design choices and the software platform the survey designer uses. Without any consideration, the survey will be inaccessible, and such participants are likely to terminate without completion. Allowing this to happen, or preventing users from accessing the survey is not a neutral decision from a sampling perspective.

In the research I undertook for this paper, I wished to identify, from the published literature, what constituted a set of essential capabilities that survey software needs to be capable of either for explicitly conducting Mobile Research, or by allowing conventional surveys to be mobile-accessible, if the survey designer so chooses. I then followed this review with a survey among ten of the most active providers of survey data collection packages that are promoted as supporting Mobile Research, to identify the extent to which these software products meet the operational and methodological requirements that early practitioners of this new branch of research have identified.

2. Context

Technical antecedents to Mobile Research

Market researchers and social researchers have been using handheld consumer-oriented devices since at least the early 1990s in the form of tablet computers and electronic calendars which became known as personal digital assistants or PDAs. Forerunners included Techneos (Macer 2001 a) and Snap (Macer 2001 b), giving rise to a branch of computer-assisted

personal interviewing (CAPI) which came to be known as MCAPI or mobile CAPI (Pazurik & Cameron 2007 p.41). Initially, it was only the portability of the devices that was an attraction, as communication was indirect, relying on a synchronization process via a PC or a fixed-line modem. However, as early as 2002, GlobalBay (Macer 2002) integrated its own MCAPI interviewing product with the newly available GPRS wireless data communications (now known as 2G) to provide an interviewing capability with a real-time wireless data connection.

The rise of the mobile phone has also been accompanied by individuals and households choosing to abandon their fixed line and use only a mobile phone, which is giving rise to coverage issues in telephone surveys. Blumberg and Luke (2007) note that it is particularly prevalent among adults aged 18-29 and individuals belonging to low income households. Three years later, the same authors observed that almost one in three households (29%) in the United States was mobile only (Blumberg and Luke 2010).

Some sampling methodologists (Martin 2007, Lynn 2011) consider that mobile interviewing has an advantage over conventional web-based interviewing in reaching younger age groups that are generally considered hard-to-reach in both conventional web-based research and in telephone research.

The emergence of mobile self-completion on smartphones as a viable mode

Interviewing on mobile devices may be a specialised activity, demanding specialised software, yet developers have long recognised the need for researchers to be able to integrate surveys or data from such surveys with other more conventional survey data streams (Cameron and Weisberg 2003), or as a supplement to other modes.

Ten years ago, technology providers and researchers willing to experiment in novel self-completion methods were looking to WAP as a means of delivering online surveys to respondents on the move (Research magazine 2001). WAP (an abbreviation of *Wireless Application Protocol*) was an early open standard for delivering web content to mobile phones that has now largely been superseded by XHTML on modern mobile devices. SMS surveys were also shown to be a convenient way to interview populations that were hard to reach by more conventional survey methods (Cooke et al 2003), and could provide a convenient, if limited means of engagement even with nationally representative samples, if a very fast

turnaround was required for a survey (Duke 2003). Despite any advantages, WAP failed ever to develop as viable method and has now been rendered largely obsolete by XHTML. Even today, SMS surveys, though still a viable and useful method, account for only a negligible share of the methods used by commercial research companies (Macer and Wilson 2011 p. 15).

Shugan (2004) anticipated the popularity of mobile phones as an self-completion interviewing medium because of their ability to relate survey responses with locational data from the GPS capabilities starting to appear in more advanced mobile phones, and even the ability to interact with a respondent specifically because they had arrived at a location of interest to the researcher.

Mobile Research, in the form of self-completion surveys delivered over an Internet connection, became more feasible and more comparable with other established survey methods once consumer devices started to appear that combined the characteristics of larger screens and fast 3G wireless internet connections. While Apple launched its iPhone with a 320 by 480 pixel screen in June 2007, it was not until one year later that the iPhone 3G provided a fast Internet connection too: the 2007 model offered, at best, the slower 'Edge" or enhanced 2G capability. Research In Motion, an established provider of smart phone and electronic organiser devices waited until 2010 before introducing its Curve 9300 series, a consumer device that incorporated both a 320 by 240 pixel screen and 3G wireless connectivity.

Mobile Research experiences

Only a few case studies on the effectiveness of Mobile Research have entered the published literature to date. Okazaki (2007) demonstrated that a well-designed survey delivered to mobile internet-enabled phones with a 3G connection can achieve responses to scale questions which are comparable in terms of quality and reliability than those on paper or on conventional web surveys. His study also identified that participation was greater among under-30 age groups and among females than in conventional online surveys.

Zahariev et al (2010) conducted a number of comparative studies between conventional web surveys and mobile surveys, looking for differences in response by mode and even by the actual model of smartphone being used. Likewise, they concluded that the data collected from the mobile survey were consistent with those collected using a conventional online survey,

and that the device used had no significant impact on the data either. However, they took a stringent approach to the survey design, which was shorter than typical online surveys, and thus, they considered, optimised for mobile delivery.

Link et al (2011) have demonstrated that smartphones can be highly effective for diary studies, where participants are asked to answer a repeated set of questions, logging their activities or observations at different times across a period lasting several days. Their study involved 428 participants over a 35-day period and achieved an unusually high completion rate for each diarised event, at 87 per cent. Furthermore, the data showed no evidence of respondent fatigue, as the completion varied little across the full period of the study. The data were also judged to be of good quality. The survey asked participants to submit a photograph taken on the device's built-in camera, and to provide a caption for the photograph. Again, compliance was very high, with 71 per cent of diary entries being accompanied by a captioned image.

Bailey et al (2011) attributes the high response rate enjoyed by smartphone diary studies to result from a combination of factors: the convenience of the device and to some extent their novelty, plus the ability to program the survey to trigger audible alerts which remind participants to complete another diary entry. However, he recommends that the respondent should be able to suppress the alarm, for periods when he or she does not wish to be disturbed.

3. Best practices

Emerging best practices for mobile survey design

As an interviewing mode, Mobile Research is still in its infancy, and a consensus still has to emerge with regard to best practice. Many early adopters have set out their own models of good practice which show some consensus, despite their variations, on the need for mobile surveys to be concise in every way, and to be optimised for the capabilities of the mobile devices to be used.

Zahariev et al (2010), in producing parallel online and mobile versions of the same survey, recommend as good practice:

1. Designing the survey around single-choice, multiple-choice and open-ended questions alone.
2. Adopting more concise wording
3. Limiting the survey length to fifteen questions.

In addition, they pointed out some technical limitations which survey designers may find that their web survey software may not support, which included:

- Identifying which specific smartphones are supported, as only specific makes or models may be supported in some packages.
- Verifying that error messages and other components are not dependent on the use of JavaScript.
- Having a specific 'skin' or page template to format the survey for delivery on a mobile device, which maximised the limited space available for questions.

Pferdekaemper (2010) identified five key operational considerations that she considered pre-requisites for successful Mobile Research:

1. To use a concise, well-worded SMS text message invitation with an integrated link to the survey.
2. To ensure that the costs that a participant may incur are reimbursed (which is becoming or has become a professional standard for many professional research organisations).
3. To avoid complex matrix questions and replace these with individual questions, presented one by one.
4. To encourage active engagement, for example, by participants providing photographs.
5. To optimize response by selecting carefully the time at which survey invitations are sent. (Pferdekaemper observed that in Germany, invitations issued between 17.00 and 18.00 hours tended to receive the highest response.

Of these, the first four require capabilities in the software that are not typically found by in many conventional web survey tools, and call for specific adaptations to meet them.

More recently, Luck (2011) identified ten design objectives which mobile survey designers should aspire to, almost all of which focus on reduction and simplification in the presentation of the survey questions, such as avoiding the need for respondents to scroll horizontally to

view questions or answer options, avoiding logos, branding and other visual clutter, and using drop-down lists as an alternative to radio buttons in some cases.

The need to optimise the presentation of surveys for the small amount of screen space on mobile devices is well made by Callegaro (2010), who had observed an increasing tendency for online survey participants to take surveys designed for conventional desktop or laptop PCs on their web-enabled smartphones. He considers it essential that not just mobile surveys, but conventional web survey software should capture the user agent string provided by the survey taker's web browser in order to make informed choices about how to handle these kinds of participants, and potentially, optimise the survey delivery for the screen size of their device.

As a precursor to the survey of vendors, I made contact with researchers in three large research firms, at one large panel provider, one in-house research unit that conducts many thousands of their own surveys online and one Web survey software-as-a-service company. Each consistently reported that they observed two to three per cent of survey responses on conventional online research attempted on smartphones and related small-format devices, and in some cases it exceeded four per cent. The consensus is also that this figure is growing.

Technical best practices in survey software

Implicit in the published experiences of early adopters of Mobile Research and the best practices they propose are expectations that the survey software used will facilitate the design decisions they are making, and successfully support the delivery of their surveys across the spectrum of mobile devices that participants in the target sample frame will be using to complete the surveys. As already observed, these requirements are much more stringent than if the survey were being designed for online delivery to a conventional web browser alone.

In essence they are that:

- The survey will appear satisfactorily on the specific device, scaled appropriately and without the need scroll or zoom to view the questions.
- A wide range of devices supported.
- The survey designer can easily simulate how the survey will appear to the participant.

For the range of devices to consider, it is fair to say that this is a constantly changing landscape. According to Gartner (2010), the market share of the different smartphone operating systems is predicted to change considerably over the next four years:

OS	2010	2014
Android (Google)	17.7	29.6
iOS (Apple)	15.4	14.9
Research In Motion (BlackBerry)	17.5	11.7
Symbian	40.1	30.2
Windows Phone	4.7	3.9
Other Operating Systems	4.7	9.6

Table 1 Forecast: Mobile Communications Device Open OS Sales to End Users by OS (Thousands of Units) Soured: Gartner 2010

Support for the first five operating systems listed in Table 1 would achieve near universal coverage, or at least 95.3% in 2010, and is essential to achieve the objective of supporting a wide range of devices. However, according to the prediction, supporting all of these operating systems will only cover 90.3% of devices by 2014.

Application or Browser

The technology provider essentially has two options in providing support for Mobile Research: either to use the device's in-built web-browser that will display standard HTML or XHTML pages, or use an application (an 'app') designed specifically to run within the operating system of that device. This also means that the researcher (or those able to choose the platform they will use for their research) also has to choose between using an app or browser to deploy his or her survey, or find a software platform that supports both.

Both approaches have characteristics which can provide benefits over the alternative method, and both impose certain limitations.

The various characteristics, expressed as advantages and disadvantages are summarised in Tables 2 and 3.

Advantages	Disadvantages
• The survey does not need a permanent stable Internet connection at all times and the app can be designed to allow data to be collected offline until communications are resumed. • An app can be designed to exploit all the programmable capabilities of the device, which includes alarms, capture and upload of pictures and video, GPS or cell-based geolocation tagging and recognizing bar-codes through the devices built-in camera • The survey designer can have greater certainty about how the survey will be delivered and appear on the range of devices supported by the app.	• The App must be downloaded to the device prior to the start of the survey. • Apps are specific to the device, or the operating system on the device. It is difficult to develop apps that cover the entire range of devices, and these are constantly changing. • It may be more difficult to deploy the same survey to both mobile and standard browsers, unless the survey platform supports both HTML and App modes.

Table 2 Characteristics of Apps-based mobile surveys

Advantages	Disadvantages
• Uses standard HTML to achieve high coverage by not being restricted to a subset of devices. • HTML also facilitates multiple formats within one survey instrument so that a mixed mode approach can be taken, with the same survey instrument working on desktop and laptop PCs, tablet PCs as well as mobile devices. • Participant can engage immediately	• If using a standard or mixed-mode web survey tool, a stringent, lowest common denominator approach to survey design must be followed. • Web survey tools may, in some places, rely on flash, or java, which the device may not support, or on the use of mouse buttons (e.g. to achieve a shift-click), which the device does not have. • Hard to take advantage of other useful

without having to locate and download a specific application on to their device. • Avoids having to exclude mobile devices from conventional web surveys.	capabilities of the mobile device, such as alarms, geolocation finding, taking photographs or scanning barcodes. • A stable Internet connection is needed throughout the period of the survey.

Table 3 Characteristics of Browser-based mobile surveys

Perhaps the most significant distinction is the ability to work independently of an Internet connection, which an app can accommodate but a browser-based survey cannot (Pazurik & Cameron 2007, p. 43). As any mobile phone user will be aware, mobile coverage is variable and cannot always be relied on, for example, away from the highly-populated areas that mobile network providers tend to concentrate on. Even where coverage is normally good, mobile users will often encounter 'dead spots' where the signal will be lost, such as within large buildings or underground.

However, this convenience comes at a heavy cost in terms of (a) restricting the availability of that survey to those devices that are supported by the app and (b) the barrier that the act of downloading an app places between respondent and survey. This can unwittingly introduce coverage error into the sample frame.

The differences between apps and browser are also significant in the kinds of capabilities that are required in order to meet the needs already identified by Mobile Research practitioners. For the purpose of this research, I therefore divided those requirements into two different lists, one which applies to apps and the other which applies to browsers.

Characteristics sought for mobile survey apps

I have identified the following key requirements for mobile survey apps, in order to support the range of activities and best practices proposed by early practitioners of Mobile research:

1. Simple, easy download for respondents. This is in order to minimize the risk that a respondent is deterred from participating because the download process is difficult to follow.

2. Web server-based authoring and deployment environment for the researcher to use. This is a matter of convenience rather than a necessity, but makes it easier for the researcher to be aware of the visual design of their survey.
3. Device specific preview (a capability sought for both app and browser tools)
4. Capture geolocation data, with respondent permission. Location data can either be from the mobile data cell (which can vary in accuracy from 0.5Km to 25Km according to the location, or if the device has GPS support, from GPS which is accurate to 1m or less). Informed consent is also good practice, and the software should allow the participant to withhold geolocation data, if they so choose.
5. Capture and upload photos and video. This should be integrated so it can be achieved without having to leave the application or upload it separately, as is the case if a web browser survey is used.
6. Diary surveys: repeated capture of same questions.
7. Diary reminder alerts with a do-not-disturb option. Respondents should be able to silence the alarm at times when they are not available, e.g. when at work, or from a safety consideration, if driving a vehicle or operating machinery.
8. Online/offline capability. This is a key benefit of the app method, yet it cannot be assumed that all apps are designed to buffer data when offline.
9. Barcode scanning with respondent confirmation. Barcodes and QR codes (2D barcodes) scanned using the device's built-in camera can save time with data entry, can even be used to select the appropriate survey or can be used to validate the survey. As with photographs, the capability needs to be integrated so the survey-taker does not have to switch to a different app to decode the barcode.

Characteristics sought for mobile browser-based surveys

Likewise, I have identified the following eleven requirements for mobile surveys delivered through the device's built-in browser:

1. Device specific preview (a capability sought for both app and browser tools)
2. Deploy surveys to both full-screen and mobile devices (mixed-mode capability). It is operationally much more convenient if the same survey instrument can be delivered to both large- and small-format web browsers.
3. Automatically detect the device resolution and reformat survey to fit. This ensures that the screen size is recognized and the display re-dimensioned to fit.

4. Optimize the presentation of the survey for small-format devices, This goes beyond item 2 to specify that the software actively changes the format of questions between online and mobile versions, such as to avoid horizontal scrolling, to convert long lists of check-boxes to drop-down lists,
5. Gracefully unwind grids into a series of individual questions.
6. Record the device type used in the data. This is taken from the browser's agent string.
7. Offer integrated survey invitations and reminders by email and SMS.
8. Allow respondent to save and resume later in 'desktop' or mobile mode. This is because a respondent on the move may have limited time, but may also be willing to complete the task later,
9. No dependency on mouse controls (shift+click etc.) as they are not supported on mobile devices.
10. No dependency on using Flash controls, as these are also typically not supported.
11. Ability to create specific routing and validation dependent on device type. This permits manual intervention, if required, in presentation.

4. The survey

For the survey, I identified ten different technology providers active in the field. Each company was sent a simple questionnaire form, in electronic format. Of the ten companies contacted, one failed to respond and one declined to participate. This left eight companies that provided information, seven of which offered browser-based solutions, six offered apps and five offered both (see Table 4).

	App	Browser	Both
Askia	✓	✓	✓
CfMC WebSurvent		✓	
Confirmit		✓	
Globalpark EFS	✓	✓	✓
iPinion Surveys	✓	✓	✓
Kinesis	✓	✓	✓
Surveyswipe & Surveypocket	✓	✓	✓
Techneos	✓		

Table 4 Incidence of apps and browser-based solutions among the software providers surveyed

5. The results

Support for the range of devices and platforms available

Companies were asked which specific devices or operating systems were supported, including the older WAP (WML) standard and the more specific mobile version of HTML, XHTML
The survey revealed important differences in the support offered, particularly among the apps, however, there were also differences between browser-based solutions, particularly for the older formats.

Device	**iPinion**	**Kinesis**	**Survey-pocket**	**Techneos SODA**	**Askia mobile**	**Global-park**
Android	✓	planned	✓	✓	✓	planned
BlackBerry	✓		planned	✓	✓	planned
Symbian	planned			✓	planned	
iOS (Apple)	✓	✓	✓	✓	✓	✓
Windows mobile	planned		planned	✓	✓	

Table 5 Mobile survey apps: platforms supported

Device	iPinion	Kinesis	Survey-swipe	CfMC	Askia	Con-firmit	Global-park
Android	✓	✓	✓	✓	✓	✓	✓
BlackBerry	✓	✓	✓	✓	✓	✓	✓
Symbian	✓	✓			✓	✓	✓
iOS (Apple)	✓	✓	✓	✓	✓	✓	✓
Windows mobile	✓	✓	✓	✓	✓	✓	✓
WML	planned	✓					✓
XHTML	planned	✓		✓	✓	✓	✓

Table 6 Browser-based tools: platforms supported

Specific capabilities for app survey tools

Support for the different capabilities sought for apps showed wide variation, with many features still at the formative stage. The results are presented below:

Device	iPinion	Kinesis	Survey-pocket	Techneos SODA	Askia mobile	Global-park
Simple 1-click from a web link	✓		✓	✓	✓	✓
From an integrated panel portal	✓	✓	✓	planned	✓	✓
From app site or App Store	✓		✓		✓	✓

Table 7 Download capabilities offered (key requirement 1)

Device	**iPinion**	**Kinesis**	**Survey-pocket**	**Techneos SODA**	**Askia mobile**	**Global-park**
2. Web browser authoring and deployment	planned[1]	✓	✓	✓	planned	✓
3. Device-specific preview	planned		planned	✓[2]	✓	
4. Capture geolocation data	✓	✓	✓	✓	✓	✓
5. Photo and video capture	✓	✓	✓	✓	✓	✓
6. Diary survey mode	✓	✓	planned	✓	planned	✓
7. Diary alerts (regulated)	planned	✓		✓	planned	✓
8. Online/ offline	✓		✓	✓	✓	planned
9. QR/Bar code scanning	planned	✓	planned	✓		planned

[1]Authoring is performed via either Confirmit or iBM SPSS Dimensions design module

[2]via 3rd party simulator

Table 8 App capabilities where support was not universal

Specific capabilities for Browser-based tools

Support was more consistent for browser-based tools with more complete features demonstrated, and fewer items in development.

Capability	iPinion	Kinesis	Survey - swipe	CfMC	Askia	Con-firmit	Global-park
1. Preview via simulator	planned	✓	planned			planned	✓
2. Mixed-mode	✓	✓	✓	✓	✓	✓	✓
3. Detect resolution and reformat survey	✓	✓	✓	✓	✓	✓	✓
4. Optimise presentation	✓	✓	✓	✓	✓	✓	✓
5. Unwind grids	✓	✓	planned	✓	✓	✓	✓
6. Record device:							
a. at survey level	✓	✓	✓	✓		✓	✓
b. at question level		✓		✓		✓	✓
7. Invitations etc by Email and SMS	✓	✓	planned	✓	✓	✓	✓
8. Save and resume		✓	planned	✓	✓	✓	✓
9. No mouse control	✓	✓	✓	✓	✓	✓	✓
10. No Flash controls	✓	✓	✓	✓	✓	✓	✓
11. Routing by device	planned	✓		✓		✓	✓

Table 9 Browser-based capabilities where support was not universal

6. Discussion

It should be noted that the survey for this paper was conducted in May 2011, and it is entirely possible that some of the 'planned features' have now been implemented by the developers.

However, the responses from the software developers show that there are widely varying interpretations of what support they need to provide to facilitate mobile research.

Items universally supported

Of the eleven specific capabilities sought for web browser surveys, all of the providers satisfied five (see Table 9):

2. Deploy surveys to both full-screen and mobile devices (mixed mode capability).
3. Automatically detect the device resolution and reformat survey to fit.
4. Optimize the presentation of the survey for small-format devices.
9. No dependency on mouse controls (shift+click etc.).
10. No dependency on using Flash controls.

There was variable support for the other six capabilities, which will be discussed below.

However, of the nine specific capabilities sought for apps, only two were universally met (Table 8):

4. Capture location data, with respondent permission.
5. Capture and upload photos and video.

There was also generally good support for item 1 too – the provision of a simple download capability for the participant to obtain the app, but the other six were met with varying degrees of support.

This is also apparent if the responses are quantified to show the total number of items supported by all products in the survey against those not supported or those for which support is planned (Table 10).

	All capabilities	Currently Supported	Planned for support	Items not supported
App	84	48	22	14
	100%	*57%*	*26%*	*17%*
Browser	98	73	9	16
	100%	*74%*	*9%*	*16%*

Table 10 Quantity of features supported or planned for support

Overall, the Web-browser products met more of the capabilities sought than the app products. However, there were far more features 'in the pipeline' for apps, and once those promises have been delivered, the overall level of compliance will be comparable.

Browser or App

While some vendors have specialized in serving the browser or the app-based solution, it is encouraging to see that many cater for both, which means that it becomes a survey design decision and not a software platform decision for researchers to select the most appropriate modes for their research.

Mixed-mode web and mobile web

It is also good to note that all the browser solutions we examined will integrate seamlessly with standard online surveys, will auto-detect the device and apply a different template or skin, sparing the researcher from having to write multiple versions of the same question. The automatic unwinding of grids into separate questions was also very well supported among the mobile-enabled web survey tools.

Intervening with manual controls, by device, was less reliable. Only four of the seven products allowed the survey logic to perform routing or selections by the specific device being used (with one planning to add this feature).

If you wished to inspect which device was used (through capturing the agent string from the browser), most products would let you do this at a survey level, but only four of the seven allowed this at a question level, even though the participant may switch device if resuming the survey later, and this information would therefore be inaccurate.

This causes a conflict with another important capability: allowing a mobile survey taker to be able to save his survey and resume later on a full-screen browser at home or at work. Five of the seven already supported this, with a sixth planning to. Ideally, both of these capabilities should coincide.

Previewing and simulations

Semi-automated optimization by the software does not entirely relieve the researcher from testing their survey on a range of devices, which can be time-consuming and difficult to

arrange. Online simulators can make this task much easier, but is an area where researchers are poorly supported, as only two of the seven providers offered an integrated device simulator within their authoring and testing environment. This does not rule out using third party simulators or actual devices, but makes the process more burdensome on the survey designer.

With apps, only one of the six products offered an integrated preview mode for the target device, with another providing links to third party simulators. This appears to be an area of weakness in the current authoring and testing environments.

The risk, if testing remains difficult to carry out, is that researchers will deploy inadequately tested surveys which participants are not all able to complete.

Range of devices supported

Many, but not all vendors support a wide range of devices. There was universal support for Apple's iOS, for Google's Android and for Research In Motion's BlackBerry. Symbian, which is declining in popularity, though still a significant platform, was only offered by five of the seven browser-based products and five of the six apps. XHTML was only supported by five of the seven web-browser tools (it does not apply to apps) and the old, and very limited WML/WAP was supported by only two. Ignoring WML is a decision that makes catering for the lowest common denominator much less restrictive, and is probably unimportant in North America or Europe, but in emerging markets such as Africa or India where data plans are expensive and smartphones are less prevalent, this could exclude many participants.

Specialist features for apps

Software developers are not necessarily taking advantages of all of the capabilities that the app can access on a modern smartphone. There was considerable variation in the support offered for audible alarms, integrated barcode scanning, integrated photo and video-taking and upload and for geolocation tagging.

Most surprisingly, only four of the six app providers supported disconnected data collection, where the survey continues to function even if the data connection is lost (one was planning to introduce this).

Only one solution offered support for all of these mobile device features; it appears that most providers are not currently targeting the distinctive capabilities that Mobile Research can offer, for diary studies, for location-aware research, or to capture images from the participant in 'the moment of truth', which researchers are seeking. This may be because many of the apps have been developed from existing online platforms, and developers lack experience in the specialised field of mobile research.

7. Conclusions

Mobile research is still at an early stage of development. Among researchers, models of best practice are still developing, and this appears to be mirrored by what is still rudimentary support for Mobile Research among many (though not all) software tools being targeted at this new research method.

While the basic requirements are catered for – such as reasonably widespread support for a range of devices that would cover virtually 95% of smartphone users and automatic resizing of questions and optimising of the screen for dual mode mobile and web surveys, the more advanced or distinctive features of Mobile Research are still less common.

Those selecting software for Mobile Research need to be aware of the considerable variation in the capabilities different solutions provide, and not assume that some seemingly obvious capabilities will be met in any Mobile or Mobile-capable research software.

Developers in particular need to be much more aware of the importance of testing, and provide better ways to assist researchers in testing that their mobile surveys are accessible and work well across all devices likely to be found in the hands of their respondents.

This research has focused on software packages that their providers have positioned to address the needs of mobile survey takers. However, it is still the case that the vast majority of online survey packages do not offer even rudimentary support for mobile devices, and assume that participants will be using a conventional browser on a laptop or desktop PC.

Callegaro (2010) confirmed that survey takers are already taking conventional online surveys on mobile devices, and without the kind of mobile-friendly adaptations of the survey packages examined in this paper, their survey experience will frequently degenerate into chaos.

Future work needs to focus on the effect of mobile devices on conventional online research, and the extent to which online survey software in general is recognising that this is an issue that needs to be addressed in their own software.

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References

Bailey, J. T., Bensky, E. N., W. Link, M. W., Benezra, K. and Makowska, H., (2011). Can Your Smartphone Do This?: A New Methodology for Advancing Digital Ethnography. Presented at *AAPOR 66 Annual Conference*, May, Phoenix AZ.

Blumberg, S. J., and Luke, J. V., (2007). Coverage Bias in Traditional Telephone Surveys of Low-Income and Young Adults, *Public Opinion Quarterly* 71 (5) pp. 734-749.

Blumberg S.J. and Luke J.V. (2011). Wireless substitution: Early release of estimates from the National Health Interview Survey, July-December 2010. National Center for Health Statistics. June 2011, retrieved from http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201106.htm on 7 August 2011

Callegaro, M., (2010). Do You Know Which Device Your Respondent Has Used to Take Your Online Survey? *Survey Practice*, December, AAPOR, retrieved from http://surveypractice.wordpress.com/2010/12/08/device-respondent-has-used/ on 1 August 2011.

Cameron, M. and Weisberg J., (2003), in Banks, R et al, *Survey & Statistical Computing IV, The impact of technology on the Survey Process*, Association for Survey Computing.

Cooke, M., Strong, C., Nielsen, A., (2003). The Use of SMS as a Research Tool, in R. Banks, (Ed), *Survey & Statistical Computing IV, The impact of technology on the Survey Process*, Association for Survey Computing

Duke, S., (2003). A world first - representative polling by text message, in R. Banks (Ed), Survey & Statistical Computing IV, The impact of technology on the Survey Process, Association for Survey Computing.

Gartner, (2010). Forecast: Mobile Communications Devices by Open Operating System, Worldwide, 2007-2014, Gartner, Stamford CT. Retrieved from http://www.gartner.com/it/page.jsp?id=1434613 on 7 August 2011.

Link, M. W., Bensky, E. N., Bailey, J. T., Lai, J., Benezra, K. and Makowska, H., (2011). This Time for Africa: Using Smartphones to Measure World Cup Engagement in South Africa, Presented at *AAPOR 66 Annual Conference*, May, Phoenix AZ.

Luck, K., (2011). How to make mobile research work for everyone, *Quirk's Marketing Research Review*, June, p.52.

Lynn, P. (2011). Mobile Phone Surveys From a Total Survey Quality perspective, presented at the *Mobile Research Conference 2011*, April, London, Globalpark. Retrieved from http://www.slideshare.net/Globalpark/from-a-total-survey-quality-perspective-university-of-essex-mobile-research-conference-2011 on 8 August 2011.

Martin, B., (2007). Research-to-go, *Quirk's Marketing Research Review*, November, p.68.

Macer, T., (2001 a), A Handy Technology, *Research*, 419, April, retrieved from http://www.meaning.uk.com/arts/52.html on 1 August 2011.

Macer, T., (2001 b), Make it Snappy, *Research*, 424, September, retrieved from http://www.meaning.uk.com/arts/58.html

Macer, T. (2002). Techno time: Will the union of CAPI and mobile phone technology work?, *Research*, 439, December. Retrieved from on http://www.meaning.uk.com/arts/85.html on 1 August 2011.

Macer, T. (2007). Converso reviewed, *Research*, 498, November, p. 60.

Macer, T. (2007). Accesspoint 4.0 reviewed, *Research*, 499, December, p. 48.

Macer T. and Wilson. S., (2011) Results of the 2010 Globalpark Market Research Software Survey, London, meaning ltd. Retrieved from http://www.meaning.uk.com/news/2010-market-research-software-survey-results-released/ on 1 August 2011.

Research Magazine (2001). New WAP service enters fray, retrieved from http://www.research-live.com/news/new-wap-service-enters-fray/2000861.article on 1 August 2011.

Okazaki, S. (2007). Assessing mobile-based online surveys. *International Journal of Market Research, 49*, 651-675.

Pazurik, A., & Cameron, M. (2007). Survey research in a wireless world. In M. Trotman (Ed.), *The challenges of a changing world* (pp. 39-44). Association for Survey Computing.

Peytchev, A., & Hill, C.A. (2010). Experiments in mobile web survey design: Similarities to other modes and unique considerations. *Social Science Computer Review*, 28 (3) pp. 319-335.

Pferdekaemper, T., (2010). Mobile research offers speed, immediacy, *Quirk's Marketing Research Review*, June, p. 52.

Shugan S., (2004). The impact of advancing technology on marketing and academic research, *Marketing Science* 23, (4), pp. 469–475.

Zahariev, M., Ferneyhough, C., Ryan, C., & Bishop, S. (2009). Best practices in mobile research. Presented at *ESOMAR Online Research*, Chicago, IL, ESOMAR.

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