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Contents

Editorial

Richard Bartholomew
Editor

Longitudinal studies provide the cornerstone of some of the most influential social science evidence – notably the series of birth cohort studies conducted in the UK since 1946. But they can be difficult and expensive to maintain with one of the biggest challenges being to retain sufficient levels of response through successive waves. In their article on participant engagement in longitudinal studies, Alison Park and her colleagues provide a comprehensive overview of the different strategies taken to maintain both the level and quality of response, including many innovative ways of promoting the active engagement of participants in the studies. The article draws on both a recent workshop and a survey of 26 longitudinal studies from across the world. While we may be familiar with the big UK-based studies such as the Millennium Cohort Study or the Avon Longitudinal Study of Parents and Children (ALSPAC), it is refreshing to also hear about experiences of less familiar studies such as the Young Lives study of childhood poverty being conducted in Ethiopia, India, Peru and Vietnam. One of the intriguing questions raised is the extent to which encouraging greater active participation may affect not only levels of response but also the future behaviour of respondents.

Articles in previous issues of this journal have examined the consequences for response rates and data quality of the increasing use of smartphones to complete online surveys. In Issue 3, Tim Hanson et al discussed this in relation to general population samples; in Issue 5, Peter Matthews et al examined the effects of smartphone use in a survey of 16- to 17-year-olds. In this issue, we return to this important theme with an article by Bob Erens and colleagues which analyses new evidence on the effects of using smartphones as compared with PCs in a workplace survey of highly qualified professionals – general practitioners who took part in the Improving General Practice Services Survey. As with the earlier studies, the overall conclusions are reassuring, with the effects of smartphone use being less dramatic than some have feared. But the authors highlight the practical design features which researchers need to incorporate to ensure questionnaires are suitable for mobile devices.

Our third article, by Liz Austen et al, explores the potential of a very different form of research which, in some instances, could provide an alternative to more conventional interview-based approaches – digital storytelling as used in a higher education context. This approach is seen as especially valuable for capturing the experiences of traditionally marginalised student groups. It can be a beneficial way of enhancing teaching and student learning. But as a potential research method, it poses challenges: editorial control lies primarily with the storyteller and researchers act as facilitators of the story rather than as co-constructors; the highly individualised nature of storytelling can make it difficult to systematically identify common themes; and the intensely personal nature of the narratives poses difficult ethical issues which need to be anticipated. The authors highlight the need to do more to explore how digital storytelling can be used more effectively for evaluation purposes.

I hope you enjoy reading this issue. We welcome proposals for new articles or shorter research notes. Our next issue will be published in summer 2019. If you are interested in offering a research note or a full article please check the submission details online at **www.sra.org.uk**

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Participant engagement in longitudinal studies: current practice, opportunities and challenges

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Abstract

Drawing on presentations given at a workshop sponsored by Cohort and Longitudinal Studies Enhancement Resources (CLOSER), this article reviews the range of participant engagement strategies used by longitudinal studies in the UK and around the world. Studies are evolving traditional approaches like mailings and materials; using websites and social media; tailoring monetary incentives; and using different forms of face-to-face interactions with participants like social events and advisory groups. We present what these studies have found to be best practice; discuss key learnings and similarities and differences between studies; and propose avenues for future research.

Introduction

Longitudinal studies use a variety of strategies to maintain interest, encourage participation, increase commitment and otherwise engage sample members over the lifetime of a study. This reflects a desire to minimise attrition over time, but can also stem from a belief in the broader value of participant engagement to the design of the study and benefiting study members for their participation. Many studies are using a range of participant engagement strategies, including holding events for study members, engaging with the arts and taking advantage of technologies to communicate with participants in new ways.

Based on presentations given at a January 2016 workshop (**https://www.closer.ac.uk/event/participantengagementkew/**) by Cohort and Longitudinal Studies Enhancement Resources, 2016 (CLOSER), a consortium of eight leading longitudinal studies in the UK, this article reviews the range of engagement strategies currently used by longitudinal studies in the UK and around the world. We present what these studies have found to be best practice; discuss key learning, similarities and differences between studies; and propose avenues for future research.

Background

Approaches to participant engagement can be seen as lying on a continuum. One end is typified by strategies which require a fairly passive role from study members. Examples of these include the various types of materials that studies aim at their participants, including letters (some offering incentives to participate) and postcards; websites; and social media activity such as Twitter. The other end is typified by approaches that require participants to play a more active role. Examples of this approach include participant advisory groups or consultations; patient and public involvement (PPI); or participatory action research. Engagement strategies have evolved – and continue to evolve – over time, with digital technologies playing a particularly prominent role in how new approaches are developing.

Several factors influence which forms of engagement strategies may be used. Study disciplinary background is one factor: participant advisory groups and PPI (both at the more active end of the engagement continuum) are more commonly found among biomedical than social science studies. There are also disciplinary differences in whether studies use strategies which involve participants' identities being revealed with their consent to each other and/or publicly. Social science studies (for which data is often more easily obtained than that of biomedical studies) avoid such approaches. Sample characteristics make a difference, with key considerations including the homogeneity of the sample; its geographic spread; the age-range of participants; and overall sample size. Practical considerations such as survey budget and the mode of interview also shape the strategies used. More generally, all studies have to operate against a backdrop of public confidence and trust in research and how personal data is stored and used, and these contexts can change over time and vary between countries. Finally, the choice of engagement strategy may reflect its perceived effectiveness, with some but not all approaches having been evaluated in terms of their impact on attrition.

Prior to hosting a workshop focused on participant engagement, CLOSER conducted a short survey in 2015 to better understand what longitudinal studies are doing to engage their participants. Overall, 26 international longitudinal studies took part: 14 were based in the UK; eight elsewhere in Europe; and four were non-European. The survey showed that a variety of strategies are used in any single study. As expected, most use traditional strategies like feedback mailings and monetary incentives. However, many studies are also using more novel forms of engagement including study websites and social media, participant advisory groups and events/conferences. To date, little is known about the effectiveness of these less traditional forms of engagement (Park and Calderwood, 2016).

Following the survey, CLOSER held a workshop in 2016 at which longitudinal studies from around the world shared the many different kinds of engagement strategies they used. In this article, we describe how these studies are evolving traditional approaches like mailings and materials; how they are using websites and social media; the tailoring of monetary incentives; and different forms of face-to-face interactions with participants. We include information about their effectiveness where this was available from the presentations, and also include some references to published research in these areas. We describe what these studies have found to be best practice (as presented at the workshop), and discuss key learning, similarities and differences between studies. We also propose avenues for future research in this area.

Participant engagement strategies

Materials and content of mailings

The 2015 CLOSER survey showed that the use of mailings remains the most common type of strategy reported by the 26 longitudinal studies that responded. Of this group, 23 use newsletters, leaflets or bulletins; 21 use traditional letters or postcards; 19 send change-of-address cards; and 19 send birthday or Christmas cards (Park and Calderwood, 2016). Every participating study used at least one of these methods, with the majority (23) using three or four. The prevalent use of these traditional approaches reflects well-established evidence about their effectiveness. Advance notification is positively associated with participation in cross-sectional studies (see for example De Leuuw et al, 2007 for a review), but there is less evidence about the impact of mailings on response rates and retention in longitudinal studies. There is some recent evidence about the effectiveness of targeting communication messages (Lynn, 2016; 2017). Much of the research in this area has focused on between-wave mailings, showing that they are effective overall at reducing attrition, and that targeted content, incentives and professionally-designed materials may be effective at boosting response, including from certain sub-groups (McGonagle et al, 2011; McGonagle et al, 2013; Fumagalli et al, 2013; Calderwood, 2014).

Studies use mailings in strategic and targeted ways, often using images to enhance both aesthetics and relevance. For example, in the annual feedback mailing for the 1958 and 1970 birth cohort studies at the Centre for Longitudinal Studies (CLS), cohort members are informed of updates and research impact through three to four carefully selected stories and images with a variety of themes and are shown both positive and negative results from research. CLS has found short articles (250-300 words) written in plain English and simple infographics to be effective at communicating research findings to participants. Images are carefully chosen to show people with natural poses and smiles engaged in activities, and to cover a range of ethnicities at an appropriate age (Rainsberry, 2016a).

In addition to mailings, some studies are using new types of physical materials. Two studies of children use photography: a medium appealing to both children and their families. The Born in Bradford study, which tracks the health of children (and their parents) born in Bradford, UK between 2007 and 2010, has worked with a social documentary photographer since its launch in 2005. Photos taken of fathers with their babies and of the children as they have grown were compiled into ‘chapbooks’ for participants and displayed at a family festival event (Barratt and Andrews, 2016). Photography has also been important as a form of research reciprocity for Young Lives, a longitudinal quantitative and qualitative study of childhood poverty that has followed 12,000 children in four different countries – Ethiopia, India, Peru and Vietnam – over 15 years. One of the most valued forms of feedback for Young Lives participants has been albums of photos taken of the children and family in front of their home at each visit and photos taken of the children doing daily activities (Knowles, 2016). The sentimental value of these photo albums well exceeds the monetary costs. The ways in which studies customise content in mailings and materials given to respondents show that ‘traditional’ methods are evolving to better suit the needs and wants of their subject populations. The strategic and creative use of images of participants are especially important not only as a form of feedback for some groups, but also as a way of highlighting content, personalising the study and connecting participants to the survey’s human impact. However, such approaches would likely not be acceptable for social science studies as they involve the participants being identified.

Online communication and social media

To some extent, online communications can be seen as an extension of more traditional forms of engagement like letters and postcards. Similar to mailings, websites, email and social media are used to feedback to participants, seek updated contact information and inform them of upcoming survey activities. Online communications also provide new opportunities to engage participants in cost-effective ways and to share news and interact 'in real time', especially as internet usage has become increasingly widespread. Nearly three-quarters of respondents to the CLOSER survey reported that their studies communicate with participants online in some form: 19 have a participant-facing website; 16 use email; and ten use social media (Park and Calderwood, 2016).

Many studies use several internet or social media outlets concurrently. As presented by Burton et al (2016), the website is a key engagement tool for Understanding Society, a UK-wide study for which diverse study participants range from age ten to 102. Sample members can contact the study through the site; find study news and examples of impact; view copies of past mailings; and see FAQs. The study also posts study news on Facebook, Twitter and Instagram. Similarly, the Avon Longitudinal Study of Parents and Children (ALSPAC), a birth cohort study of families in the Bristol area, UK (also known as Children of the 90s), has a lively social media presence with several Facebook pages for different sub-groups. Facebook posts include pictures and news about events; research findings; invitations to events; and information on what to expect. Unlike with Understanding Society, ALSPAC's Facebook pages allow for one-to-one communications between participants and with the study, and are used to elicit involvement and feedback. ALSPAC also has a YouTube channel, Instagram account and Twitter account (O'Hare and Jacobs-Pearson, 2016).

The use of this technology comes with challenges, however. Internet and social media use varies among different age-groups and other sub-groups (Ofcom, 2017), in particular with higher use shown among younger people. So, opportunities to engage through the internet or social media may apply to only a proportion of the study sample or only particular age cohorts. Even among younger people who have grown up with this technology, important nuances exist between teens' and young adults' engagement with social media content.

The Millennium Cohort Study (MCS), a longitudinal study of about 19,000 children born in the UK in 2000-01, and Next Steps, which follows the lives of around 16,000 people born in 1989-90, had both recently relaunched their communications programmes. Both were at key transitional points within the respective surveys: MCS cohort members were about to become the main respondents for interview for the first time, while the Next Steps survey was to be relaunched under the management of the CLS, following an up to ten-year gap in contact with participants. Following audience research (described later in this article), both studies created new websites and launched Facebook and Twitter accounts.

The studies found that both the level of engagement and the preferred content differed between the two age-groups. Online engagement was more effective for the 14-year-old MCS members and their families than Next Steps' 25-year-old members, who showed low levels of engagement over Facebook and Twitter overall. Further, for MCS members, real-time updates made for good social media content (more 'likes'), news was more popular than summaries of findings on the website, and mailings were effective at driving website traffic. Next Steps' members, on the other hand, 'liked' findings and impact information on social media, and email was more effective at driving website traffic than post (Rainsberry, 2016b).

Using social media also raises ethical concerns about study members' privacy and confidentiality. In order to mitigate risks to privacy and confidentiality as well as the risks that members would post or share false or negative information on social media, MCS and Next Steps use protected Twitter accounts with disabled photo-tagging; disable timeline posts, ratings and photo-tagging in Facebook; provide 'staying safe online' information on the website; monitor social media accounts daily; and set the profanity filter to 'strong' (Rainsberry, 2016b).

There are different approaches to the use of social media between biomedical studies such as ALSPAC, and studies in the social science tradition such as Understanding Society, Next Steps and MCS. The former encourage interaction on social media between participants and are not concerned about participants revealing their identities to each other; the latter primarily use social media to disseminate information and minimise or discourage interaction between participants. This difference is likely to reflect a number of issues, including disciplinary differences in data access.

As the effectiveness of social media and websites can vary by study and at various stages of a study, further research is needed on the impact of online engagement, as well as on differences in usage and preferred content among various sub-groups. Empirical evidence is also needed on cost-effectiveness in terms of time investments and effects on attrition or other study outcomes for both social media and websites, which differ in the quality of engagement. Social media requires more recurrent updating and monitoring than websites: it is important not only to keep accounts lively through frequent postings, but also to monitor for potential safety or confidentiality issues in social media interactions. Moreover, the attractiveness of particular social media sites to different age-groups will change over time. Websites, on the other hand, tend to function as more passive forms of engagement, but are able to provide much more information than social media outlets and may require less continual maintenance.

Monetary incentives

The CLOSER survey found that monetary incentives were the third most commonly used engagement strategy after online communications and mailings. Ten of the 26 studies used monetary incentives or a mix of monetary and non-monetary incentives (Park and Calderwood, 2016).

Incentives are effective at boosting response rates in both cross-sectional and longitudinal studies (for example Singer, 2002; Jackle and Lynn, 2008). In the longitudinal context, unconditional incentives have a larger long-term effect than conditional incentives (Jackle and Lynn, 2008), and higher-value incentives tend to reduce attrition at the subsequent wave (Rodgers, 2002). Further, reducing incentive amounts at later waves does not seem to have a negative impact (Jackle and Lynn, 2008).

At the CLOSER workshop, several household panel studies shared how they are adapting monetary incentives to suit their specific study design, and how they are tailoring incentives for specific populations over subsequent waves. The Longitudinal Internet Studies for the Social Sciences (LISS), a household panel study in the Netherlands that administers its questionnaires online every month, keeps respondents 'happy' by providing monetary incentives of €15 an hour and free internet access and computer loan if necessary (Janssen, 2016).

Both Understanding Society and the Panel Study of Income Dynamics (PSID) used unconditional incentives initially, but now find conditional incentives to be effective at boosting participation among certain sub-groups. For example, Understanding Society offers a £10 voucher per adult for those whose household responded in the previous wave, and £20 for those whose household did not respond in the previous wave (if they respond, the incentive reverts back to £10 in the subsequent wave). In addition, ad hoc incentives are given for additional tasks, like completing a time diary or qualitative interview as part of the study or returning change-of-address cards (Parutis, 2016). PSID, currently the world's longest running national household panel survey of about 10,000 families, interviews by telephone every other year. The use of incentives has been a longstanding plan, and they devote a lot of resources to monetary incentives (approximately $1 per interview minute). Additional incentives include small payments for returning an address update postcard and reimbursements for mobile phone minutes, childcare or meals. PSID has recently begun to use incentives more strategically due to lower responses among certain sub-groups; periods of low activity; lagging or burdensome study components; high-cost activities where cooperation is essential (for example keeping an appointment for in-person visits in remote areas); or when there are challenges in achieving response rate goals (for example end-of-study incentives that double in the final month – $75 to $150) (Sastry, 2016).

A traditional strategy to reduce attrition and boost response rates, monetary incentives remain effective. Unlike other forms of engagement, the effect on survey participation is more direct and easier to quantify. The aforementioned household panel surveys suggest that tailoring monetary incentives to account for greater respondent burden or to persuade more difficult-to-engage sub-groups can help counteract reluctance to participate and potentially save on other costs.

Participant involvement in study design

Some studies actively engage participants by involving them in the design and management of the study itself. Of 26 studies, eight studies have participant advisory groups, and six have carried out some form of participant consultation, according to the CLOSER survey (Park and Calderwood, 2016). More common among studies from a biomedical tradition, this strategy provides an opportunity for intimate engagement and impact on the survey. Two different models were used by studies: ongoing advice for various stages or parts of a survey, or singular consultations to solicit information for specific issues.

Brightlight and ALSPAC use ongoing advisory panels and focus groups to inform their study design. The 2012 TYA Cancer Cohort Study, a cohort of 1,000 teenage and young adult (TYA) patients followed for three years, is central to Brightlight, a national evaluation of TYA cancer services in England. The design of this study was informed by work with young people acting as co-researchers in a youth advisory panel. Brightlight reports that the benefits of working with the advisory panel were higher than expected in uptake and retention. The youth participants also had important insight into the recruitment process. Those in the youth advisory panel continue to work with researchers to consult on study conduct (for example recruitment, retention, frequency and content of newsletters) (Fern, 2016). ALSPAC set up an advisory panel in 2006. Members are recruited and re-enrolled annually; they advise on study documentation, data collection proposals and study design; and sit on the study's ethics committee to share their opinions about the future of the study. Several other focus groups were established, including a smoking-study feedback group and family-newsletter focus group. Participants were also involved in the design and content of the 21st birthday book sent to study members as a Christmas present (O'Hare and Jacobs-Pearson, 2016).

Other studies have used one-time consultations to solicit opinions on aspects of study design like informed consent and communication preferences. The Nord-Troøndelag Health Study (HUNT), a longitudinal population health study in Norway, held a workshop to consult participants on how they wanted to be contacted, as well as to discuss issues about dynamic consent. As a result of the meeting, the study found that participants wanted to have access to their individual information, and that 'once and for all' consent was 'good enough' (Stuifbergen, 2016). MCS conducted qualitative and survey research with parents and 12/13-year-old members, and also other non-cohort members, to inform the study design for the Age 14 survey. Participants were asked about what has driven or prevented involvement; the dynamics of family decision making about participation; the experiences of taking part; and communication preferences. These findings informed practice in the form of MCS communications (mailings and online) and in their content. As a result of this activity, a relaunch mailing was posted directly to cohort members with information on how and why their participation was important; a joint mailing was sent to families (with separate envelopes for the parents and young person); and as described earlier, a study Facebook page and Twitter account were created (Calderwood, 2016).

Whether a singular event or continuous, participant involvement in study design can be considered a reciprocally beneficial investment. The studies learn how to best recruit, retain and communicate with participants, which is particularly valuable when the survey population is a specialised one. In turn, involvement in these advisory groups and consultations seem to increase participants' commitment and understanding of the survey process and its impact on society (although this only applies to a very small proportion of study members). Such approaches have not, to our knowledge, been empirically evaluated for their impact on attrition, although this is seldom the main reason for involving participants in engagement activities of this nature. Although some of this learning could be achieved by using non-study members in the same age-group, participants themselves have unique insights and experiences.

Face-to-face events

At the CLOSER workshop, several studies described using face-to-face events to make respondents feel special and valued; to share research; and to show the impact of their participation. As was the case with advisory groups and consultations, these approaches were less common than other forms of engagement, and more common in locally-based studies (which were more likely to be biomedical). This no doubt partly reflects the fact that it is more feasible and cost-effective to put on events at a local rather than a national level. Of the studies that responded to the CLOSER survey, seven held social events for participants and six held participant conferences or talks (Park and Calderwood, 2016).

Those that engage participants face-to-face tend to do so through a variety of events. ALSPAC is a good example of this approach. Its main event is ResearchFest, a conference for participants that showcases 'Children of the '90s' research as part of a year-long events programme. Bringing together researchers, participants and staff, the conference is a mix of scientific talks and hands-on activities; participants are trained to work with researchers to deliver high-quality lay posters and a film. ALSPAC also held a summer lecture series (158 participants); a 'Children of the Children of the 90s' party at Bristol Zoo; coffee mornings for parents of similar-aged children to meet up; holiday parties and creative workshops for study mothers (O'Hare and Jacobs-Pearson, 2016).

Understandably, studies for which participants live in a smaller geographical area have greater opportunities to organise face-to-face events. These types of studies are also mindful of the importance of sharing information about their impact and educational or even material resources with the community. The Lothian Birth Cohort 1936 study, for which members are surveyed every three years, holds 'tea' events, and shares how members' participation has affected important research. It also endeavours to make their members feel special by sharing members' stories through 'Life Portraits' in the news media and through a four-star-rated play, 'Still Life Dreaming', seen by over 700 people (Morton, 2016). In Young Lives, a longitudinal study of childhood poverty in Ethiopia, India, Peru and Vietnam, community members (peers, caregivers, and community representatives) are interviewed along with the children who are the primary subjects. Therefore, in an effort to build trust with the community as a whole and to be sensitive to cultural issues with reciprocity in their survey sites, Young Lives has not only given 'community gifts' such as a cupboard for a school staffroom, but has also held community events and workshops. Successful meetings with local officials, researchers and NGOs and a participatory theatre event were held in India. In Vietnam, researchers found it important to involve commune leaders and structures and to hold a meeting to report back before leaving the community. Participatory activities with children have also been held, but to varying degrees of success (Knowles, 2016).

Studies are also creating opportunities to educate or provide services for participants through face-to-face events. The Cork Babies after Scope: Evaluating the Longitudinal Impact Using Neurological and Nutritional Endpoints (BASELINE) Birth Cohort Study, the first birth cohort study in Ireland, provides health assessments as part of the study. BASELINE held a well-attended parent information evening. Participants receive allergy testing and follow-up; neurodevelopment assessment with follow-up; and healthcare advice on topics such as eczema, weight-gain and feeding (Cobbe, 2016). The Southampton Women's Survey (SWS), the only birth cohort study in Europe in which mothers were recruited before conception of their children, found that educational interventions reciprocally enhanced the original study by raising overall enthusiasm and engagement. For example, some participants (or their siblings) of SWS are involved in LifeLab, an effort to engage 13- and 14-year-olds on how to improve their health and the health of their future children through increased health and science literacy. Their excitement at seeing how SWS findings are being used in LifeLab materials has supported both retention in SWS and recruitment to LifeLab (Inskip, 2016). Education is also an important form of engagement and feedback in the Young Lives study, particularly because many communities involved in the study have poor infrastructure and services and low levels of education. Parents in Peru, for example, received immediate feedback on children's nutrition and education, and opportunities to participate in workshops (Knowles, 2016).

In general, although events can be resource- and time-intensive, studies find that they increase participants' pride and enthusiasm for continued participation. Studies that use face-to-face events do not rely on a singular occasion: rather, they offer a programme of various types of experiences for study members, their families or their communities. Yet, rather than diluting participation across events, successful events tend to raise engagement overall. They connect individual participation experiences with the research impact on the wider community. However, by their nature, a relatively small proportion of study participants attends these kinds of events. Some would argue that the value of these events cannot be measured by attendance rates because they are building a culture of community and commitment between researchers and respondents, and fostering the relationship with the community in which the study might be located. In addition, studies can then report on the event as part of their communications with the whole study community, helping with their wider engagement activities.

Therefore, the effect of these events may be especially difficult to quantify. Such approaches have not, to our knowledge, been empirically evaluated for their impact on attrition, although as discussed above, there are many other reasons for involving participants in engagement activities of this nature. Nor does there appear to have been any exploration of the impact that taking part in events like these might have on participants' subsequent responses to survey questions.

Conclusion

Longitudinal studies must not encourage only initial participation, but also engage participants over many years in order to reduce attrition over subsequent waves. Therefore, studies carefully select strategies to foster this long-term relationship. The wide variety of participant engagement strategies described here shows how studies have adapted to participants' needs and to changing cultural and technological environments to help study members feel they are taking part in something interesting and impactful.

Several lessons can be learned from the various approaches. First, studies underscore the importance of making participants feel valued and irreplaceable by showing them that they are making meaningful impact on society. They do this through creative event planning; opportunities for participants to assist in study design; and feedback materials. Second, online communications can be an effective tool for participant engagement, but it is important to consider how different groups use the internet and interact with social media. Third, traditional methods like mailings and monetary incentives are still effective, especially when tailored to the needs of respondents. Fourth, there are some notable differences between studies from the social and biomedical science traditions, particularly over the acceptability of identifying study participants. Finally, a multi-pronged approach seems particularly successful in raising enthusiasm and increasing commitment to the study because strategies are mutually enhancing. For example, photos taken at events are used as content for websites or social media, and mailings or emails can boost website traffic.

Although there is some evidence to suggest the positive impact of various engagement methods, empirical evaluation of their impact on response and attrition is not often carried out. In addition to the difficulty of ascertaining the impact of a particular approach on attrition (since multiple strategies are often used in combination), longitudinal studies are often concerned about longer-term impacts and motivated by other factors than minimising attrition alone. Moreover, robust evaluation often requires experimental allocation to different engagement strategies, which is also challenging. However, there is more that can be done. Specifically, relative cost-effectiveness has yet to be assessed over the long-term: what is the effect on response rates over time; to what degree do these strategies help to convert refusals or non-response? How online communications and social media usage might be tailored for different sub-groups is also an important area of research, as well as the identification of solutions that address privacy and confidentiality concerns. Future research should explore the degree of impact on participants' involvement in study design, and for which design areas it is most essential to seek feedback. More generally, the impact of different participant engagement on responses given to survey questions, data quality and respondent behaviour (or panel conditioning) is also an important area for future research.

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Comparing data quality from personal computers and mobile devices in an online survey among professionals

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Abstract

It is increasingly common for respondents to complete web surveys using mobile devices (smartphones and tablets) rather than personal computers/laptops (PCs). Evidence of the impact of the use of mobile devices on response and data quality shows mixed results and is only available for general population surveys. We looked at response quality for a work-related survey in the UK among general practitioners (GPs). GPs were sent email invitations to complete a web survey and half (55%) completed it on a mobile device. While GPs using a mobile device were less likely to complete the full questionnaire than those using a PC, we found no differences in data quality between mobile and PC users, except for PC users being more likely to respond to open-ended questions.

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Introduction

The use of web surveys has increased dramatically over the past 20 years, and their use will continue to grow given their promise of lower costs and quicker turnaround times than more traditional face-to-face, telephone or postal surveys (Smith, 2013).

When completing web surveys, it is now increasingly common for respondents to use mobile devices (smartphones and tablets) rather than personal computers or laptops (PCs). For example, in an online panel study in the Netherlands (the CentERpanel), the use of mobile devices increased from 3% in 2012 to 16% in 2013 (de Bruijne and Wijnant 2014). In the fourth wave of the Longitudinal Study of Young People in England (LSYPE2), despite being advised against the use of a smartphone for the survey, 28% of the 16/17-year-olds completed the survey on a smartphone, while 12% used a tablet and 60%

a PC (Matthews et al, 2017/18). Studies have shown lower response rates, longer completion times (Cooper et al, 2016; Mavletova and Couper 2013) and higher break-off rates (Wells et al, 2013; Bosnjak et al, 2013) among those using mobile devices, as well as higher social desirability bias for sensitive questions when answering on a mobile device in public spaces (Toninelli and Revilla 2016a). Problems with lower response, longer completion times and higher break-off rates may be due to different types of respondents who choose to use mobile devices rather than PCs, or they may be the result of a failure of the research design to accommodate mobile device users (see for example Callegaro, 2014), or due to the greater likelihood of distractions, such as multi-tasking, when completing a survey on a mobile device outside the home or work environment (Toninelli and Revilla 2016b). There are other potential drawbacks with mobile devices, such as difficulties inputting answers due to the smaller size of some mobile device screens and the need to tap answers on the screen rather than using a keyboard, leading to increased data inputting errors and a lower likelihood of scrolling to see all response categories, and so on (Antoun et al, 2017; Couper et al, 2016; Williams et al, 2015).

Research has also found differences between the types of people who complete surveys using mobile devices and those using PCs (for example, women were more likely than men to use smartphones in the LSYPE, as were people with lower educational levels) (Matthews et al, 2017/18). However, studies on the impact of mobile device versus PC on data quality show mixed results, as highlighted by a number of recent studies and summaries including Tourangeau et al (2017), Matthews et al (2017/18), Antoun et al (2017) and Struminskaya et al (2015).

In general, research on device effects is 'still in its infancy' (Lugtig and Toepoel 2016). Moreover, all the published articles on this topic appear to relate to the general population, or particular sub-groups (for example, young people), and the majority refer to US or EU studies. We are not aware of any studies that have looked at the impact of mobile devices on response quality in the context of online workplace surveys (that is, a survey among a group of workers about their work). The current analysis refers to an online workplace survey of general practitioners (GPs) in the UK. We compare data quality between respondents who completed the survey using PCs and those who used mobile devices.

The survey

The 'Improving General Practice Services Survey' (IGPSS) was designed as an online survey to look at quality improvement activities in general practice as reported by GPs (as well as general practice managers, who are not included in this paper). The IGPSS was carried out between July and September 2017. It was a web survey only, with no other data collection modes made available to respondents.

The GP survey involved sending an email to all GPs on the Royal College of General Practitioners (RCGP) membership list on 24 July 2017 (n=46,238). The population of interest was GPs who had worked in NHS general practice in the UK within the last 12 months. We excluded GPs who had not worked in the UK in the last 12 months due to retirement, a career break or working abroad. Other categories of GPs ineligible for the survey were locum GPs, out-of-hours GPs and GPs not working in NHS general practice (for example, those working in prisons, hospitals or private practice).

All GPs were sent emails on either 26 or 27 July 2017 inviting them to take part in the survey. A first reminder was sent to all GPs who had not responded on 23 August. A second reminder was sent to GPs who had not yet responded on either 12 or 13 September 2017.

In all, 3,979 GPs started the questionnaire. Since the RCGP membership list does not include information on whether GPs are currently working in the NHS, the initial questions established eligibility for the survey and GPs who fell into one of the ineligible categories (as outlined above) were removed from completing the questionnaire at that stage. In all, 3,069 GPs were eligible for the survey. A further 692 GPs did not complete enough of the questionnaire to be included in the final dataset, which contained 2,377 GPs. This paper uses all 3,069 eligible GPs when looking at device type used for starting the survey and at

drop-off rates. For analysis of data quality, it uses all GPs who completed the relevant questions, and this varies throughout the questionnaire depending on the point at which GPs stopped completion.

The GP survey questionnaire included questions on: type and size of practice; quality improvement (QI) activities undertaken; barriers and facilitators to QI activities; methods and tools used for QI; and demographic characteristics. For GPs who completed the full questionnaire, the average time spent was 16:42 (minutes:seconds).

The survey was administered using the Qualtrics software (**www.qualtrics.com**).

Results of the IGPSS will be available on the Health Foundation website (**www.health.org.uk**) in due course.

Methods

The methodological analysis looking at data quality according to device type used by respondents is serendipitous, as it was not built into the original IGPSS design. The fact that this was not an experimental design, and that respondents chose which device to use for completing the web survey, makes it difficult to disentangle measurement and selection effects, and is a limitation of this analysis. In similar non-experimental studies among the general population, it is often possible to control for covariates related to the selection of particular devices (such as gender, age, income, education level and so on), but this has not been done in the current analysis for several reasons: first, very few relevant covariates were collected (only gender and age); second, the respondents were already fairly homogeneous in all being members of the same professional group; and third, gender and age were collected at the end of the questionnaire and thus had high levels of missing data due to the relatively high proportion of GPs who did not complete the full survey. Another limitation of our analysis is that we are not able to examine differences between smartphones and tablets (for reasons described below).

Coding device type

For GPs who started the questionnaire, the Qualtrics software provided the research team with the following paradata:

- Browser (for example, Chrome, Safari)
- Operating system (OS) (for example, Android, iPad, iPhone, Windows NT)
- Screen resolution

This paradata was used to classify whether respondents completed the survey on one of two device types: laptop/desktop (PC) or phone/tablet (mobile). The rules used for classifying devices are shown in the appendix.

With the paradata available from Qualtrics, it was not always possible to distinguish between smartphones and tablets, which is why we have categorised them together as ‘mobile’ devices. This is not ideal given the findings of some other research about the smaller screens of smartphones being one of the key factors in finding differences between mobile devices and PCs. Although looking at differences between devices according to screen size or method of data entry (keyboard or touchscreen) are of interest (Lugtig and Toepoel 2016), these variables were not collected during the survey and thus were not available for analysis.

Data quality indicators

Differences in data quality between PCs and mobile devices were examined using eight quality indicators:

- Break-off rates
- Survey duration
- Item non-response
- Straightlining
- Primacy effect
- Number of responses to multi-coded questions
- Likelihood of response to open-ended questions
- Length of open text responses

These indicators have been used by other researchers to look at differences in data quality by device type.

Break-off rates: the proportion of respondents who stop completing the questionnaire at various points before reaching the end, have been found to be higher among those completing web surveys on mobile devices.

Survey duration: the length of time required to complete the survey, may lead to higher break-offs, and can give an indication of respondent burden. It has been shown that the additional scrolling required on mobile devices, especially for grid questions, is a major contributor to the longer completion times typically found for mobile devices compared with PCs (Couper and Peterson 2016). For the current analysis, very long durations suggest that respondents left the questionnaire open for periods when they were not, in fact, working on the survey. For example, in the GP survey, the longest duration recorded was over 72,000 minutes, which suggests the respondent never 'submitted' the questionnaire and the end time was thus recorded as the time and date the survey closed. We excluded outliers over 60 minutes from the analysis, which applied to about 10% of respondents who completed the full questionnaire. These outliers included similar proportions of mobile and PC users, suggesting that lengthy interviews were not associated with device type.

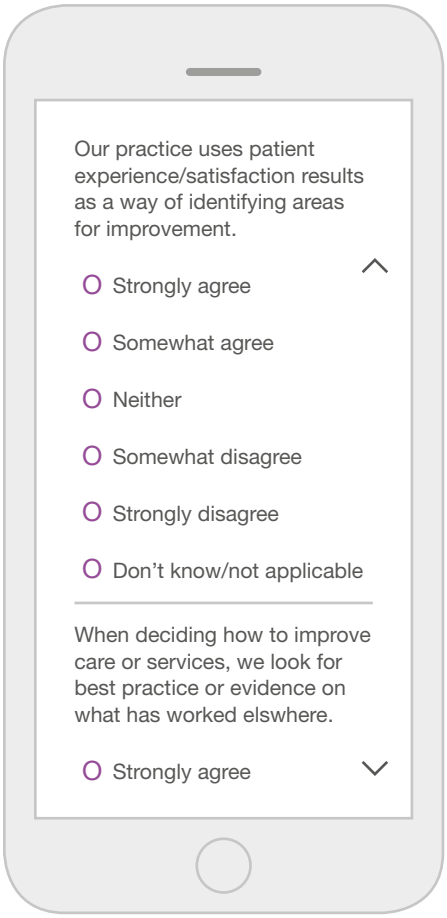
Item non-response: missing data can introduce bias into survey estimates, which includes respondents not answering a question or failing to give a substantive answer by ticking 'don't know', which could indicate the use of cognitive shortcuts. We look at item non-response for the four questions, containing 37 items, in the survey which involved Likert scales (for example, asking whether respondents agreed or disagreed with various statements). These were laid out in a grid format on PCs, but for smaller screen mobile devices, Qualtrics formats the statements into an 'accordion' so they can fit vertically on the screen (see Figure 1). For each item, we looked at the percent that were skipped or ticked don't know, and we provide the mean percentage over the 37 items.

Straightlining: is when a respondent provides the same answer to all of the items in a grid (or to a sub-set of consecutive items). It suggests that respondents may not be paying sufficient attention to answering the questions and taking cognitive shortcuts to get through the questionnaire more quickly. Current evidence shows straightlining for grid questions to be higher among respondents using mobiles than among those using PCs (Struminskaya et al, 2015). The same four questions looked at for item non-response described above were examined for straightlining. The first question included seven items and four response categories, and we considered straightlining if all seven items had the same response. The second question included eight items with five response categories, and was divided into two blocks of four items with the response headings repeated at the top of each block (for PCs). We defined straightlining as giving the same responses within each block. The third question contained 11 items and three response categories, and the items were divided into blocks of four, four, and three items (for PCs). We defined straightlining as giving the same response within each block. The fourth question contained 12 items and three response categories, and the items were divided into three blocks of four items each. We defined straightlining as giving the same response within each block. For mobile devices with smaller screens, instead of a grid format, the items were shown in accordion format with the response categories underneath each item in turn; this format may reduce the likelihood of straightlining, and we may, therefore, expect to find higher levels of straightlining for PCs.

Figure 1: Likert scale layout in grid format for PC (top) and accordion format for smartphone (bottom)

Thinking of activities to improve patient care and services within your practice in the last 12 months, please tick whether you agree or disagree with the following statements.

	Strongly agree	Somewhat agree	Neither	Somewhat disagree	Strongly disagree	Don't know/not applicable
Our practice uses patient experience/satisfaction results as a way of identifying areas for improvement.	O	O	O	O	O	O
When deciding how to improve care or services, we look for best practice or evidence on what has worked elswhere.	O	O	O	O	O	O
The GPs in our practice are able to monage the changes needed to improve the quality of care and services provided.	O	O	O	O	O	O
Our Practice Manager plays an important role in setting priorities for improving the services we provide.	O	O	O	O	O	O
Our practice is continually looking for ways to improve the care and services we provide.	O	O				O



The primacy effect: where respondents are more likely to select the first answer in a list, is another potential indication of cognitive shortcuts being taken. It has been shown to be more common for smartphones in cases where the list of responses does not all fit on a smaller screen display, especially for questions where respondents are asked to tick all that apply (Lugtig and Toepoel 2016). The GP questionnaire included one question with 13 items where respondents were asked to choose up to three responses, and another question with 15 items where respondents were asked to choose all that apply. We looked at the percentage of respondents who chose the first three answers on each list.

Number of responses to multi-coded questions: for the three questions which asked GPs to select all that applied, we looked at the number of responses chosen. If more answers are chosen, it may indicate greater cognitive effort on the part of respondents, and is likely to be more challenging when not all responses fit on smaller screen sizes, which means respondents need to make more effort by scrolling to see all categories. The three questions included eight, ten and 13 response options (excluding 'other' and 'don't know'). We looked at the mean number of responses chosen.

Likelihood of responding to open-ended questions and length of response to such questions: have been found to differ between PCs and mobile devices, mainly because of the different methods of data entry (touch screen versus keyboard) and, in particular, on mobile devices with smaller screen sizes which make typing more difficult (Wenz 2017). We looked at four questions where respondents were asked to type in their responses, and we present the mean percentage responding to these questions, as well as the mean length of response (in characters). (We have not looked at length of response to 'other' answers where pre-coded responses were also included.)

Results

Device used for survey completion

Of the 3,069 GPs known to be eligible for the survey, 1,328 used a PC for completing the survey, 1,604 used a mobile device (and 137 were uncertain). Overall, 45% of GPs used a PC and 55% used a mobile device (after excluding those whose device could not be classified). The proportion of GPs using a mobile device is higher than the proportion of respondents who use mobile devices in the general population to complete web surveys (for example, 23% of British adults in the 2013-14 Community Life web survey used a mobile device, according to Wenz 2017).

There were noticeable differences by gender and age, with women and younger GPs more likely than men and older GPs to complete the survey using a mobile device. As Table 1 shows, three in five women (60%) used a mobile device, compared with only two in five men (40%). Women aged under 50 were nearly twice as likely to use a mobile device as men aged 50+ (66% and 37% respectively).

Table 1: Device type used to complete survey by age within gender, GPs

	PC	Mobile
Women		
Aged under 50	34%	66%
Aged 50+	49%	51%
All	40%	60%
Men		
Aged under 50	56%	44%
Aged 50+	63%	37%
All	60%	40%

Response quality indicators

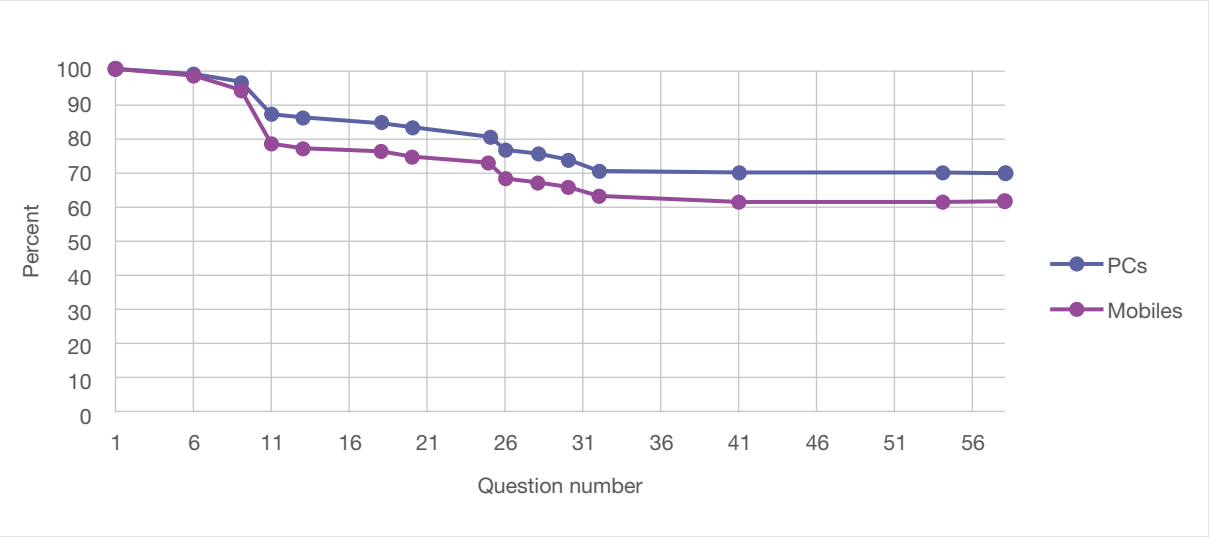
Below, we provide the results for the eight quality indicators described above.

Break-off rates

Compared with surveys of the general population, break-off rates for GPs were high: only two-thirds (66%) of all eligible GPs who started the questionnaire completed it in full, while one-third broke off at some stage of completion. As Figure 2 shows, respondents using PCs were more likely to fully complete the questionnaire (defined as completion through to Q58) than those using mobile devices (70% compared with 62%). For both devices, there was a significant drop-off between questions 9/10 and 11. Questions 9/10 were the first questions that were not tick boxes but asked GPs to type in text: either their NHS practice number at Q9 or, if that was not known, their practice's address at Q10. Drop-off rates were higher for mobile than PC users: 16% of mobile users left the survey at this point, compared with 10% of PC users.

After that point, break-offs tended to be steady throughout the remainder of the questionnaire, and at a similar rate of about 1-2 percentage points per question for PCs and mobiles alike.

Figure 2: Percent responding by question number, GPs



Survey duration

Our results showed PC users spending longer on the survey than mobile users, with mean completion times of 13:10 (mm:ss) and 11:38 (mm:ss) respectively. However, this is explained by the higher break-off rates of mobile users. Mean duration times for GPs who completed the questionnaire in full were the same for PC and mobile users (16:38 and 16:36 (mm:ss) respectively).

Item non-response

There was no difference in the likelihood of not providing a substantive response (that is ticking 'don't know' or skipping the question) to the questions we examined. The mean percentage of 'don't know'/not answered for the 37 items was 13% for PC respondents and 14% for mobile respondents.

Straightlining

We looked at the mean percentage of straightlining over nine blocks of questions containing 38 items, and found a small difference between PC users (17%) and mobile users (15%). (The mean percentage of straightlining appears quite high, but this is explained by one block of three items which had high levels of consistent answers between all the items, despite having exactly the same format and response categories of the two blocks, of four items each, immediately preceding it. If this block is excluded, the mean percentage of straightlining was around 10%.)

Primacy effects

The percentage of respondents selecting the first answer category presented for each of the two questions examined showed no differences between PC and mobile users. The mean percentages selecting the first item listed was 54% for PC users and 53% for mobile users. Looking at the likelihood of selecting the first three categories showed a similar pattern.

Number of responses to multi-coded questions

The mean number of responses selected to the three questions that asked GPs to tick all answers that apply was 5.2 for PC users and 4.5 for mobile users. This difference is not statistically significant, and is consistent with evidence from previous research (for example Lugtig and Toepoel 2016).

Length of open-ended answers

GPs using PCs were more likely to type in an answer to open-ended questions than those using mobile devices: 31% and 25% respectively. Also, among those who did provide an answer, they were on average somewhat longer for PC users than mobile users (77.1 characters versus 72.6 characters), but not to an extent that would appear to affect data quality. Two of the open-ended questions were of the type where GPs were asked if they had anything else to say with respect to the topic in the previous question, and one was the final question asking if they had anything else to say about QI in general practice. Only one of the open-ended questions was a direct question which all respondents were expected to answer – the question asked GPs to type in their top priority for improving patient care. The differences found between PC and mobile users were larger for this question: 61% of PC users answered the question compared with 51% of mobile users; and those responding on a PC gave longer responses than mobile users (58 versus 49 characters).

The results to the response quality indicators are summarised in Table 2.

Table 2: Response quality indicators by device type, GPs

	PC	Mobile
% break-offs	30	38
Mean completion time (minutes:seconds)	13:10	11:38
% item non-response	13	14
% straightlining	17	15
% primacy effect	54	53
Mean number of responses to tick all that apply questions	5.2	4.5
% providing answers to open-ended questions	31	25
Mean length of answers to open-ended questions (characters)	77	73

Discussion

The current analysis compares responses given by highly qualified/experienced professionals (GPs in the UK) using PCs with those using mobile devices to complete an online workplace survey. We have drawn three key conclusions.

First, by sending electronic links to the survey included in an email invitation to our highly educated GPs, we found a higher proportion (55%) completing the survey on a mobile device than is commonly found in online surveys in the general population, even those targeted at younger adults. It seems critical, therefore, that online workplace surveys targeted at similar professionals are optimised for use on small-screen devices (for examples of how to design surveys for small screens, see Hanson and Matthews 2016/17; de Bruijne 2015).

Second, respondents were likely to stop completing the survey when they first encountered an open question that asked them to type in text rather than select a pre-coded item from a list, but this was more likely for those completing the survey on a mobile device. It appears that this is particularly likely to be the case for respondents who are less motivated to take part as, among those who did continue past this first text question, there were no large differences in the amount of text entered in subsequent open-ended questions (although those on mobile devices were somewhat more likely not to enter any text). The implication is that open-ended questions should appear towards the end of the questionnaire, rather than at the start.

Third, among our group of highly educated professionals who completed the survey, there were very few differences in response quality between those using PCs and those using mobile devices. There were no differences in survey duration, item non-response, straightlining, primacy effect or number of items selected at multi-coded questions. The only noticeable differences were that PC users were more likely than mobile users both to type in responses to open-ended questions, and to give slightly longer responses when they did answer, which is likely explained by the greater ease of using a PC's keyboard compared with a mobile's touchscreen. Even these differences, however, were not very large.

There are a number of limitations to the current study. One is that it was not designed as an experiment, and GPs were free to choose which device they used to complete the survey. This means selection effects cannot easily be disentangled from potential differences in response quality, nor did we have sufficient demographic data to control for respondent differences (for example, age) in the analysis. A second is that we were not able to distinguish devices used according to screen size, as it may be small screens rather than device type that has the most significant impact on response quality (Wenz 2017), especially if the questionnaire is not optimised for smaller screens (Antoun 2017). In future surveys, we will attempt to capture data on screen size to look at this more fully in the analysis. A third limitation is that the questionnaire was not designed as 'mobile first'. While we did incorporate some elements of 'mobile friendly' design (such as showing grids in accordion format on mobile devices), other elements were not 'mobile friendly' (such as longer lists of responses which do not fit on a small screen and require the user to scroll down to see all response options). It could be that if the survey was designed as 'mobile first', the questionnaire would be more comparable across different types of devices. A fourth limitation is that the response rate to the GP survey was low. While low response is typical of GP surveys in the UK, it makes it difficult to be confident that the findings are representative of all UK GPs. Related to this, the current analysis looks at a particular group of highly qualified and very busy professionals, which may hinder the extent to which our findings will generalise to other workplace surveys, even those of other professional groups.

Conclusions

In conclusion, the findings are encouraging, as it appears that once health professionals have engaged with a survey, the device they are using to complete it does not appear to have a significant effect on the quality of their responses. Discouraging, or even blocking, the use of mobile devices, as some have suggested (Hanson and Matthews 2016/17; de Bruijne and Wijnant 2014), does not appear to be necessary in these circumstances. Of course, optimising survey questions for different devices or screen sizes is still important, and the Qualtrics software used for the IGPSS adjusts question layout for different devices. For example, a grid (or matrix table as referred to by Qualtrics) that includes a number of statements in rows and response categories (or scale points) in columns in PC format, is transferred into an 'accordion format' on a mobile device, so that each statement and the list of response categories can be included on screen. Our analysis of a workplace survey supports findings from previous analyses of general population surveys which show that surveys that are optimised for mobile devices can provide data quality as good as that obtained from PC users (see for example, Dale et al, forthcoming). Given that the use of mobile devices for completing surveys is likely to continue to increase, researchers should be encouraged to continue to examine ways to optimise questionnaire design for different types of device while at the same time maintaining consistency (for example, of question wording) and minimising mode effects.

Appendix

The rules for classifying devices into either laptop/desktop or phone/tablet, using information collected by the Qualtrics software on browser, operating system and screen resolution, were as follows:

For non-Windows OS:

All Android were classed as mobile

All iPad OS were classed as mobile

All iPhone OS were classed as mobile

All Macintosh OS were classed as PC

For Windows OS:

All Windows NT 5 and Windows NT 6 were classed as laptop/desktop

All Windows Phone 8 and Windows Phone 10 were classed as phone/tablet

For Windows NT 10, the classification was based on screen resolutions, following the guidance provided on GlobalStats statcounter website (**http://gs.statcounter.com/screen-resolution-stats/**):

1366 x 768	PC
1920 x 1080	PC
1440 x 900	PC
1280 x 1024	PC
1280 x 800	uncertain
1600 x 900	PC
1024 x 768	uncertain
1536 x 864	PC
1680 x 1050	PC
768 x 1024	phone/tablet
1280 x 800	uncertain
800 x 1280	mobile
600 x 1024	mobile
1024 x 768	uncertain
601 x 962	phone/tablet
1054 x 600	phone/tablet
1024 x 1366	phone/tablet
962 x 601	phone/tablet

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Exploring digital stories as research in higher education

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Abstract

The use of digital storytelling (DST) as a research methodology is gaining momentum. This approach is described as a visual methodology which can be positioned as a form of narrative inquiry and an alternative to an interview. This article explores the use of DST to capture student voices within higher education by outlining recent literature in this area and implications for researchers. It concludes by suggesting that there is significant room for more discussion of how DST can be used as a method of research to gather the feedback and voices of students. The implications for future researchers concern the complexity of both the method and the analysis, alongside the need for stringent ethical practices concerning the use of images and the potential impact of the storytelling on the research participant.

Introduction

Since the 1990s, the use of digital storytelling (DST) has steadily increased in an attempt to combine different ways of storytelling with the emergence of new digital media tools. The traditional roots of DST can be traced back to the University of California at Berkley's Centre for Digital Storytelling, founded in 1993 by Dana Atchley, Joe Lambert and other artists in the San Francisco region (McLellan, 2006). Its aim is to provide a novel platform to empower and give voice to individuals or groups who are often overlooked in mainstream culture (Clarke and Adam, 2010). In its traditional form, DST refers to the process of developing personal narratives based on certain life experiences. Those stories are supported by a combination of text, audio recordings, images, music and animations to create short films with duration of typically two to five minutes (Benick, 2012; Davis, 2011). Due to the great variety and different applications, DST exists in numerous different formats, from multimedia online videos to image-only stories, podcasts or blogs entries, all of which contain some form of narrative produced and shared digitally (Clarke and Adam, 2010; Nilsson, 2008). Consequently, it has been adapted in various academic and non-academic fields, such as an educational tool, a research method, a therapeutic medium or to increase community engagement (Clarke and Adam, 2010). The most common feature of recent approaches refers to the agency of the storyteller as editor, and the use of software which enables this.

In this article, digital stories are defined as a collection of still images with accompanying audio or textual narration, and used as data in student voice research within higher education. Student voices (from a student sample) are now routinely captured through a range of methodologies within higher education, including institutional surveys, teaching evaluations, and action research (Austen, 2018). The objective of this type of research is often quality assurance and enhancement with the overall aim being an improved student experience (Searle, 2010). However, there are associated aims which align with a social justice

agenda, and explore differential student outcomes and inequity in higher education (McLeod, 2011). DST in higher education is generally regarded as beneficial for enhancing teaching and student learning (Benick, 2012), including as a social pedagogy (for example, to help build relationships during online learning) and as an inclusive assessment (Jenkins and Gravestock, 2013; Lowenthal and Dunlap, 2010; Gravestock and Jenkins, 2009). More recently, this approach has been used to capture student voices, particularly those that are often hidden or marginalised. This article explores this particular context, and then outlines implications for social researchers who may be interested in using an innovative methodology which has potentially emancipatory benefits for participants.

Literature review

A literature review was conducted to identify academic articles published between January 1993 and December 2017 to explore: how the method of DST impacts on student voice; how DST has been used as a research methodology by and with students; and how DST can be used as a tool for process or impact evaluation in higher education. Within these databases, 193 articles were identified as relevant to the defined impact areas. 31 were put through a rigorous process of data extraction (adapted from Saks and Alsop, 2012) which ranked each on two criteria: quality of the research (zero to three) and relevance to the study (zero to three). 17 sources that scored between four and six in total have been included in the literature review, and thus, form the basis of this discussion.

The literature review highlights that the majority of research within this contained search has focused on how DST is used as a platform to empower marginalised student voices. Digital stories are collated from students as part of scholarly inquiry, institutional research (research which moves the institution towards strategic goals) or as a pedagogic tool to build belonging and communities within learning environments. The storytelling process provides students, particularly 'historically marginalised' students, a chance to 'author and inscribe their own social and cultural truths' (Benmayor, 2012 p. 507) and to 'challenge how they have been socially and historically marginalised' (Stewart and Ivala, 2017 p. 1170). The accessibility and inclusive format of the digital story has also been used specifically for providing feedback for organisational change (Paiewonsky, 2011) and as an assessment method in higher education (Jenkins and Gravestock, 2013). In addition, the collated digital stories of students are often used to challenge perceptions, for example regarding specific student identities (migrant students – Benick, 2012) or student behaviour (drinking cultures – Burnett et al, 2015).

The literature review also highlighted challenges in the production of student digital stories, namely assumptions about digital capability (Callens and Elen, 2015; Riberio, 2016) and the labour-intensive support required to ensure completion (Hoggan and Militello, 2015; Clarke and Adam, 2010). Importantly, the ethical considerations of DST appeared as a consistent theme. Due to the nature of DST, the outcomes are often very personal and emotional stories. Stacey and Hardy (2011), for example, conducted a mixed-method study with newly qualified nurses who created digital stories to reflect on their previous practical experiences and shared their stories with final year nursing students. In this article, participants reported the process of creating such stories as challenging, as they often displayed highly personal experiences to an unknown audience, which students felt placed them in a vulnerable position. Since many of the stories also showed very emotional content, the educationalists collaborating with the researchers in this project recommended that these stories should only be created and shared in 'sensitive and safe learning environments' (ibid, p.162), in order to keep students and workshop facilitators safe.

Researchers have a responsibility to carefully assess whether potential participants are suitable for the project or if participation may cause any harm. Dush (2012) illuminates on this 'ethical complexity' (p. 628) in her article on sponsored DST by highlighting the 'vulnerability' of participants in so-called 'fiduciary relationships' (p. 633) and addresses how the personal nature and the 'motives' behind the story can 'make it difficult for a subject to give genuinely informed consent' (p. 633). Gubrium et al (2014) also

found that the support provided by researchers within DST workshops can shape participants' voices and ultimately, the outcome of their stories. Thus, they advocate that researchers should 'carefully reflect on power dimensions inherent in the participatory process' (ibid, p.1610).

Protecting the confidentiality of the storyteller is equally important, especially if the emotional content of the story might have negative consequences. Audio recordings within the stories themselves may reveal the identity of the storyteller if strategies are not adopted to account for this. However, some participants mentioned that they see the 'ability to publicly share their completed stories as opportunities' (p. 1611) and feel empowered by the process. Gubrium et al (2014) further argue that, as digital stories evolve over time, it is difficult to collect consent for release at the beginning of the research project. As a result, the authors suggest that the release decision should not be a 'one-time process'; it should rather be 'woven throughout a project' (ibid, p.1612), in which the final release decision should be made at the end of the project, when participants know the actual outcome of their stories.

Implications for researchers

The literature scoping of the use of DST for capturing student voices provides the background for discussing how this 'emerging method for narrative research' (Kim, 2016) could be adopted as a research methodology within higher education, or within broader social inquiry.

The analysis of digital stories as research data is positioned within qualitative inquiry as a variant of visual research methods. However, digital stories can contain audio narration, visual images and sections of text which position this methodology as multimodal storytelling (Kim, 2016). They are also first-person narratives controlled by the storyteller and do not involve a negotiation of 'relational space' between researcher and participant (Bach, 2012). The digital story would be defined as the 'topic' rather than a 'resource' (Harrison, 2002) but fails to fit neatly into traditional descriptions of visual methodologies.

Researchers attempting this approach should consider their epistemological framework and pre-define the nature of the 'discourse' (for example, student voice), 'narratives' (for example, student stories) and relationships to 'experiences' (as social constructs). The techniques of narrative inquiry can provide some grounding, especially in consideration of the importance of the whole story and the weight of the component parts. Fundamentally, researchers need to acknowledge that stories can be fictionalised or embellished, and will change dependant on the reinterpretation of experiences by the storyteller and the storytelling conditions (for example, intended audience). Individual stories (or narratives) have limited power, but as a collective discourse there is more scope for influence. A theoretical grounding, for example the use of a postmodern rationale for the fluidity of discourse (Derrida, 1988), is important to formulate at the outset. In relation to student voice research, it is assumed that a student's story represents their own truth however this is analysed as a social construct. While researchers could corroborate accounts across different stories (for example, of teaching practices within a course cohort), it is more important to consider the impact of experience, how this has been described in the story, and why this might be the case.

Methodology

In contrast to visual methodologies which use existing visual material, this approach requires the research process to create visual data to analyse (Alexander, 2001). Participants may require some parameters to help guide their story (for example, your first year at university, your experience of a work placement). These parameters should relate to research questions and should be crafted using the same concerns as, for example, qualitative interview schedules (that is, the use of prompts and the impact of the researcher on the data collection). Due to the features of multimodal storytelling, unstructured stories may be too complex to analyse coherently across a sample. The reflexivity of the researcher should be considered throughout, and the limitations of setting parameters (and potentially biasing or guiding a story) need to be acknowledged alongside the agency of the storyteller.

In comparison to traditional visual narrative inquiry (see Jackson et al, n.d.) which relies on intensive relationships between researcher and participant – digital stories are controlled by the storyteller, and researchers act as facilitators of the story rather than co-constructors. This is less resource intensive but does require the conditions for storytelling to be resourced and managed by the research project.

Due to the potentially personal and emotional nature of the stories created, DST should be undertaken within comfortable environments. Storytelling participants will need to be supported to use any prescribed software, and will need time to draft the structure of the story and create the digital output. In previous projects, the author has used an initial two-hour session with up to ten participants to produce a complete or partial digital story, depending on the confidence of the participants. The first half of the session should provide an introduction to DST, specifically watching and critiquing the stories of others. It is important to discuss identity and self and any risks which might be associated with the stories viewed. When the context of DST is known, the second half of the session should provide time and space to develop a written story, storyboard, and to explore image selection (from internet stock or personal files). It is important to build in peer support and time for discussion between participants to help develop stories and test comfort levels. On reflection, participants should explore whether any edits or adaptations of their story are necessary. Importantly, consent should be obtained from participants to take part in the session and to use the stories *as data* on completion (obtained separately at the beginning and the end of the session). This approach is adapted from the story circle process which is a common approach for supporting DST.

> 'The purpose of a story circle is to create a safe and comfortable space for participants to present the first draft of their stories and to allow participants to come together as a community in discussing and mutually mentoring each other in story construction. It is during the story circle that participants share in developing the generative themes of their stories, which can be used for dialogue within the digital storytelling group, and later fuel related public dialogue at the community level. The story circle serves as an opportunity for storytellers to find a way to resolve issues they may be facing in telling their stories.' (Gubrium, 2009 p. 188)

In the student sessions, this support is then followed by an additional hour group-session and one-to-one support as needed. Researchers will need to provide a room which has digital software and headsets for any audio recording.

Sampling

Access to a sample of digital stories will depend on where and how they are produced. There may be opportunities to access stories that have already been produced, for example within assessment conditions. Students' digital stories produced within, for example, personal development components of modules, could shed light on cohort experiences, common difficulties, and effective pedagogy. Staff must seek individual permissions from students for digital stories to be analysed as data in this way, and ethical approval from a research ethics committee should govern this approach to consent.

DST at scale is possible, but the resource implications of this are noteworthy. Embedding DST within the curriculum may ensure a higher completion rate, and therefore sample, if permission to analyse is sought. However, supporting students to produce digital stories outside taught provision, for example as part of student feedback mechanisms or student representation systems, requires extra-curricular student engagement in workshops or training sessions. This is a particular consideration for student samples that are harder to reach – the marginalised or under-represented may require more thoughtful incentives. Positioning DST as a digital skill could be an incentive for participation. Providing an opportunity to voice a hidden story is another.

Marginalised or under-represented students become an obvious targeted sample for the production of digital stories, and the benefits of researching this group using a potentially emancipatory approach is obvious. Whether the DST becomes a process or a product (Jenkins and Gravestock, 2013) is an important consideration and care should be taken to consider the aims and objectives of collecting and analysing digital stories. With increased pressure in higher education to support (and evaluate the support of) widening participation students, there is also a risk of research burden and exploitation of a told story. Specifically, it is unethical to collect stories and research the content without taking any steps to address issues raised, improve experiences, or feedback to students on changes made.

As a qualitative method, research using DST does not aim for statistically representative findings. The research should aim to recruit a sample which produces data saturation and this is reported alongside the aims and objectives of the study. Often, only a small number of hidden narratives are needed to begin to build an alternative discourse. DST can also be used effectively for exploratory projects, and can provide the foundation for further investigation.

Use of images

Digital stories can use the participants' own photographs. Ethically, the participants should seek permission from anyone within the photograph to be included in the story. DST software has access to all digital images which are available to use under a creative commons licence. Participants searching the internet for images should also work within these restrictions. All images should be attributed at the end of the story (Adobe Spark automatically does this if the images are found through the software). Support and guidance on copyright need to be provided.

Anonymity and confidentiality

There are DST techniques which protect the anonymity of the participants. Participants can avoid using their own name or any defining feature in their story, including personal images. It is also possible to use a narrator for audio recording, or avoid audio recording altogether. These techniques need to be balanced with the authenticity of the story, and discussion about self should be embedded into the start of any DST session.

As DST can be empowering for participants, all involved should be given the opportunity for their story as a whole to be published, alongside research findings. The defining principles of DST suggest that the content of the story should be controlled by the storyteller. However, it is the responsibility of the researcher to discuss personal, institutional and researcher risk with all participants. Alternatively, the researcher can ensure that any content within the digital stories is viewed confidentially by the researchers only, and referred to anonymously in any reporting and write up, akin to preserving the anonymity of interviewees.

Consent

Due to the personal and emotional nature of the stories created, DST should only be used within well-defined parameters of consent and withdrawal. Consent to produce, store, analyse as data, and publish the content (including specifics about where and when) should be discussed at the outset of the project, and the participants should have the right to withdraw their stories from any public platform at any time. Researchers should be aware that participants are likely, and should not be discouraged from, completing the story and then deciding against publication or sharing of any kind. This point reinforces the features of control and agency in contemporary DST. An un-shareable digital story should be treated in the same way as withdrawn interview data, although, as there is still a product, there is still some benefit and outcome for the participant. Consent and withdrawal should be a continued discussion for the duration of the project.

Analysis

Digital stories can produce audio (which can be transcribed like interview data); images (which can be analysed like the interpretation of photographs); and text (to which content analysis can be applied). Analysis can be conducted inductively (for example, using grounded theory) to look for emerging themes across a sample, or deductively, to specifically look for aspects of previous inquiry or new prepositions. Alternatively, the stories can be kept whole and analysed using narrative theorising to actively interpret and construct characters, setting/context, plot/events, activities and relationships, consequences, and purpose/motivations (Yamasaki et al, 2014).

Outputs

Researchers must seek specific consent to publish participant digital stories, outlining the digital platform and intended use.[1] For example, participant stories can act as triggers for further conversations about the research and possible impact. These digital stories can be published alongside written reports of the methodology and analysis. It may also be appropriate for the researchers to produce a digital story of the findings as an alternative to written output. It is useful to obtain the original media file (for example, mp4) rather than reply on a weblink which is dependent on the longevity of access to the digital software and platform. The work of Austen and Jones-Devitt (2018) models this approach to research outputs.

Conclusion

The DST method is well used within public health, education and journalism as a means of exploring and empowering voices. This approach can operate across disciplines where there is a need to explore voice, meaning, and self-directed/self-authored narratives (Rossiter and Garcia, 2010). There is also a body of literature which identifies DST as a visual methodology which can be positioned as a form of narrative inquiry and an alternative to an interview. However, this review shows that the use of DST *as a research methodology* to capture the student voice within higher education is, to date, fairly limited. There is significant room for more discussions of how DST can be used as a method of research in order to gather the feedback and voices of students within institutions. The challenges for future researchers concern the complexity of both the method and the analysis, alongside the need for stringent ethical practices concerning the use of images and the potential impact of the storytelling on the research participant.

There is a significant research gap in how the method can be used for evaluation purposes as, in this review, no evidence was found of it being used for this purpose. This could be due to perceptions that DST is a platform to present, or a space to communicate, ideas. Yet, there is the potential to use DST to evaluate the effectiveness of a process (as an alternative to a qualitative interview); the impact of an initiative, intervention or activity (on students or others); or self-evaluation (for example, of a student's personal development). The utility of DST within longitudinal designs is also of interest to consider changing narratives or the reinterpretation of experiences over time.

[1] For examples of repositories of digital stories across discipline access:
https://digistories.co.uk/
https://www.patientstories.org.uk/
https://blogs.shu.ac.uk/steer/digital-storytelling-shu/

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