



STEER: Factors to consider when designing online focus groups using audio-visual technology in health research

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STEER: Factors to consider when designing online focus groups using audio-visual technology in health research

Journal:	<i>International Journal of Qualitative Methods</i>
Manuscript ID	IJQM-19-0101.R2
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Keywords:	Focus Groups, Methods in Qualitative Inquiry, Qualitative Evaluation, Virtual Environments, Ethical inquiry
Abstract:	<p>Technological advancements and ease of internet accessibility has made using internet based audio-visual software a viable option for researchers conducting focus groups. Online platforms overcome any geographical limitations placed on sampling by the location of potential participants and so enhances opportunities for real time discussions and data collection in groups that otherwise might not be feasible. Although researchers have been adopting internet-based options for some time, empirical evaluations and published examples of focus groups conducted using audio-visual technology are sparse. It therefore cannot yet be established if conducting focus groups in this way can truly mirror face to face discussions in achieving the authentic interaction to generate data. We use our experiences to add to the developing body of literature by analysing our critical reflections on how procedural aspects had the potential to influence the data we collected using audio-visual technology to conduct synchronous focus groups. As part of a mixed methods study, we chose to conduct focus groups in this way to access geographically dispersed populations and to enhance sample variation. We conducted eight online focus groups using audio-visual technology with both academic researchers and healthcare practitioners across the four countries of the United Kingdom. A reflexive journal was completed throughout the planning, conduct and analysis of the focus groups. Content analysis of journal entries was carried out to identify procedural factors which had the potential to affect the data collected during this study. Five themes were identified (Stability of group numbers, Technology, Environment, Evaluation and Recruitment), incorporating several categories of issues for consideration. Combined with the reflections of the researcher and published experiences of others, suggested actions to minimise any potential impacts of issues which could affect interactions are presented to assist others who are contemplating this method of data collection.</p>

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10 audio-visual technology in health research
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14 **Short title:** Online focus groups using audio-visual technology
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9 healthcare practitioners across the four regions of the United Kingdom. A
10 reflexive journal was completed throughout the planning, conduct and analysis
11 of the focus groups. Content analysis of journal entries was carried out to
12 identify procedural factors which had the potential to affect the data collected
13 during this study. Five themes were identified (**Stability of group numbers,**
14 **Technology, Environment, Evaluation and Recruitment**), incorporating several
15 categories of issues for consideration. Combined with the reflections of the
16 researcher and published experiences of others, suggested actions to minimise
17 any potential impacts of issues which could affect interactions are presented to
18 assist others who are contemplating this method of data collection.
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33 **Keywords** online focus groups, audio-visual technology, researchers,
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37 38 **What is already known?**

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41 Advances in the accessibility of audio and visual technology mean greater
42 opportunities are available to qualitative researchers which enable real time
43 focus groups unrestricted by geographical limitations to facilitate wider
44 involvement of research participants
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50 51 **What this paper adds?**

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9 Reflective evaluation of our experiences of using audio-visual technology to
10 conduct asynchronous focus groups provides insights on strategies to facilitate
11 participation and interaction, enhance participant experience and so optimise
12 data richness when this method is selected
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19 **Introduction**

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21 Focus groups, by their nature, are a collective activity (Kitzinger, 1994), used by
22 researchers to bring together purposefully selected individuals to gather data in
23 a group setting (Gothberg, Reeves, Thurston, Applegate, Kohler, & Peterson,
24 2013). Their hallmark is the use of interaction between participants to produce
25 data and insights that might not be accessible without this interaction (Morgan,
26 2019). When using focus groups to conduct research, population sampling of
27 participants is advocated to avoid selection bias and optimise external validity
28 (Krueger, 1994). The ability to convene focus groups composed of participants
29 from a range of locations is, however, an issue often faced by researchers (Flynn,
30 Albrecht, & Scott, 2018), compounded by resource restrictions and the ability or
31 willingness of participants to travel. As a result, researchers may make
32 methodological compromises in relation to sampling which can result in trade-offs
33 that could affect data richness (Flynn et al., 2018; Krueger, 1993).
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9 Technological advancements now available to researchers can remove
10 restrictions imposed by geographical barriers. This makes it possible for focus
11 groups to be comprised of participants deemed most appropriate to address the
12 research question and thereby enhance the rigour of a qualitative study. When
13 geographical restrictions are removed, theoretical and purposive approaches to
14 sampling become more feasible as opposed to convenience sampling based on
15 who is accessible (Morse, 2015). Similarly, the feasibility for phenomena variation
16 may be enhanced through the heterogeneity of the people and contexts included
17 in the sample (Higginbottom, 2004). Access to broader geography can also
18 enable sampling sizes to be increased, potentially giving greater depth and
19 variation to the data collected (Morse, 2015). Therefore, online options which
20 remove geographical limitations could provide more opportunity to recruit an
21 adequate and appropriate sample to add rigour to a study, providing an option to
22 obtain data from the fullest range of participants (Higginbottom, 2004) and
23 enhance validity by enabling a richer data set to be realised (Morse, 2015).
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44 The accessibility of free software, availability of stable and fast internet
45 connections (Abrams, Wang, Song, & Galindo-Gonzalez, 2015) and the
46 integration of webcams into personal computers and mobile devices, which are
47 now common place, means audio-visual focus groups conducted via the internet
48 are a very feasible option for qualitative researchers. Although published
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9 examples of such an approach in healthcare research and wider disciplines are
10 becoming available, the literature base which explores the use of audio-visual
11 technology to conduct synchronous online focus groups is still in its infancy. The
12 first study empirically examining the quality of data produced from focus groups
13 conducted using online audio-visual technology was published just four years ago
14 (Abrams et al., 2015). Studies comparing factors such as costs, recruitment and
15 participant logistics (Rupert et al., 2017) or evaluating participant experience
16 (Matthews et al. 2018) are sparse and have only begun to emerge recently.
17 Publications which describe the experiences of those who have used audio-visual
18 software to conduct online synchronous focus groups dominate providing useful
19 guidance from the lessons learnt to assist the novice researcher. It therefore
20 cannot yet be established if conducting focus groups in this way can truly mirror
21 face to face discussions in achieving the authentic interaction necessary to
22 generate the data required.
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42 Although the use of an online audio-visual environment is perceived to closely
43 align with the face to face environment (Matthews, Baird, & Duchesne, 2018),
44 some think the virtual nature hampers the ability to capture the essence of a focus
45 group in relation to interactions and group dynamics (Greenbaum, 2008).
46 Matthews et al.'s (2018) evaluation of audio-visual focus groups with nine
47 healthcare professionals found that all felt easily able to express their ideas
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9 during the discussion and felt comfortable in the online environment with others
10 previously unknown to them. However, just over half felt conversation was more
11 difficult or flowed less easily than in a face to face environment. Studies which
12 made direct comparisons between the quality of data generated face to face with
13 that generated online had favourable outcomes in terms of very few differences
14 in the richness of data collected (Flynn, Albrecht, & Scott, 2018; Kite &
15 Phongsavan, 2017; Abrams et al., 2015).

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26 Although literature in this field is sparse with little data from which to draw practice-
27 informing evidence (Morgan, 2019), the comparisons which have been made by
28 others gave us confidence that using this approach to optimise the diversity of
29 our sample would not impinge the richness of our data. Theoretical perspectives
30 from text books (Morgan, 2019) and reflexive accounts (Kite & Phongsavan,
31 2017; Strout et al., 2017; Tuttas, 2015) allowed us to benefit from lessons learned
32 by others in our planning. These examples alerted us to procedural factors unique
33 to conducting focus groups in an online environment which could pose a threat
34 to the generation of rich data (Strout et al., 2017) by limiting interactions, the very
35 hallmark of focus groups, and essential to achieving our research aim. As
36 advocated in qualitative research, we used a journal as a reflexive tool throughout
37 this study. Doing so enabled us to identify issues which had the potential to
38 impact on methodological and ethical aspects of this study. Although these issues
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9 are similar to those encountered in conducting face to face focus groups, they
10 require consideration and actions unique to an online context. Due to the
11 fundamental importance of interaction to focus groups, researchers must create
12 an environment that encourages participation and interaction. We noted during
13 our data collection that the nature of an online environment had the potential to
14 produce detached statements from participants as opposed to interactive
15 exchanges and so recognised the importance of strategies to promote
16 interaction. Analysis of our experience presented here highlights procedural
17 aspects which should be considered when planning synchronous focus groups
18 using audio-visual software to optimise the ability of this method to capture data
19 through interactions which can methodologically be aligned as closely as possible
20 to face to face alternatives.
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36 37 **Research Design and Methods** 38

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40 This article draws on reflections from phase one of a mixed methods study which
41 received ethical approval from the Nursing and Health Science Filter and Ethics
42 committees at Ulster University. The aim of the study was to explore the concept
43 and culture of researcher practitioner engagement in the context of healthcare
44 research. This was achieved through a hybrid model of concept analysis
45 (Schwartz-Barcott & Kim, 2000). During the theoretical stage we analysed the
46 attributes, antecedents and consequences of the concept of 'researcher
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9 practitioner engagement' from definitions and published incidences of the
10 phenomenon. A subsequent fieldwork stage was carried out to refine the concept
11 through the experiential knowledge of two groups; academic researchers based
12 in Higher Education Institutions (HEI) in the United Kingdom (UK) who had
13 engaged nurses, midwives or therapists in their research in a role other than as
14 a study participant; and frontline practitioners from these disciplines working in
15 healthcare settings in the UK who had been engaged in research by academic
16 researchers in a role other than as a study participant. Focus groups conducted
17 via the internet were chosen as the most appropriate method of data collection
18 for this fieldwork stage. This optimised our reach across the UK by enabling us
19 to include a geographical spread of participants whilst also offering flexibility to
20 practitioners with varying work patterns and clinical workloads.
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36 37 **Selecting the technology** 38 39

40 Several different software options are available to conduct online focus groups
41 and it is important that these are evaluated according to the practical,
42 methodological and ethical requirements of the research. In our study, we
43 required software which enabled reliable and secure real time audio and visual
44 communication in a private online space; a facility to record both audio and visual
45 components; a platform which demanded low levels of user competency; and no
46 financial commitment from participants to purchase or download software. We
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9 used Tuttas's (2015) evaluation of the software available at the time of her study,
10 a web-based search for any additional products and consultation with a
11 technology specialist. Two potential options were identified but one was
12 dismissed as during a trial within the research team, its stability and reliability to
13 host a group discussion was questioned. The software chosen to carry out focus
14 groups online was Zoom©. This platform hosts online audio-visual meetings; it
15 has the capacity to show multiple users on screen, record audio and visual
16 communications and can be used from mobile devices. Features include sharing
17 a screen to display presentations and a white board facility. Software is free to
18 all users up to a maximum of 45 minutes per meeting. As we anticipated focus
19 groups lasting a minimum of 60 minutes, we chose to pay a small monthly charge
20 payable only by the meeting host. Usability of the software was evaluated as part
21 of a pilot focus group with five PhD researchers from the Institute of Nursing and
22 Health Research at Ulster University. The lead researcher (ND) reflected on
23 facilitating the group online and obtained participants' perspectives via an online
24 questionnaire. Favourable feedback was received from four participants who
25 commented on their experience of the online element of the group, with three
26 specifically highlighting ease of use of the selected software. Another commented
27 that any more than five participants in the group might have restricted the ability
28 to hear everyone's views.
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Study Participants

Using a purposeful sampling framework, a range of recruitment strategies were adopted to bring our study to the attention of potential participants including targeted emails to healthcare researchers in all Higher Education Institutions in the UK, advertisements in professional publications available to members of professional bodies to access healthcare professionals and a strategic social media campaign to reach both groups. A Participant Information Sheet included detail on the purpose of the study, what participation involved and outlined how all ethical considerations had been addressed. Volunteers were asked to complete a brief online recruitment questionnaire via Qualtrics® which indicated their willingness and eligibility to take part. Recruitment was ongoing; each focus group was arranged when an adequate number of eligible volunteers were available, and a Doodle poll circulated to identify availability over a range of identified dates and times. Focus groups were planned based on availability of the majority in each round; those who were not available were included in the next Doodle poll. An email was sent to participants one week prior to the focus group which included an informed consent form (to be signed and returned prior to the focus group), a weblink to join the online group, and an offer to take part in a test call for those unfamiliar with the software or who wished to test their hardware.

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9 In total, 40 academic researchers and 20 frontline practitioners completed the
10 online recruitment questionnaire. Of those academic researchers who met the
11 study criteria, ten did not indicate their availability via the Doodle poll. Five were
12 'lost'; two were not available on any of the suggested dates, two registered to
13 take part in a focus group but did not log in to the online meeting during the
14 allocated timeslot and one cancelled due to sickness shortly before the focus
15 group commenced. Of six eligible practitioners who were invited to take part in a
16 focus group but did not participate, five did not respond to invitations to complete
17 a Doodle poll and one was not available on allocated dates. Over a four-month
18 period, 17 academic researchers took part in five focus groups (Table 1) and 8
19 practitioners took part in 3 focus groups. Each focus group lasted on average 83
20 minutes. This included time for introductions, setting ground rules and a pre-
21 recorded PowerPoint presentation that lasted four minutes to outline the
22 background and methodological approach of the study. Zoom© software enabled
23 PowerPoint slides to be visible to all participants throughout the focus group using
24 the 'share my screen' facility to provide a visual display of each discussion point.
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50 **Table 1:** Characteristics of focus groups and participants
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	Focus group	n	Length (minutes)	UK region	Role
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Academic Researchers (n=17)	R1	4	75	England (n=2) Scotland (n=1) N. Ireland (n=1)	Academic role	Professor (n=2) Lecturer (n=1) Research fellow (n=1)
					Clinical area	Nursing (n=2) Physiotherapy (n=1) Occupational therapy (n=1)
	R2	4	93	England (n=4)	Academic role	Professor (n=4)
					Clinical area	Podiatry (n=1) Speech and language therapy (n=1) Occupational therapy (n=1) Nursing (n=1)
	R3	3	89	England (n=3)	Academic role	Professor (n=1) Associate Professor (n=1) Lecturer (n=1)
					Clinical area	Nursing (n=2) Unknown (n=1)
	R4	2	86	England (n=2)	Academic role	Professor (n=1) Doctoral researcher (n=1)
					Clinical area	Nursing (n=1) Speech and language therapy (n=1)
	R5	4	59	England (n=1) Scotland (n=2) N. Ireland (n=1)	Academic role	Professor (n=1) Reader (n=2) Lecturer (n=1)
					Clinical area	Midwifery (n=1) Physiotherapy (n=1) Occupational therapy (n=1) Nursing (n=1)
Frontline Practitioners (n= 8)	P1	3	87	England (n=3)	Physiotherapist (n=1) Occupational therapist (n=1) Speech and language therapist (n=1)	
	P2	2	86	England (n=1) Wales (n=1)	Occupational therapist (n=2)	
	P3	3	90	Scotland (n=1) England (n=2)	Physiotherapist (n=1) Occupational therapist (n=1) Speech and language therapist (n=1)	

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9 To provide transparency and contribute to the credibility of our overall study
10 (Shenton, 2004), the lead researcher (ND) documented reflective commentary
11 in a journal from the outset. This facilitated reflexive evaluation of the
12 effectiveness of the chosen method and was used to record researcher
13 observations, opinions, critical reflections and notes on theoretical reading.
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20 Journal entries included:

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- 23 ▪ recommendations made by authors who reported lessons learnt when
24 conducting focus groups online
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- 26 ▪ factual information about each focus group including timings and any
27 occurrences during the group (for example technical issues)
- 28
- 29 ▪ observations on factors which facilitated the group conduct
- 30
- 31 ▪ reflexive evaluation of the effectiveness of the method in collecting the
32 data necessary to achieve study objectives
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- 34 ▪ improvements to enhance subsequent groups and reflections on any
35 changes made
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38 Additional reflexive entries were made to the journal during transcription of each
39 focus group and data analysis as were reflexive discussions amongst the
40 research team and advice sought from an academic colleague highly
41 experienced in focus group planning and conduct. This was an iterative process;
42 where an issue had been identified, reflexive notes were made following
43 subsequent groups on the effect of any action taken to address this issue and
44 literature returned to in order to identify potential solutions where others had
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9 noted similar issues. Once data analysis was completed, all journal entries
10 relating to the focus groups were collated. Content analysis was used to identify
11 the unpredicted issues experienced during the conduct of the focus groups which
12 the researcher, using intuition and tacit knowledge, reasoned had the potential to
13 affect the data generated during this study. Reflective notes were coded by
14 highlighting each section of text that indicated issues that had been identified as
15 having a potential impact on the study, actions taken to address any issues which
16 arose and reflections on action that could have been taken. Once all codes were
17 developed, these were grouped into those which addressed similar issues and a
18 representative name given to each category. As shown in Table 2, categories
19 were grouped into five themes (**Stability of group numbers, Technology,**
20 **Environment, Evaluation and Recruitment**). For each category, the actions which
21 the researcher took, or identified through reflections or consultation of theoretical
22 readings that could have addressed these issues were noted (Table 2). To ensure
23 further credibility, themes, categories and suggested actions were reviewed by
24 an academic colleague outside of the research team who is highly experienced
25 in focus group methods. Presented below is a summary of these reflections
26 including key points to consider when preparing to use online focus groups in
27 research.

28 **Theme 1: Stability of group numbers**

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9 Events which occurred during some focus groups impacted on the stability and
10 consistency of participant numbers. In group R2, one participant joined after
11 discussions began; having initially decided not to proceed with the group due to
12 technical difficulties, the participant later established connection and joined the
13 discussion twenty minutes in. As this situation could change the group dynamic,
14 it has been suggested by others that a participant who joins online more than 10
15 minutes after discussions commence should be reallocated to a future group
16 (Wilkerson, Lantaffi, Grey, Bockting, & Rosser, 2014). However, it is difficult to
17 establish if and how this issue could change the data (Gothberg et al. 2013). At
18 that time, it was reasoned that the dynamic was more likely to be affected by
19 pausing discussions to remove the participant. There was also concern that this
20 participant could be 'lost' should they not be able to join a future group. Although
21 expulsion based on technical issues feels punitive, it clarified to us that the
22 consequences of 'late arrival' should be clearly outlined to participants in pre-
23 focus group communications to avoid this situation occurring. We subsequently
24 identified a software feature to lock a meeting at a point determined by the
25 facilitator and so by communicating a time limit prior to the group can prevent any
26 difficulties this situation could raise.

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51 Similarly, one participant left focus group R1 early. The timing of this group had
52 been underestimated at 60 minutes and so changes were made when
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9 communicating the time expectation to future groups. Despite requesting a diary
10 slot of 90 minutes, a participant left early in each of the two subsequent groups
11 (Focus groups R2 and R3). Diary demands of professionals are understandable,
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15 but it may be that the nature of the internet makes leaving a group easier than in
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18 a face to face space. The result is reduced contribution from these participants
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20 during the latter stages of the discussion and potentially lost data. In recognition
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22 of the challenges faced in freeing up time to take part in such studies, others have
23
24 set up asynchronous chat rooms to enable ongoing contributions post-focus
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26 group (Matthews et al. 2018); this strategy can overcome time limitations, the
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28 issue of early leavers and accommodate reflective thinkers. To facilitate the
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30 additional benefit of an anonymous contribution that may have been prohibited
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32 by the audio-visual environment, all participants were initially offered the option
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34 to provide further comment on any element of the discussion via follow up email.
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38 On realisation of the impact and likelihood of early leavers and the limitation of
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40 emails in allowing further interactive discussions, we subsequently set up an
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42 online chat room via Chatzy©. Others who adopted this strategy had minimal
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44 uptake (Matthews et al. 2018); similarly, we received no follow-up emails or
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46 contributions to the chatroom discussion. As Matthews et al. (2018) surmise, this
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48 could suggest that all discussion took place during the focus group with
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50 participants feeling they have no more to add or it could be reflective of
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9 professionals' busy schedules and, therefore, limited time to offer further
10 contributions. However, this strategy should be used cautiously; although offering
11 opportunity for additional participant input, it should perhaps be considered
12 separate to focus group data if not exposed to interactive dialogue if low numbers
13 partake or no interaction between members is noted.
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21 Virtual groups have been shown to have higher cancellation, no-show, and
22 attrition rates than face to face groups (Rupert et al. 2017; Matthews et al. 2018)
23 with studies providing examples where online participants were more likely to
24 withdraw, both prior to the start and during the group (Kite & Phongsavan, 2017;
25 Tuttas, 2015). This too was our experience; three participants were confirmed to
26 take part in focus group R4; and following the advice of others (Matthews et al.
27 2018; Strout et al. 2017; Tuttas 2015; Wilkerson et al. 2014), attempts were made
28 to identify at least one further participant to allow for potential drop-out, however,
29 due to limited availability of volunteers, this was not possible. One of these three
30 participants failed to log into the discussion and was not able to contact the
31 research team until hours later to advise of their change of circumstance. We
32 made an 'on the spot' decision to continue with the discussion as opposed to
33 cancelling or rearranging the group as we were unaware whether the third
34 participant would join in in due course. The resulting discussion would be
35 considered a dyadic interview as opposed to a focus group (Morgan, Ataie,
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9 Carder, & Hoffman, 2013); this highlights the need to consider the minimum
10 number required to form a focus group, the importance of adequate numbers to
11 accommodate for at least one dropout and transparency in pre-focus group
12 information on the action that will be taken should the minimum number not
13 attend. If a focus group does not happen because not enough people turn up,
14 this is more of an issue than if one person does not turn up for an individual
15 interview (Morgan, 2019). The risks are alienation of those participants who were
16 available and the challenges of rescheduling future groups, both of which could
17 result in further withdrawal. However, the advantage of the online environment
18 is that although inconvenient, it is surmised that rescheduling is logistically easier
19 than face to face groups. Although there are notable differences between dyadic
20 interviews and focus groups, there are also similarities (Morgan, 2019). Our
21 motivation for using focus groups to meet the objectives of this study was to allow
22 interaction that would facilitate sharing and comparisons based on potentially
23 differing experiences from a range of contexts. This dyadic interview enabled us
24 to achieve this and possibly obtaining greater depth of dialogue from these two
25 participants during a discussion as it lasted longer than two groups with four
26 members. Based on this, the decision was taken that should this situation arise
27 again, a discussion with two participants could proceed as the advantages for
28 retaining participants and the resulting data would not compromise the study. This
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9 decision also helped us to overcome the challenges we faced in convening small
10 numbers of frontline practitioners and so prevented us from losing potential data.
11 Focus group P2 therefore proceeded as a dyad when only two participants could
12 be convened together. This however will not be an appropriate course of action
13 for all studies, dependent on their nature. Researchers should be clear on the
14 differences between dyadic interviews and focus groups and the influence of
15 these different types of interactions to inform reasoning (Morgan et al., 2013).
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26 Like others, we found small group sizes easier to manage online (Kite &
27 Phongsavan, 2017). Even with low numbers we were required to extend the time
28 allocated to each group from 60 minutes to 90 minutes; small groups allowed for
29 courteous turn talking and had larger numbers been present, we believe in-depth
30 discussion would not have been possible in the time available to cover the focus
31 group schedule. Features of audio-visual software such as a hand raising facility
32 can be used in larger groups to facilitate turn taking, however we found we did
33 not need to avail of this tool and so are unable to offer insight into if and how it
34 potentially could facilitate or hinder interactions. Although more groups increased
35 transcription time and costs, like Kite & Phongsavan (2017), we advocate for
36 planning more online focus groups with fewer participants than when conducting
37 face-to-face groups. The flexibility of the virtual nature of our focus groups
38 allowed for this. Although smaller numbers were appropriate in this context,
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9 others may find it inhibitive (Matthews et al., 2018) depending on the nature of
10 their study.
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13 **Theme 2: Technology**

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16 We took the decision to use online meeting software using audio-visual
17 technology to closely mirror a face to face environment. Pre-focus group
18 communication with participants clearly indicated that hardware with a
19 microphone, camera and internet connection was required to take part. Despite
20 this, two participants (one in focus group R3 and one in focus group P1) joined
21 using a computer with no camera. The decision was taken to continue so as not
22 to lose a group member from already small groups. Both participants could see
23 the facilitator and other group members but were not visible to others; lack of a
24 camera did not appear to have any negative influence on interactions as both
25 were engaged with the discussion and engaged by others. However, depending
26 on the participants, this could affect the dynamics within a group and prevents
27 observation of non-verbal communications so is a further factor to consider in
28 study design and assertions in pre-focus group communication. Researchers
29 who feel such inconsistency could negatively impact group interactions could
30 include a clear statement on consent forms for participants to confirm their access
31 to the necessary equipment and understanding that they cannot take part in the
32 group should they not have the correct technology to engage both audio and
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9 visually. Equally, decisions should be made to account for those with cameras
10 but who perhaps experience technical issues during discussions that cause
11 interruption to visual communication, as can happen with varying internet
12 connections. This leads to our second potential challenge which stems from the
13 likelihood that unforeseen technical interferences can occur in the conduct of
14 online focus groups (Gothberg et al. 2013). In Chong et al.'s study (2015) using
15 webinar technology, for example, there was one participant with technical
16 difficulties in each group. Other research teams have secured IT personnel to be
17 available at both the facilitator and participants' venues to rectify any issues which
18 might arise (Flynn et al. 2018; Chong et al. 2015). Resource limitations prevented
19 us from being able to offer such support, however we experienced minimal
20 technical issues which prevented participation. This could be attributed to our
21 selection of software which we had established as requiring low levels of
22 competency. We considered participants' self-efficacy in using the software an
23 important factor as it could potentially impact on the quality of data collected
24 (Flynn et al. 2018; Abrams et al. 2015). A further consideration is the infancy of
25 this technology; although participants may have previous experience of
26 participating in focus groups, doing so online may be a new experience and so
27 may take time initially to familiarise with the process of interacting in this
28 environment. This encouraged us to offer test calls to ensure participants felt
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9 confident and comfortable in using the technology prior to the focus group. Test
10 calls were taken up by three participants; we found this had the additional benefit
11 of enabling the researcher to introduce themselves to the participant and begin
12 to develop a rapport. Equally, the facilitator took multiple opportunities to use this
13 platform in other areas of their work both as a host and as a meeting attendee
14 prior to the focus groups; this developed self-efficacy in using software features
15 to optimise interaction and in supporting other users to troubleshoot. Participants
16 also had the flexibility to join the group from the environment of their choice,
17 which, as we discuss later, may have been a factor which contributed to their
18 ability to participate. As some took part from their home environment, removing
19 choice by restricting their participation to an environment where IT support was
20 available could have contributed to non-participation.
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36 37 **Theme 3: Environment from which participants take part**

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40 Unlike face to face groups, researchers have limited control of the participant's
41 environment as it is self-selected (Chong et al., 2015). Carrying out focus groups
42 online can, therefore, result in issues which the researcher cannot mitigate
43 against. Examples include distractions caused by disruption by colleagues
44 entering the room or use of the internet such as checking emails (Chong et al.,
45 2015). We experienced similar issues during this study; participants in all
46 academic researcher focus groups (R1, R2, R3, R4, R5) took part in the focus
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9 groups from their desk, either at home or in the workplace. Although creating a
10 comfortable environment for participants (Flynn et al., 2018), some were
11 observed distracted by activities on their desk, computer and mobile phone whilst
12 other members of the focus group were speaking. There were examples of
13 participants being interrupted by colleagues or family members entering the room
14 and on occasion, disappearing from the screen to attend to these discussions.
15 This raises additional privacy considerations that are unique to an internet-based
16 study as opposed to traditional face to face spaces (Chong et al., 2015). From a
17 practical perspective, others entering a room can create noise distractions and
18 interfere with audio recording. One participant overcame this by muting their
19 sound to prevent interference from background noise. Other researchers have
20 suggested actively encouraging participants to mute when not speaking (Kite &
21 Phongsavan, 2017; Tuttas, 2015). In the main, we found that this was not
22 necessary and potentially could have resulted in disjointed discussions.
23 Participants could be encouraged to wear a headset with a microphone (Kite &
24 Phongsavan, 2017), however, this equipment may not be available. One
25 participant in focus group R4 wore headphones without a microphone; although
26 this maintained privacy for others in the group should anyone have entered the
27 room, it prevented the headphone wearer from being aware of a background
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9 conversation that was picked up by the computer microphone and which distorted
10 the recording.
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13 From an ethical perspective, the environment raises issues around both
14 anonymity and confidentiality. We asked participants to confirm they were able to
15 take part where they could ensure confidentiality would be respected for both
16 themselves and the other members of the group. In instances where this did not
17 occur, it did not become evident until later in the discussions when interruptions
18 were made. Other participants did not express concern to the facilitator during
19 the focus groups in which this occurred, possibly due to the lack of sensitive
20 discussions. Given the nature of the participants involved and the environment
21 from which they join the group, particularly if within working hours, interruptions
22 such as these may be unavoidable. However, these situations have the potential
23 to breach confidentiality. As with focus groups carried out in face to face spaces,
24 it is only the researcher who can guarantee that confidentiality will be respected
25 and cannot guarantee the actions of other focus group members. Online spaces,
26 however, allow for others outside of the focus group membership to be in the
27 vicinity of the discussions without the researchers' or other focus group members'
28 knowledge. This is a situation for which researchers should consider a clear plan
29 of action to mitigate. Although the need for a confidential space was reinforced in
30 the Participant Information Sheet (PIS), this may need to be restated on the
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9 informed consent form and when setting the ground rules at the beginning of the
10 focus groups. Also, practical elements may need to be explicitly addressed in any
11 communications with participants as these may not be issues they have
12 considered prior to taking part. Facilitators must be clear on what action they will
13 take should participants indicate that they are not in a suitable environment at the
14 beginning of the focus group. Consideration should be given to the impact on
15 group numbers should withdrawal be forced at this stage and how to deal with
16 withdrawal mid-group should it become evident during discussions that
17 confidentiality has been compromised.
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32 **Theme 4: Evaluation**

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34 Use of the internet to conduct audio-visual focus groups has been evaluated from
35 the participants' perspective (Matthews et al. 2018), but little is published in this
36 regard. We did not incorporate an evaluative element into our study protocol and,
37 therefore, were reliant on our own reflexivity to appraise this process. Use of a
38 reflective journal throughout helped us to adopt an iterative approach by
39 controlling for the unpredicted issues in subsequent groups. What remains
40 unknown is the experience of the participant as a member of our internet-based
41 focus groups or what the outcome of the study would have been had it been
42 feasible to convene these same participants in a face to face group. Considering
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9 the very limited evidence base and sparse reporting relating to this novel method
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11 (Morgan, 2019) others planning to carry out internet-based focus groups using
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13 audio-visual software should consider building an evaluative component into the
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15 study design to share with others and strengthen the design of future studies. In
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17 addition, offering participants the option to take part in an online or face to face
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19 group provides opportunity to compare the depth and breadth of interactions
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21 between the two formats within one study (Kite & Phongsavan, 2017).
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27 **Theme 5: Recruitment**

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29 During the recruitment phase, no potential participant contacted us to indicate
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31 that they could not take part because they did not have access to the necessary
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33 equipment or a private environment. We recognise, however, that specific
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35 requirements to enable participation in an online meeting may have negatively
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37 impinged on recruitment. Recruiting from two different professional groups,
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39 academic researchers and healthcare practitioners, gave us the opportunity to
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41 reflect on factors that may have caused a difference in the ease by which we
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43 were able to recruit from one group over the other. Data collection for academic
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45 researchers was completed well in advance of their practitioner counterparts;
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47 academic participants took part from their desks during the working day in an
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49 office environment or had the opportunity to work from home. Anecdotally they
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9 told us that they had extensive experience of online meetings and student
10 tutorials using audio-visual technology and the majority had used the Zoom©
11 software package previously. Conversely, healthcare professionals work shifts,
12 have busy clinical workloads and may be restricted by lack of access to the
13 required equipment in a confidential space during their working day. We
14 acknowledged the challenges of practitioner recruitment when designing our
15 study (Hysong et al. 2013) and had reasoned that the flexibility of an internet-
16 based option could enhance the recruitment process. Accessibility to fit in with
17 working schedule was rated highly in evaluation of one online study (Matthews et
18 al. 2018). Telephone-based focus groups were preferred over face to face by
19 59.4% of participants as an alternative tool to involve health professionals who
20 might otherwise be inaccessible (Ross, Stroud, Rose, and Jorgense et al. 2006).
21 In 2018, when our recruitment took place, 95% of adults aged 25 to 54 years
22 owned a smartphone (Statista, 2018), which offers a personal device that should
23 support participation, both audio and visual. This, however, relied on willingness
24 of practitioner participants to take part outside of working hours if time or a private
25 environment within which to use personal smart phone technology was not
26 feasible during the working day. What is unknown to us, is the impact that factors
27 such as the need for a confidential environment, restricted access to the
28 necessary hardware and self-efficacy in using such technology had on ability or
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9 willingness to participate. Offering an alternative method of participation, so as
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11 not to alienate those who without the equipment, perceived skills or confidence
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13 to participate could be considered to prevent sampling bias within a study.
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15 Researchers also need to be able to teach participants how to use these tools
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17 (Wilkerson et al. 2014); we offered test calls but perhaps could have been more
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19 forthcoming in identifying the need for and offering training support, as ownership
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21 of a mobile device such as a tablet or smartphone does not mean confidence in
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23 using the technology we proposed. Although an option would have been to use
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25 our recruitment survey to ask potential participants if they required any support
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27 to enable them to participate, funding limitations would have prevented us from
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29 being able to meet any resource need indicated, such as provision of a tablet or
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31 on-site technical support.
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40 **Table 2:** Summary of issues and potential actions

Themes	Actions for consideration
1. Stability of group numbers	
a) Late arrival of participants	
Potential impact: <ul style="list-style-type: none"> ▪ changes to group interactions ▪ richness of data collected when group membership changes ▪ participant retention in the study if late arrival results in group expulsion 	<ul style="list-style-type: none"> ▪ analyse any potential impact of late arrivals in relation to the study topic and participant characteristics ▪ assess appropriateness and necessity of software features such as locking a meeting to prevent late arrivals or disruptions ▪ devise a strategy to manage late arrivals

<ul style="list-style-type: none"> ▪ feasibility of group if minimum participant numbers not achieved 	<ul style="list-style-type: none"> ▪ manage participant expectation by communicating late arrival management strategy prior to focus group
b) Early leavers	
<p>Potential impact on:</p> <ul style="list-style-type: none"> ▪ changes to group interactions ▪ richness of data collected when group membership changes 	<ul style="list-style-type: none"> ▪ adequate time allocated to focus group ▪ clear communication to participants on minimum expected time commitment ▪ additional data collection methods to extend focus group (e.g. asynchronous chat room)
c) Unexpected 'no-shows' and/or late cancellations	
<p>Potential impact:</p> <ul style="list-style-type: none"> ▪ alienation of those in attendance if group must be rescheduled due to inadequate numbers ▪ challenges of rescheduling potentiality leading to lost participants 	<ul style="list-style-type: none"> ▪ direction via pre-focus group communication to manage expectations should this situation arise ▪ identify strategies to prevent 'no-shows' such as reminders ▪ establish minimum participant requirements with over-recruitment to allow for no shows or drop outs
2. Technology	
a) Participants joining with audio only	
<p>Potential impact:</p> <ul style="list-style-type: none"> ▪ lost participant if decision taken to discontinue participant when no video available ▪ potential changes to group interactions and richness of data ▪ unable to observe non-verbal communications 	<ul style="list-style-type: none"> ▪ add statement to informed consent form and/or recruitment questionnaire to establish equipment available to participants ▪ maintain consistency by allocating participants to specific focus groups based on technology available to them
b) Technical support for participants	
<p>Potential impact:</p> <ul style="list-style-type: none"> ▪ effect on recruitment if environment in which participant joins focus 	<ul style="list-style-type: none"> ▪ pilot testing to identify potential technical issues ▪ develop ability to trouble shoot by acquiring self-efficacy in using selected software prior to formal data collection

<p>group is limited to where technical support can be provided</p> <ul style="list-style-type: none"> ▪ participant's ability and/or willingness to take part if they perceive themselves to have low self-efficacy with equipment ▪ researcher's familiarity with software and ability to trouble shoot 	<ul style="list-style-type: none"> ▪ availability of more than one researcher during focus groups (one facilitator, one trouble shooter) ▪ offer test calls for those who are inexperienced or lack confidence using the selected technology
<p>c) Optimising use of software features</p>	
<p>Potential impact:</p> <ul style="list-style-type: none"> ▪ optimise interactions amongst participants ▪ enhance participant experience 	<ul style="list-style-type: none"> ▪ ensure familiarity with all software features that can enhance interaction such as screen displays, raise hand, accessibility features ▪ pilot testing ▪ take part in a group as a member to experience participation and reflect on areas for consideration for study participants
<p>3. Environment from which participants take part</p>	
<p>a) Distractions within the participant's environment</p>	
<p>Potential impact:</p> <ul style="list-style-type: none"> ▪ can disrupt group dynamics and hence data collected ▪ distractions caused to group members on hearing others speak in the background ▪ quality of audio recording 	<ul style="list-style-type: none"> ▪ alert participants to specific unacceptable distractions via ground rules e.g. avoid use of mobile phones and checking emails ▪ request participants use mute function on microphone should background noise occur within their environment
<p>b) Contravening ethical processes</p>	
<p>Potential impact:</p> <ul style="list-style-type: none"> ▪ participant taking part from a space which threatens anonymity and/or 	<ul style="list-style-type: none"> ▪ devise strategy for addressing a situation when it becomes evident that participant is in an environment which

<p>confidentiality beyond focus group members</p>	<p>contravenes ethical procedures (both at the beginning of the group and during the group)</p> <ul style="list-style-type: none"> ▪ clear communication in pre-focus group information on process that will be employed should participant contravene ethical processes ▪ encourage participants to use strategies such as marking a space with a 'do not disturb' sign
<p>c) Participant comfort</p>	
<p>Potential impact:</p> <ul style="list-style-type: none"> ▪ allows participation in a comfortable environment ▪ rapport with researcher 	<ul style="list-style-type: none"> ▪ offer a range of flexible times to allow for environment of choice ▪ test call to develop rapport prior to focus group
<p>4. Evaluation</p>	
<p>a) Limited evidence of effect on data of audio-visual online as opposed to face to face data collection</p>	
<p>Potential impact:</p> <ul style="list-style-type: none"> ▪ credibility of data collected if factors which could facilitate or hinder interaction when using audio-visual technology to conduct focus groups are unknown or not planned for ▪ unknown effect on data by conducting focus groups online as opposed to face to face 	<ul style="list-style-type: none"> ▪ reflexive evaluation of the method by research team during planning, conduct and analysis of focus groups ▪ pilot testing ▪ adopt an iterative approach to focus group conduct using feedback from participants and researcher reflexivity ▪ build into the study design evaluation of participant experience to identify strengths and limitations to assist with design of future studies ▪ comparisons of data collection using face to face groups versus audio-visual focus groups (methodological triangulation)
<p>5. Recruitment</p>	
<p>a) Participant alienation</p>	
<p>Potential impact:</p> <ul style="list-style-type: none"> ▪ exclusion of potential participants who do not have access to suitable equipment 	<ul style="list-style-type: none"> ▪ within recruitment questionnaire, ask potential participants to identify any factors which may restrict participation

<ul style="list-style-type: none"> ▪ exclusion of those unable to secure a private environment to adhere to ethical requirements of confidentiality and anonymity ▪ exclusion of those who are inexperienced or lack confidence in the use of the required software and/or hardware ▪ selection bias 	<ul style="list-style-type: none"> ▪ identify if and how research team can address any factors which might limit participation e.g. training ▪ consider offering alternative formats to prevent participant alienation
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Conclusion

This was our first experience of carrying out synchronous focus groups using the internet. Our choice of method provided us with the opportunity to include participants from across the United Kingdom resulting in a diverse sample which we believe has added richness to the data collected. We also believe the flexibility of the medium offered encouraged participation. As researchers with experience of conducting face to face focus groups, we are aware that many of the methodological, practical and ethical considerations of focus groups carried out using the internet are similar to those which must be considered in a face to face venue. However, as novices of this online method, we have learnt several lessons on important factors which should be considered to overcome the methodological challenges that working in an online context can raise and to enable authentic interactions. Situations arise that are unique to online environments and are as not as easy to handle or plan for as they would be in a

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9 face to face space as control is given to participants, for example, in respect of
10 their environment. Researchers, therefore, need to have clear plans of action
11 and anticipate every eventuality to optimise participant experience, whilst
12 ensuring data are collected robustly and in adherence to ethical approvals.
13 Making use of tools such as ground rules, pre-focus group information and
14 informed consent documents can help to mitigate against potential issues which
15 may arise by ensuring participants are well appraised of the process,
16 expectations and any action that could be taken in the event of situations
17 arising. Although we do not offer empirical evaluation, our reflexive learning
18 can help others to anticipate challenges specific to their study context to
19 optimise participant experience and opportunities for authentic interaction which
20 generates data in online focus groups as close to that which can be generated
21 in a face to face environment. Further methodological evaluations are now
22 required to continue to develop the evidence base for this approach by further
23 exploring the impact of internet-based focus groups on interactions, willingness
24 to engage and the richness of the data collected.
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27 **Declaration of conflicting interests**

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29 The authors declare no potential conflicts of interest with respect to the
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31 research, authorship, and/or publication of this article.
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