



Co-designing a real-time digital experience sampling approach to understanding ageing well in the right place: The place-based inclusion of middle- to older-aged people with intellectual disabilities and middle- to older-aged LGBT+ people

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ARTICLE INFO

Keywords:

Community-based participatory research
Older people
Intellectual disabilities
LGBT+
Experience sampling method
Ageing well in place
Co-design

ABSTRACT

Ageing well in place is a multidimensional concept that involves maintaining inter/independence, meaningful community participation, and a sense of purpose and belonging within supportive environments. For older people with intellectual disabilities and/or who identify as LGBT+, social and cultural inequalities can interact with age-related challenges such as morbidities and contracting social networks to hinder ageing well in place. This paper details the design and development of the Place Study, a digital, real-time Experience Sampling Method created to explore how older people with intellectual disabilities and/or who identify as LGBT+ navigate everyday experiences of inclusion and exclusion in physical places and online spaces which form their communities. The Place Study was co-designed with people with lived experience using principles of Community-Based Participatory Research to evaluate the usability, accessibility, and clarity of the study tool. The tool uses the ArcGIS Survey 123 platform to enable participants to submit reports consisting of multiple modalities, including text, audio, photographs, and geolocation, allowing for the generation of nuanced reflections of experiences of being in place. Iterative feedback from evaluation groups formed of people with intellectual disabilities and people who identify as LGBT+ allowed for refinements to accessibility and the creation of appropriate and effective scaffolding. Key challenges included hardware usability, software limitations, and the implementation of tailored and ongoing support. Solutions were co-produced through an action/feedback loop, resulting in a refined data generation tool with appropriate scaffolding to enhance participant engagement.

1. Introduction

Understanding what it means to age well in place requires attention not only to physical environments but also to the lived experiences of those navigating them, particularly people whose identities and support needs are often marginalised in ageing research. This article focuses on the development of a digital, real-time experience sampling method designed to explore how middle- to older-aged people with intellectual

disabilities and/or who are LGBT+ experience inclusion and exclusion in the everyday places and spaces, both physical and digital, that shape their lives.

The tool used to generate data, known as the Place Study, was co-designed with members of these communities as part of a broader project, the IncludeAge project (<https://includeage.co.uk>), which generated new insights into inclusive environments and community participation for these populations. By detailing the iterative,

Ageing in Place: Critical Perspectives

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<https://doi.org/10.1016/j.wss.2026.100433>

Received 17 October 2025; Received in revised form 15 June 2026; Accepted 16 June 2026

Available online 17 June 2026

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participatory process through which the Place Study was developed, prior to use with study participants, this article offers a methodological contribution to inclusive research practice, while also advancing critical understandings of how place, identity, and wellbeing intersect in later life.

In what follows, we first outline the conceptual framing of ageing well in place and the importance of community participation for wellbeing. We then introduce the Experience Sampling Method (ESM) and describe how it was adapted for use with our participants. The remainder of the article details the design and development of the Place Study, the challenges encountered, and the solutions co-produced with people with lived experience. We conclude by reflecting on the implications of this work for inclusive research and for rethinking what it means to age well in the right place.

1.1. Ageing well in place

Ageing well is a multidimensional concept that goes beyond simply growing older in one's home or community. It involves maintaining inter/independence, meaningful community participation, and a sense of purpose and belonging within supportive environments (Sixsmith et al., 2023; World Health Organization, 2021; Grove, 2021; Woolrych et al., 2019; Fang et al., 2016). Older people are able to age well in place when they can choose to engage in valued and meaningful social activities, form interpersonal connections and access appropriate services (Grove, 2021; Woolrych et al., 2019). The ability to engage in these forms of participation are shaped by both personal capabilities and the physical, social and cultural environments in which people live, and which recognise the diversity and needs of the individual. When environments are inclusive, accessible, and responsive to diverse needs, older adults are more likely to age well in place (Grove, 2021).

However, ageing well is not guaranteed by simply remaining in place. Physical and psychological barriers to ageing well in place can be found in unsupportive and inaccessible local and built environments, stigma, and lack of inclusive programmes and activities (Grove, 2021; Woolrych et al., 2019; Fang et al., 2016). Such places can include parks which feel unsafe at night or community centres in which existing groups and cliques feel unwelcoming to newcomers (Grove, 2021; Woolrych et al., 2019). For ageing well in place to be achieved, Sixsmith et al. (2023) emphasise the importance of age-friendly ecosystems, defined as “a complex system of multiple actors, organizations, and environments, which included older adults themselves, healthcare providers, community champions, formal and informal carers, along with voluntary and community sectors, as stakeholders within the ecosystem” (p. 15). Therefore, it is important to understand how these different elements interact to shape environments that either support or hinder how someone experiences connection or disconnection, belonging, and inclusion or exclusion.

1.2. Community participation

A key aspect of ageing well in place is community participation, which has been shown to contribute to wellbeing and quality of life (Gough et al., 2021; Carver et al., 2018). Defined as “active involvement in activities that are intrinsically social and either occur outside the home or are part of a nondomestic role” (Chang, Foster, and Helfrich, 2013, p.772), it can include digital engagement, such as online gaming. Hence, even while at home, one may still engage in community participation. An example of this is playing online computer games with other people, thereby forming and participating in a digital community. The ubiquity of digital communities and Information and Communications Technology (ICT) usage create opportunities for inclusion and participation. However, some minoritised populations face considerable barriers to their ability to engage with digital communities (Braun et al., 2025; Wilson et al., 2021).

For people with intellectual disabilities – commonly defined as

lifelong conditions affecting intellectual functioning, social understanding, and adaptive behaviour (McCausland et al., 2022; McCarron et al., 2019; Merrells, Buchanan, and Waters, 2017) – engagement in community life supports valued roles, relationships, and agency (Kaley et al., 2022; Williams and Porter, 2017; Haigh et al., 2013). However, despite these recognised benefits, many people with intellectual disabilities remain excluded (McCarron et al., 2019; Bredewold, Hermus, and Trappenburg, 2018), leading to loneliness (Wormald, McCallion, and McCarron, 2019; Gilmore and Cuskelly, 2014), stigma (Franklin et al., 2022; Haft, Greiner de Magalhães, and Hoeft, 2022), and harassment (MacDonald, 2015; Sin et al., 2010). Ageing compounds these issues through frailty, obesity, thyroid disorders (Liao et al., 2021; Evenhuis et al., 2012; Haveman et al., 2010), cardiovascular and musculoskeletal conditions, and mobility impairments (Liao et al., 2021; Haveman et al., 2010), reducing participation and compounding the growing risk of isolation brought about by their contracting social networks (Wormald et al., 2019; Walker, 2015; Gilmore and Cuskelly, 2014; Jenkins, 2012).

Older LGBT+ people face social and health inequalities (Fish et al., 2021) shaped by broader social and health inequalities (McDermott, Nelson, and Weeks, 2021). Exclusion from mainstream settings due to heteronormativity and ageism leads to isolation and reduced access to supportive networks (Westwood et al., 2020; McParland and Camic, 2016). Families of choice often provide support but may be insufficient especially for those living alone (Kneale et al., 2021; Fish and Weis, 2019). Inclusive services, LGBT+-specific groups, and intergenerational initiatives reduce loneliness and promote wellbeing and community participation. Importantly, queer generativity, where older LGBT+ individuals share experiences and advocate for rights, represents a salient form of community engagement that counters mounting socio-political threats and sustains queer joy across generations (Rosati et al., 2021).

The decision to focus on middle- to older-aged people with intellectual disabilities and middle- to older-aged people who are LGBT+ within a single project was driven by three key reasons: Firstly, as mentioned above, both populations continue to face barriers to their community participation, going unheard and underrepresented. This is particularly true when they encounter communities and services which have not been designed with these central aspects of their identities in mind. Secondly, different social identities face different disadvantages insofar as community inclusion is concerned. Disadvantage based on the intersection of age with other aspects of identity is often overlooked and it is vital to understand the heterogeneity of ageing. Thirdly, there are no current data or interventions which adequately address the challenges to inclusion of these two populations alongside each other. Thus, researching with both populations in a single project will allow for the creation of understandings of inclusion, bringing to light parallels and differences, which can then be translated into actionable change to enhance their community inclusion.

Because of the vital role community participation plays in ageing well in place (Sixsmith et al., 2023; Carver et al., 2018), it is necessary to understand how people from minoritised populations experience the everyday places and spaces which make up their communities. These understandings should explore the multiple facets which make up their experiences of being in place, from the built dimensions and general upkeep to the feelings imparted by other occupiers to the purposes for being there. Comprehension of these various facets creates a nuanced understanding of the physical, social, and cultural factors impacting senses of inclusion and exclusion within a place or space.

1.3. The Experience Sampling Method

The Experience Sampling Method (ESM) is a method in which people report their actions, thoughts, and feelings in real-time in the environments in which these occur (Mountian et al., 2011). It allows for the data generation of both external and internal experiences in naturally occurring contexts of everyday life (van Berkel, Ferreira, and Kostakos,

2017). ESM is unique in that these data can be generated by participants in multiple modalities without the presence of a researcher to affect the reporting. Because it does not rely on retrospection in the way other methods such as interviews do, ESM can be especially useful in research with people with intellectual disabilities as they may experience challenges with memory, recall, communication and comprehension (Vicari, Costanzo, and Menghini, 2016). Despite its benefits, the use of ESM in intellectual disability research is a relatively recent phenomenon (Bakkum et al., 2024a; Wilson et al., 2020). For LGBT+ people, it has been suggested that ESM could represent a form of disclosure as activism (Holman, Ogolsky and Oswald, 2022). However, ESM appears to be seldom used in LGBT+ research, and even when it has been used in research, this has tended to be among younger LGBT+ people (Williams et al., 2022).

1.4. The IncludeAge Place Study

The current article examines the design and development process of a digital experience sampling method named the Place Study, which explores the experiences of middle- to older-aged people with intellectual disabilities and/or who are LGBT+ (age 40+) as they inhabit and navigate the physical places and online spaces that make up the context of their day-to-day lives. The Place Study is part of the IncludeAge project, which has developed understandings of inclusive physical, social, cultural, and virtual community spaces and places, services, and resources with and for middle- to older-aged people with intellectual disabilities and middle- to older-aged people who are LGBT+, with the aim of using findings to help enhance their community participation. To create these understandings, IncludeAge is comprised of four research activities: 1) narrative, semi-structured life course interviews exploring participants' memories of places where they had experienced inclusion or exclusion, their feelings in being in such places, and what had contributed to those experiences and feelings; 2) the Place Study and a follow-up interview based on their responses (the focus of the current study and discussed in greater detail in the Methods section); 3) social network mapping which explores how participants' social networks help or hinder their participation in the community; and 4) organisational interviews which explore how organisations seek to be inclusive in policy and practice to these populations. These elements of data generation were conducted by both academic and community co-researchers with intellectual disabilities and co-researchers who are LGBT+ employed on the project.

2. Methods

The IncludeAge project, and the Place Study in particular, are grounded in the principles of Community-Based Participatory Research (CBPR) (Jagosh et al., 2015). CBPR promotes equitable partnerships between academic and community collaborators, co-creating knowledge and solutions that reflect the lived realities and priorities of the populations involved (Fang et al., 2021, 2016; Jagosh et al., 2015). In IncludeAge, these principles were operationalised in several ways: 1) five consultation sessions about the initial research proposal with people with lived experience, three of which were held in-person at intellectual disabilities advocacy groups across England and Scotland and two of which were held online with people who are LGBT+ and comprised of personal contacts of project team members. During these sessions, presentations were made about the proposed research and topics such as project values, aims, relevance and methods, and themes in the proposal (such as Place, Life Course, and Intersectionality) were discussed; 2) the establishment of two community advisory groups - an intellectual disability group ("Discovery") and an LGBT+ group ("Gold") - which met regularly to review study materials, guide project direction, and ensure accessibility and relevance of both public-facing and research materials; 3) community members also participated as co-researchers, contributing to data generation, analysis, and knowledge mobilisation.

Their involvement and engagement ensured that research activities were conducted 'with' rather than 'on' or 'for' communities, facilitated recruitment of participants into the study, data generation and, through co-analysis, strengthened both the rigour and authenticity of findings; and 4) the Place Study evaluation group which emerged directly from these advisory and co-research networks, embodying the project's commitment to participatory, reflexive, and inclusive research practice.

Both advisory group members and co-researchers were identified through personal contacts of the research team and from the membership bases of sectoral IncludeAge project co-investigators working at intellectual disability and LGBT+ advocacy and support organisations across England and Scotland. In line with CBPR principles of equitable partnerships between academic and community collaborators, community advisory group members and co-researchers were paid for their work on the project. Additionally, evaluation group members were allowed to keep the tablets they were provided as compensation for their efforts in refining the Place Study tool.

2.1. Ethics

The IncludeAge project received ethical approval from the University of Dundee School of Health Sciences and Dentistry Research Ethics Committee (Application Number: UOD-SREC-SHSC-2023-023). Evaluation group members were informed about the purpose and methods of the study but that the use of the tool to submit information about their thoughts and feelings concerning places or spaces they used (i.e., the data submissions they submitted as part of the design and development process), were not processed as part of the main dataset (i.e., that their forms would not be part of the dataset analysed) unless they chose to take part at a later date (i.e., after the Place Study went "live").

2.2. Evaluation group demographics

The Place Study evaluation group was formed of seven people with intellectual disabilities who were members of Discovery group and five LGBT+ members of Gold group. Inclusion criteria for membership of the evaluation group were: 1) to be aged forty years or older; 2) have an intellectual disability, either diagnosed or undiagnosed and/or identify as LGBT+; 3) have capacity to consent to and engage with project materials; and 4) be able to communicate in the English language.

The demographics of the evaluation group members were as follows: Their ages ranged from forty to sixty-nine years old. All members of the evaluation group were White British. Of the seven members with intellectual disabilities, two additionally identified as LGBT+, although they had been recruited to the intellectual disabilities pathway of the project. The seven evaluation group members who were LGBT+ (including the two aforementioned people with intellectual disabilities) were of the following identities: 3 gay men, 1 lesbian woman, 1 bisexual man, 1 trans man, and 1 trans woman.

Due to additional support needs, the research team assisted evaluation group members to access Zoom where necessary, provided individualised support, training and translated necessary documents into easy read formats to enable participation in project activities. Technological proficiency was not considered a criterion for membership in the evaluation group as we considered it our responsibility to ensure that adequate and appropriate training and support be provided to all team members where access to digital media was necessary, or where such access was impossible, for alternative means to be provided.

2.3. The Place Study tool

2.3.1. Design

Data generation was facilitated through an interactive ArcGIS Survey123 platform (Hennig, Volger, and Pánek, 2023). This digital interface combined narrative, spatial, visual and geolocational elements, allowing participants to document their experiences *in situ*. The tool

enabled participants to respond to prompts using text, photographs, audio recordings, and also incorporated geolocation tagging. This aimed to enable generation of rich, multimodal data about places of inclusion and exclusion. Each entry was automatically mapped, linking qualitative reflections with spatial coordinates to create an evolving digital story of participants' lived environments.

2.3.2. Recruitment

Place Study participants were recruited through community organisations, and support and advocacy networks to ensure inclusive representation across both intellectual disabilities and LGBT+ populations. Recruitment of people with intellectual disabilities was conducted in collaboration with IncludeAge partner organisations supporting inclusion and self-advocacy, while LGBT+ participants were engaged through community-based and rights-focused organisations. To maximise reach, a snowball sampling approach (consistent with GDPR requirements) was employed within intellectual disability and LGBT+ networks to identify potential participants. Prospective participants were contacted online or in person and invited to an initial discussion with a member of the research team, who reviewed the participant information sheet and obtained informed consent. Recruitment was further supported by Gold and Discovery groups.

2.3.3. Data generation

As part of the IncludeAge study, 76 middle- to older-aged LGBT+ participants and 79 with intellectual disabilities completed narrative life course interviews. A subset volunteered to participate in the Place Study, submitting 5–15 digital reports over two-month periods. Each report focused on a physical or online space regularly visited, aiming to capture authentic experiences of inclusion and exclusion. Data generation ran from June 2024 to October 2025 to reflect seasonal variation. Participants freely selected places and spaces to report on, with guidance to focus on everyday environments, and were encouraged to report both positive and negative experiences.

The Place Study explored participant perceptions of being “in place and online space,” associated emotions, and factors shaping inclusion or exclusion. Its design drew on the Place Standard Tool (NHS Health Scotland, 2015) and Age-Friendly Cities framework (WHO, 2007). Reports included eight different forms of data generation (See Figs. 1 & 2):

1. Geolocation of the place or space.
2. Free form description of the type of place or space.
3. A short 9 question questionnaire on belonging, wellbeing, safety, and physical conditions of the place or space.
4. Closed questions to establish relational and intergenerational aspects.
5. Emotional reactions to the place.
6. Narrative (textual or aural) on inclusivity.
7. Photograph representing feelings of inclusion or exclusion informed by the photovoice method (Sutton-Brown, 2014).
8. Free-form narrative (verbal or aural) describing the photograph and why it represents inclusion or exclusion.

Reports averaged five minutes, with variances due to digital competence and response length. The tool was created using ArcGIS Online, a suite of geographical information systems software (Hennig et al., 2023), specifically Survey123, an online form and survey builder, and preloaded onto electronic tablets provided by researchers. Larger tablets accommodated visual or motor challenges. Reports could be submitted *in situ* or later, with geolocation saved at the point of completion, rather than when sent. This enabled the collaborative creation of storymaps which provided a visual representation of how participants experienced the different places and spaces in their communities which form the physical and online matrices of their everyday lives, and an understanding of what elements are important to them in enabling these communities to feel inclusive and accessible.

2.3.4. Design considerations

In developing the Place Study, the same reports were to be elicited from middle- to older-aged LGBT+ participants and middle- to older-aged participants with intellectual disabilities. The design considered four key factors for capturing everyday experiences of inclusion and exclusion:

1. Questions had to provide real-time snapshots of participants' experiences while they were actively engaged in a place or space.
2. The questionnaire layout needed to be accessible and understandable.
3. Hardware and software could not be prohibitive for those with cognitive or motor impairments.
4. That we were able to implement effective support systems to enable participants to use their electronic tablets to complete the Place Study.

Questionnaire Design: Recognizing varied cognitive abilities among LGBT+ participants and those with intellectual disabilities, questions were written in simple language. Response wording was kept consistent, with some necessary variation for sense-making. For participants with intellectual disabilities, answer choices were accompanied by standardized color-coded “smiley faces” representing positive, ambivalent, and negative options. Such methods are recommended for self-report measures for people with intellectual disabilities (Kooijmans et al., 2022).

Emotional Responses: The emotion list was curated by the research team and aimed to capture a broad range of emotions, adapted partly from Carr's (2004) circumplex model (Boniwell and Tunariu, 2019). Emotions were organized from positive to negative to reduce confusion for participants with cognitive impairments. Each emotion was paired with a PhotoSymbol™, a series of photographic depictions of concepts, emotions, actions, and objects used in accessible documents for people with intellectual disabilities (PhotoSymbols, n.d.). The photosymbols chosen were pre-tested by Discovery group members to reach some consensus as to which ones most accurately and simply encapsulated the emotion they were intended to accompany. Participants could also use an open-text field or audio recording to describe their feelings in their own words.

Inclusion in Place and Space: Participants explained why they were in a place and whether it felt inclusive via written or audio recording, minimizing the need for expressive writing or sentences (see Fig. 3).

Photovoice: To allow visual expression, photovoice was integrated into the software. Participants could photograph their location and describe (in text or audio) why it represented their experience (see Fig. 3).

2.4. Refinement procedure

This section outlines the participatory feedback process through which the Place Study was reviewed, refined, and finalised prior to implementation. Drawing on Community-Based Participatory Research (CBPR) principles of equitable partnerships between academic and community collaborators, co-creating knowledge and solutions that reflect the lived realities and priorities of the populations involved (Fang et al., 2021, 2016; Jagosh et al., 2015), the process actively engaged members of the Discovery and Gold advisory groups in evaluating the usability, accessibility, and clarity of the study tool.

Advisory group members were invited to assess the usability and comprehensibility of the Place Study prototype using preloaded tablets, providing feedback on all aspects of the process; from navigating the device and completing questions to submitting responses. Those who volunteered for this task were formed into an evaluation group. Feedback sessions took place through group meetings or individual correspondence, depending on participant preference. Generally, feedback

15:40 Mon, 24 Jun 95%

IncludeAge Place Study

Tell us more...

How easy was it to get to this place or online space?

☒ Easy
 ☐ A bit difficult
 ☐ Hard

How easy is the place or online space to use or to get around?

☒ Easy
 ☐ A bit difficult
 ☐ Hard

How well do the facilities or services fit your needs?

☒ Very well
 ☐ Well
 ☐ Not well

How welcoming is the place or online space?

☒ A lot
 ☐ A bit
 ☐ Not much

How safe does the place or online space feel?

☒ Very safe
 ☐ A bit unsafe
 ☐ Very unsafe

Is it well looked after?

☒ Very well
 ☐ OK
 ☐ Not very well

How much do you feel like you belong in this place or online space?

☒ A lot
 ☐ A bit
 ☐ Not much

Which age group or groups are currently in it?
Please select all that apply.

☒ Children
 ☐ Teenagers
 ☐ Younger adults
 ☐ Middle aged people

2 of 3

Fig. 1. Place Study report showing 3) & 4).

15:41 Mon, 24 Jun 96%

IncludeAge Place Study

Record some things about the place

How do you feel right now in this place? Please select all that apply

 Excited	 Accepted	 Happy	 Relaxed
 Comfortable	 Confident	 Unhappy	 Nervous
 Uncomfortable	 Confused	 Self-conscious	 Bored
 Tense	 Scared	 Shamed	 Embarrassed

Or enter your own words below

OR use the button below to audio record what you think, feel, smell, or see about the place or online space you're in [up to 3 minutes]

Please take a photo of something that shows how you feel about being in this place or online space if you feel safe and comfortable doing so

3 of 3

Fig. 2. Place Study report showing 5) & 6).

14:04 Mon, 3 Jun 95%

IncludeAge Place Study



Tense



Scared



Shamed



Embarrassed

Or enter your own words below

OR use the button below to audio record what you think, feel, smell, or see about the place or online space you're in [up to 3 minutes]



Please take a photo of something that shows how you feel about being in this place or online space if you feel safe and comfortable doing so



Please tell us a little about why you took this photograph below

OR use the button to audio record your feelings [up to 3 minutes]



 made with photosymbols™

Tap the  tick to finish the survey

 3 of 3 



Fig. 3. Visual and Audial options.

from evaluation group members with intellectual disabilities were solicited through group discussions and, where possible, in-person, whereas feedback from evaluation group members who were LGBT+ communicated their feedback via email and Teams chats. Evaluation group members were asked to reflect on the ease of use, clarity of language, and relevance of the questions, as well as any barriers encountered during data entry.

To support accessibility and confidence with technology, particularly with older people and those with intellectual disabilities, all evaluation group members received introductory training on tablet use, with paper versions offered to those who preferred non-digital participation. Feedback was systematically reviewed and incorporated by the research team in collaboration with the ArcGIS co-investigator, resulting in iterative refinements to the tool. This feedback and our responses to them are detailed in the following [Section 3](#). Challenges and Solutions.

Following two rounds of revisions, a finalised version of the Place Study was produced for participant use. The iterative feedback process reflected the project's commitment to inclusive, participatory design, recognising the varied needs, capacities, and preferences of its diverse collaborators.

3. Challenges and Solutions

In the following section, we present feedback from the refinement procedure and how we responded to them, broadly divided into three categories: Challenges with 1) the hardware; 2) the software; and 3) the Place Study itself.

3.1. Challenges with the hardware

3.1.1. Physically and cognitively managing the tablets

Some evaluation group members reported difficulties handling and manipulating the tablets. They reported that the tablet design was not intuitive, and locating physical and digital controls (e.g., volume buttons, settings icon) was challenging. Another issue was the retractable-pin charging plugs, which were hard to manipulate for members with motor difficulties. The need to connect separate charging plugs and cables added complexity. Although fixed-pin plugs were later provided, this highlights the importance of considering all aspects of research instruments and how such issues might have gone unnoticed but for the generation of feedback through iterative design and development processes. Similar barriers to technology use have been reported among people with intellectual disabilities ([Chadwick et al., 2023](#); [Seale, 2023](#)) and older adults ([Wilson et al., 2021](#); [Yazdani-Darki et al., 2020](#); [Vaportzis, Clausen, and Gow, 2017](#)).

While the research team could not physically modify the tablets, evaluation group members were encouraged to seek guidance when challenges arose. Support persons, especially for evaluation group members with intellectual disabilities, played a key role in assisting with tablet use. The role of support persons in facilitating the digital inclusion and usage of ICT devices of people with intellectual disabilities has elsewhere been demonstrated ([Chadwick et al., 2023](#)) and proved no less so amongst the evaluation group.

3.1.2. Considerations of device provision

The evaluation group used Samsung A9 tablets (8.31" × 4.91"), chosen for their portability and unobtrusiveness in public. However, some members with intellectual disabilities and motor or visual impairments found the small icons and fonts challenging, a barrier to ICT usage noted in both gerontological and intellectual disability research ([Bakkum et al., 2024b](#); [Guedes et al., 2023](#); [de Urturi Breton et al., 2012](#); [Wilson et al., 2021](#); [Yazdani-Darki et al., 2020](#)). This was mirrored by evaluation group members who were LGBT+. While they did not report difficulty in using the tablets themselves, they noted that as many of our participants would be older, some participants might experience similar motor and visual impairments. To address this, larger Samsung A9+

tablets (10.12" × 6.64") were provided, but their size and weight introduced new problems: they were cumbersome for carrying, photography, and audio recording, and could cause self-consciousness in public. Offering tablet size options (or paper versions) proved an imperfect solution, hampered by the practical limitations of the tablets and alternatives.

3.2. Challenges with the software

The evaluation group identified several issues with the operating system layout and ArcGIS Survey123. Members, particularly those with visual impairments, found font sizes in the Place Study too small, making it difficult to:

1. Read questions and instructions.
2. Select Likert scale answers
3. Tap icons to proceed (e.g., submit reports).

Customisability options like high-contrast backgrounds and enlarged fonts can facilitate digital use for people with intellectual disabilities ([Guedes et al., 2023](#)) and older people ([Wilson et al., 2021](#)). While these options were part of the tablet operating systems, inter-application customisation within ArcGIS Survey123 was limited.

Evaluation group members noted that within the Place Study reports, open-text fields were small and hard to select, and that they were not always clear on how to proceed to following sections. Although user interface modifications were restricted, we enlarged open-text fields and prompts and added written prompts at section ends directing users to navigation icons (See [Fig. 4](#)).

The evaluation group also recommended ongoing instructions, audio read-outs of the questions, and pop-up prompts. Such modifications can demonstrably improve task accomplishment for older adults and people with intellectual disabilities ([Wilson et al., 2021](#); [Randall et al., 2020](#)). Likewise, the use of instructions integrated into the layout of a programme, and which do not require the user to shift focus to an external manual of instruction have some efficacy in assisting people with intellectual disabilities accomplish tasks ([Funk, Mayer, and Schmidt, 2015](#)). Unfortunately, while we were able to include specific prompts at key points in the report it was not possible to implement all of these suggestions due to functional limitations of the ArcGIS Survey123 platform.

The tablet's digital keyboard also posed challenges: hidden by default, it appeared if the screen was touched unintentionally and lacked an intuitive way to hide it. It was also too small for some evaluation group members to use easily, especially those with motor impairments. Adapting to digital interfaces can be difficult for older adults ([Wilson et al., 2021](#)) and people with intellectual disabilities ([de Urturi Breton](#)

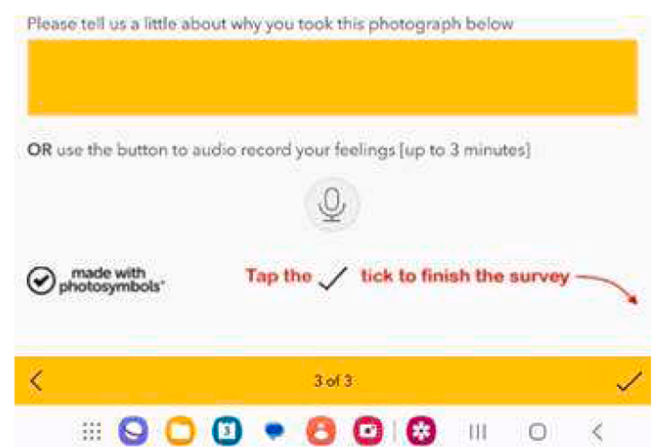


Fig. 4. Example of a key prompt.

et al., 2012), requiring additional supports or adaptations. Given that we were working with pre-existing operating systems and programmes, these were beyond our ability to modify. To provide the scaffolding to compensate for these difficulties, the IncludeAge research staff asked our community co-researchers to produce instructional videos modelling and prompting the completion of Place Study reports for both LGBT+ participants and participants with intellectual disabilities, which could be played concurrently with the execution of the Place Study.

Additionally, handbooks in both easy read and non-easy read formats were created once the second iteration of the Place Study had been developed, detailing the process of doing the Place Study, beginning with the homepage of the tablet and where to locate the Survey123 icon to how to submit the report, either *in situ* or at a later date. In response to feedback, handbooks include elements which one may not immediately consider necessary of explanation, such as loading screens and times, reminders to swipe down to view remaining questions, and images of what a Likert scale choice looks like when selected. The easy read handbooks were evaluated both by evaluation group members and sectoral co-investigators working at intellectual disability advocacy organisations for their accessibility, clarity and comprehensibility.

3.3. Challenges with the Place Study

The evaluation group members evaluated the Place Study queries and prompts. While understandable, they asked for several questions to be rephrased or broken into separate statements for ease of use for participants who have intellectual disabilities and/or visual impairments. However, certain questions proved less easy to answer than others, particularly when they dealt with abstract ideas. The question, for example, “Do you feel there are other people like you in this physical place or online space?” raised a query of what we meant by “like you”, and how this might be perceived. We had intended for this question to be personally interpreted by participants (i.e., a participant might interpret “like you” as relating to their age, disability, gender identity or other aspects of their identity). However, it was clear that more direction would help in the interpretation of this question. In order to provide this additional scaffolding, the instructional videos mentioned in Section 3.2 Challenges with the Software explained how the question was intended to be personally interpreted by the participant.

It was also observed that evaluation group members completed reports at a variety of locales including their homes, day centres and public transport, indicating an understanding of the purpose of the Place Study, that is to explore their experiences in the everyday places and spaces that formed their communities. While their responses indicate that understanding and considering answers to the questions in the report was not considered to be a particularly onerous task, it was clear that practice with the first few report submissions helped enormously with participant comfort with and use of the Place Study tool. LGBT+ evaluation group members also recommended that we implement regular check-ins once the Place Study went live to ensure that participants were able to complete their Place Study reports. They noted that, if uncontacted, some participants might hesitate to reach out to researchers with queries.

4. Discussion

We recognised during the planning and development of the Place Study that participants might encounter barriers to accessing and using the tool that researchers alone could not fully anticipate. Applying participatory research principles allowed the study design to be informed by the lived experience, expertise, and preferences of participants themselves (Sixsmith et al., 2023; Fang et al., 2016). The iterative and collaborative design process aimed to create space for the expertise of people with lived experience to identify practical challenges and suggest improvements to ensure the tool was both usable and meaningful.

An iterative approach was adopted to enable evaluation group members to influence the development of the Place Study at multiple stages, rather than being limited to a single point of feedback. This was particularly important to ensure that all participants (regardless of communication preferences or support needs) had opportunities to contribute. Although this process lengthened the development timeline, it strengthened the overall accessibility, inclusivity, and functionality of the tool, allowing the team to respond proactively to issues and co-develop solutions with evaluation group members.

4.1. A structured evaluation process

The question as to whether a more structured evaluation process would have been beneficial is one which deserves some attention. By “more structured”, we mean that protocols and conditions put in place from the outset, such as specific windows of time to contribute to each iteration of the Place Study or a set number of reports to be completed. However, we recognised that evaluation group members were contributing their time voluntarily and had diverse personal and professional commitments that understandably took precedence. To support meaningful participation, flexibility was built into the evaluation process, allowing members to complete the Place Study reports at times and in places that felt natural and convenient to them (Blachnicka-Ciacek et al., 2024; Sixsmith et al., 2023). This approach respected their autonomy while providing insight into the real-world contexts in which participants might later engage with the tool.

Given the voluntary and longitudinal nature of the study, engagement levels varied. Some evaluation group members completed only a few reports, which affected their familiarity with the Survey123 app and the depth of feedback they could provide. Nonetheless, all contributions were valued and instrumental in refining the usability and accessibility of the Place Study.

4.2. More comprehensive support

Another aspect of the design and development process which, if more fully developed, might have elicited more comprehensive feedback from evaluation group members, especially those with intellectual disabilities, was the support provided by the research team. Tablets were sent fully set up for both the Place Study and personal use, and instructions on completing the Place Study were explained at an advisory meeting. However, we initially neglected to produce accompanying instructional material, assuming these would be created after the final iteration had been developed. We had also anticipated that we would be in frequent contact with the evaluation group members about both the Place Study and other project-related issues and felt that we would be able to address any queries and difficulties as they arose. This oversight stemmed from focusing on the comprehensibility of the questions and tablet accessibility, overlooking the need for hard copies of accessible instructions.

Geographical distance between researchers and evaluation group members further limited in-person support, particularly those with intellectual disabilities. While some members lived near research sites, others required remote communication via Teams or Zoom. Providing their feedback remotely proved challenging for some evaluation group members, and assisting them in navigating their tablets remotely was difficult and sometimes impossible as researchers could not visually and gesturally prompt them as to how to locate and manipulate options and controls.

Despite this, many members successfully completed reports with initial assistance, and this familiarity with the software improved confidence. However, in-person support would have prevented many early difficulties. Future development of digital tools for older adults, particularly those with cognitive impairments, should prioritize in-person support and involve trusted support persons (Chadwick et al., 2023; Guedes et al., 2023; Yazdani-Darki et al., 2020; Vaportzis et al., 2017). Readily available, accessible instructional material is also

essential from the earliest stages. These materials should avoid unnecessary complexity and assumptions about user knowledge. To ensure relevance, they should be co-created with individuals with lived experience.

4.3. Working with extant software

In our endeavour to be a genuinely participatory-based research project, we have made, insofar as possible, our materials (such as interview schedules and instructional handbooks) and processes (such as training workshops) accessible. Public-facing materials, for example, are produced in both easy read and non-easy read formats. However, as researchers working with extant software, it is important to consider that there are limits to how far accessibility could be implemented in our data generation tools. Both older people and people with intellectual disabilities face considerable barriers to ICT usage, often brought about by difficulties engaging with complex user interfaces (Braun et al., 2025; Wilson et al., 2021; Yazdani-Darki et al., 2020) and, although these challenges can be partially overcome through appropriate support and guidance (Chadwick et al., 2023; Randall et al., 2020; Funk et al., 2015), the inaccessibility and complexities of these interfaces remain inherent to both the software and hardware. These complexities made it difficult for some evaluation group members to complete the reports, particularly those with information processing, visual and sensorimotor impairments. Unfortunately, it was neither within the capacity nor stated objectives of IncludeAge to create a piece of software from the ground up.

Highlighting aspects of inaccessibility stimulates questions about how far accessibility can be implemented in any given piece of software, particularly one that has not been co-designed by people with additional support requirements, whether they be age- or disability-related, and how these contribute to the digital divide. In the field of intellectual disability research, co-designing software has been shown to both bridge this divide and be feasible (Johansson et al., 2025; Guedes et al., 2023), with positive outcomes in terms of creating accessible programmes.

4.4. A preponderance towards intellectual disabilities

Throughout the design and development process, greater attention had been paid to the evaluation group members with intellectual disabilities than to those who are LGBT+. This preponderance highlights the challenge in working with two separate groups of people within a single project where one has heightened support requirements and is in fact, a necessity for equitable and participatory research. The recognition of individual capabilities and needs, as well as the flexibility to tailor approaches which amplify the former and scaffold the latter creates research centred around those it purports to serve. It does, however, require careful planning from the outset to ensure that target goals are achieved. The tempering of expectations should be factored into planning. It is unreasonable and unrealistic to expect a group with additional support requirements to perform with the same degree of alacrity in some areas than a group without those same requirements. Note that we mention in some areas, for in others, the former will possess skills and experiences which the latter lack. Well done participatory research acknowledges and makes use of these variable strengths. Much of the feedback from both evaluation members with intellectual disabilities and who are LGBT+ reflected each other, however, particularly when they centred around physically handling the tablet and using the software. These similarities highlight the sensorimotor and visual impairments associated with the ageing process.

4.5. Meaningful outcomes

The challenges explored throughout this manuscript highlight the need to balance practicality with inclusive practice, and that, as researchers, there are certain constraints against which we work. Of paramount importance during the design and development process was

that evaluation group members were able to access, understand and complete the Place Study in as authentic a manner as possible (i.e., in the same fashion as we hoped participants would be able to, regarding how they filled out reports over the course of their everyday lives and in real-time) without suffering any undue burden. However, due to the points highlighted above regarding geographic location and providing guidance remotely, we were not always able to support them in doing this and had not sufficiently attended to some important considerations, particularly that they would have other obligations which would take precedence over their IncludeAge commitments.

Nonetheless, while the design and development process was limited in terms of the number of evaluation group members involved, it was successful in the goal of refining the Place Study and strengthening accessibility. At the time of writing this manuscript, the Place Study is coming to the end of data generation with 69 participants having submitted a total of 795 reports. The number of report submissions speaks to the eventual usability of the Place Study tool made possible through our evaluation group members drawn from the two target populations.

Structured check-ins with participants and their support persons have been implemented to ensure that they are both able to do, and are doing, the Place Study. Although we are sensitive to the fact that participants have their own priorities, the design and development process has shown that gently-cloaked, but firm, reminders are necessary. These check-ins are weekly or fortnightly and organised over Zoom. In instances where online meetings have not been possible or where in-person support has been required, researchers have, wherever possible, travelled to meet the participants. The time and resources required for such intensive activity needs to be properly costed into research projects. Handbooks and instructional videos modelling the use of both the tablets and the Place Study have been created for participants and have proved invaluable to enable data generation.

Having discussed the evaluation process and its role in enabling data generation, it is worth reflecting on how the Place Study and the design principles and practices that underpin it have created the possibility of valuable data generation in real-time through the Experience Sampling Method to enhance our understanding of ageing well in place.

4.6. The Place Study and ageing well in place

As noted by Sixsmith et al. (2023), ageing well in place is multidimensional and complex, involving multiple actors, environments, and services. For older people with intellectual disabilities and older LGBT+ people, ageing well in place can be compromised by systemic barriers, stigma, and inaccessibility (Bredewold et al., 2018; McParland and Camic, 2016). It is therefore critical to understand how diverse older people experience inclusion and exclusion in everyday environments.

The Experience Sampling Method (ESM) can be a valuable tool in generating understandings of place and space by capturing thoughts, feelings, and actions as they occur in real-time, natural contexts (van Berkel et al., 2017). The Place Study used ESM to explore how middle-to older-aged adults navigated the places and spaces that formed their everyday lives through geo-locational, aural, visual and textual data generation. By allowing participants to express themselves through this variety of modalities, the Place Study created a participant-driven narrative understanding of what elements impacted their feelings of inclusion or exclusion, (dis)connectedness, and belonging within their communities. This method avoids the challenges inherent in retrospective methods such as interviews and also enables participants to generate data without interference from the researchers themselves (van Berkel et al., 2017; Mountian et al., 2011). Such immediate data in real-time can provide perspectives on place and space which have not been made visible through other methods. By focusing on real-time, place-based experiences, the Place Study revealed how environmental, social, and cultural factors interacted to support or hinder ageing well. Such real-time data is needed to more comprehensively inform the design and development of age-friendly environments and communities

so that interventions and policies can more effectively intersect with lived experience to promote the facility of older diverse people to age well in place.

The Place Study tool also adds further value to the data generation process since it places agency and responsibility for data generation in the hands of, in this case, seldom heard and under-researched populations, generating deeper insights into the physical and online matrices of their everyday lives. These insights are vital for designing age-friendly ecosystems and inclusive policies that recognise the heterogeneity of older populations (Sixsmith et al., 2023). In so doing, the Place Study enabled researchers to capture the lived realities that shape wellbeing in later life. In order, however, for these understandings to be generated, the Place Study needed to be relevant, appropriate and accessible to the people it was intended for. The need, therefore, for its design and development to be co-steered by people from those minoritised populations proved crucial. By extension, the profundity of their contributions was possible only through the action/feedback loop which we used.

5. Conclusion

The design and development process of the Place Study demonstrates the strengths of participatory methods in creating accessible research tools for minoritised populations. By actively involving evaluation group members who were part of the same demographic populations as our participants in the iterative design and development process, the research team was able to identify and address barriers that would have otherwise gone unnoticed. Participatory methods enabled the creation of tailored support structures which enhanced participant engagement with the Place Study. Importantly, the collaborative feedback/action loop allowed for continuous refinement of the tool and the ongoing implementation of solutions to challenges that arose, ensuring that the diverse needs of participants to engage with the Place Study could be effectively scaffolded. While resource-intensive, such co-design and participatory approaches ultimately lead to the creation of research tools which are fit for purpose.

Nonetheless, certain challenges arose during the design and development process which present an opportunity for learning lessons for future co-production. Mechanisms and structures of support could have been more fully developed from the outset, such as the provision of accessible instructional material in both physical and digital formats, and a more frequent timetable of check-ins. Research team members should also familiarise themselves with the software they intend to use so that they may anticipate as far as possible, challenges around accessibility and usage amongst participants. It is also important to consider that, when working with two distinct groups of people, one may require further support than the other, and the impact this may have on other elements of a research project.

Through their engagement with the Place Study, participants are able to map out the various physical, social and cultural environments in which they live, as well as the roles played by other actors occupying those environments. By mapping out their own narratives, *in situ* and in real-time, participants create and attribute meanings to the environments they occupy as they conduct their everyday lives. Understanding these various elements and how they interact with each other to create ecosystems in which participants age can then, in turn, generate further understandings on how participants experience connection or disconnection, belonging, and inclusion or exclusion, as they age within their communities. Because these understandings capture the lived realities of being in place and space, they can then be used to inform the direction of age-friendly policies and practices.

Funding

This research was funded by the UK Economic and Social Research Council (grant number: ES/W012774/1).

Ethics statement

The authors have adhered to the ethical guidelines stated in Elsevier's Publishing Ethics Policy.

The paper adheres to the submission guidelines.

All authors have made substantial contributions.

CRediT authorship contribution statement

Joe Tai: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation. **Judith Sixsmith:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Mei Lan Fang:** Writing – review & editing, Writing – original draft, Visualization, Supervision, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Darren Chadwick:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Kathryn Almack:** Writing – review & editing, Writing – original draft, Visualization, Supervision, Resources, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Susan Buell:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Susan Levy:** Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Richard Vytiniorgu:** Writing – review & editing, Writing – original draft, Visualization, Validation, Project administration, Methodology, Investigation, Formal analysis, Data curation. **Joanna Gregory-Chialton:** Writing – original draft, Project administration, Investigation, Formal analysis, Data curation. **Tracey Dixon:** Writing – original draft, Visualization, Software, Project administration, Methodology, Investigation, Data curation, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Joe Tai reports financial support was provided by UK Research and Innovation Economic and Social Research Council. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

We thank all participants for generously sharing their lives with us. We are especially grateful to our co-researchers and community advisory group members whose lived experiences, insights and contributions meaningfully shaped this work. We also thank our community partners across England and Scotland for their sustained collaboration and commitment to inclusive place-making. Lastly, we would like to thank the Economic and Social Research Council for funding this research (ref: ES/W012774/1).

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