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Walking through the abstract[ed] city and co-creating urban space

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ABSTRACT

This paper explores how co-designing urban walkability can be augmented by an innovative hybrid approach, whereby virtual records and visualisations of the walking experience can enhance the awareness, perceptions and immersion of the participant in both real and virtual spaces. From one side of that model, the research explores how people might be intrigued enough to discover the real context, based on their experience informed and enriched by parallel images of the city. On the other side, the study aimed to develop a critical understanding of urban walking through the lens of 3D high-definition LIDAR scanning technology, where visualisation techniques were used to support studies to explore how the rich experience of walking could be captured and represented. The paper presents a theoretical framework to propose how walking could be promoted, and positively influenced by the urban environment, by regarding the city from the abstract perspective of the virtual point cloud. The research has investigated how and whether a place – real and abstracted – could act as a trigger to produce novel ideas and unfold thoughts in a participatory way. The interlinkages between motion and (visual) perception of the environment as an aesthetic experience were critical to informing how digital technology can be utilised as a virtual space within which the richness of real interactions and experiences with urban space can be represented, refined, interacted with and used within a rich(er) process of co-design.

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1. Introduction

Since around 2008, half of the global population has been living in urban areas, and it is projected that this will increase by 2050 to include 68% of the global population (United Nations 2018). Urbanity, the dramas of modern city life, the intersections of built fabric and mobility, materialities, flows, masses, dynamism and this peculiar diplomatic and sophisticated synergies and coexistence of the "plethora of bodies, objects, movements and activities" (Karrholm et al. 2014) form part of the everyday reality to most of the global population.

Bipedal mobility is the default means of transport and a way of spending regular

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periods in urban areas as "[*in] a way all movement involves intermittent walking. Pedestrianism is everywhere, even when using those big mobility machines*" (Urry 2007, 63). However, negotiating the city on foot induces a broad spectrum of activities and can be a challenging and complex experience especially when other pedestrians, vehicles, bicycles, architecture, sometimes narrow pavements, "*hurried thoughts or elaborate day-dreams, weather and watches to attend to*" (Calvert 2015, 1) have to be navigated.

Improving walkability has recently been high on planning agendas, and used to create more resilient and sustainable living environments (Liang, D'Uva et al. 2022, Manca et al. 2022; Næss 2016; Su et al. 2019; Wang and Yang 2019). In an urban context, the act of walking can be seen as an immersive examination of urbanity. Through walking, relationships with the city can be deepened by cognitive exploration, where new environmental meanings and unique perspectives could be uncovered.

2. Research focus

On one side, the research explored how people might be intrigued enough to explore the real context based on their experience enriched by the parallel images of the city. Therefore, depicting the hybrid urbanscape, in real and digital contexts, through parallel visions of the city became a central strand of the study. The research also aimed to develop a critical understanding of urban walking directly through the lens of 3D high-definition LIDAR scanning technology, where visualisation techniques were used to support studies to explore how richness in the experience of walking could be captured and represented. It extends previous studies whereby virtual reality environments and 3D videos of virtual environments simulating the walkable environments have been used to dynamically represent the experience (Boing et al. 2022; Birenboim et al. 2019), as opposed to more conventional static representations using photos and images (Liao et al. 2022).

This combination of analogue walking and experience of the virtual was utilised to achieve an enhanced understanding of individuals' perceptions of city walkability and was contemplated as potentially contributing to participatory tools for urbanscape design.

2.1. Capturing, representing, and contextual background

> The city as we imagine it, the soft city of illusion, myth, aspiration, nightmare, is as real, maybe more real, that the hard city one can locate on maps, in statistics, in monographs on urban sociology and demography and architecture. (Livesey 2004, xi)

Output from high-definition LIDAR 3D scanners gives "*various abstracted digital records*" (Tait et al. 2016) in the form of point cloud data sets. These provide a record and understanding of numerous complex subjects depicting physical outer surfaces and photographic data relating to the visuality of objects or areas at the time of scanning (Tait et al. 2016). The mobile Kaarta scanner (Figure 1) used within this study, enabled scan initiation through walking – contextualizing the position of a person carrying the equipment.

Figure 1. Photo of the Kaarta scanner (left) and point cloud image of the area (author owned, 2020).

By using the scanner on journeys through the urban environment, we were able to capture and create an experience of the point cloud city (Figure 2)- a lightweight, semi-transparent, vision of contemporary urbanity, contesting the solidity of omnipresent granite structures in xxxxx. The ease within which the model of surroundings could be composed and de-composed, cut through, and represented seemed unparalleled and through the eyes of an architect, curating this seductive vision of interwoven laser beams and actual context-built model of solid surroundings capturing in-the-moment happenings like people passing, seagulls and floating plastic bags, for instance, was somewhat appealing. It was acknowledged that this situational complexity encompassing the urban "noise" of that environment contributes significantly to the experience of city walking (Belkouri, Lanng, and Laing 2022). Hence, the approach which was utilised in the study sought to capture the urban grain and movement somewhat frozen in time to provide a contextual grounding for designing a contemporary city.

Figure 2. Point cloud image of the theatre building in xxxxxx (author owned, 2020).

In regarding these perspectives as synergetic, the paper presents a theoretical framework to propose how walking could be promoted, and positively influenced by the urban environment, by regarding the city from the abstract perspective of the virtual point cloud. In this sense, the acts of walking and mapping were combined and used as a research method to capture reality and discover new ways of apprehending the environment.

2.2. Walking as an embodied, situated practice

> The aim is to indicate walking as an aesthetic tool capable of describing and modifying those metropolitan spaces that often have a nature still demanding comprehension, to be filled with meanings rather than designed and filled with things. Careri (2017, 32)

Previous research used various visual assessment tools in empirical studies trying to establish people's perceptions of walkable environments (Talen and Koschinsky 2013; Wallmann, Bucksch, and Froboese 2012; Wang and Yang 2019), yet this project proposes a novel approach to undertaking the research. That is, it combines and correlates the physical act of walking, stimulated by the visual discovery of juxtaposed virtual contexts, arguably gaining or prompting deeper qualitative insights.

Mondschein (2021, 134), argued that the human experience of travel is becoming "*less cognitively active*" as new information technologies (GPS) and vehicle automation are likely to "*passivise future travel, reducing the need for humans to engage in the world around them as they move through cities*". Our relationships with the physical environment and socio-cultural sensitivity are moulded by inhabiting and interacting with the spaces the cities afford (see Koglin 2017 on how materialities influence urban mobilities). Our experiences, and interpretation of our surroundings, require that "*learning the city is a necessary part of living it*" (Mondschein 2021, 124).

Connections or special bonds with places within an urban context are created by inhabiting, navigating through space, familiarising with it and utilising the surroundings (Belkouri, Lanng, and Laing 2022). In an urban setting, it can be assumed that providing and designing for a higher provision of walkable environments could result in greater feelings of community cohesion and contribute to "urban buzz" (Calvert 2015), to the point that it has been suggested that those who walk actually "create" a city (De Certeau, 1984, cited in Bean et al., 2008, p.2834). Embracing the notion that humans have been programmed for attachment, it can be assumed that we feel best when the physical context around us allows for ascribing places with significance and when it affords forming connections (Hollander and Sussman 2021). A sense of spatial belonging "*can be produced through longer immersion by the walking body across a more extended space*" (Edensor 2010). It can be argued that "*through walking, a distinct embodied material and sociable 'dwelling-in-motion' emerges*" (Sheller and Urry 2006 in Edensor 2010) and this peculiar intermeshed relationship with the city can be deepened through cognitive exploration of the city where seemingly familiar spaces are re-discovered. Thus, the slower rhythm and explorative aspects of urban wandering – "*the mindful passage*" (Edensor 2010) can lead to a better appreciation and apprehension of the environment. As "*walking (. . .) wanders so readily into religion, philosophy, landscape, urban policy, anatomy, allegory*

and heartbreak" (Solnit 2001, 5). The spiritual rewards triggered by the physical act of walking as well as the mindful, existential mode of the urban walker can be triggered when we question, contemplate and reach out for experiences and connections that expand our personal microcosm that is tangled with the realm of city materialities, streets, architecture, and other people (Belkouri, Lanng and Laing 2022). Walking and thinking in movement "*proceed hand in hand*" (Sheets-Johnstone 1999) and can be considered especially important because its relatively slow rhythm affords the sensory intake of (varying) details of the immediate context, the feeling of the sense of scale and experience of spatial urban geometries. Furthermore, as Casey (1998) argues, the act of walking is also an act of place-making, for "dwelling is accomplished not by residing but by wandering" (p. 115). Walking, therefore, can be seen as a (mobile) research method and a way to study spaces in the city via the original visual perspectives gained by directly experiencing the surroundings (see Careri 2002 on walking as an aesthetic tool, and on Stalker group and situationist dérive).

> The city is thus a key setting in which walking as practice has been explored, with the urban choreographies of the "sidewalk ballet", practices of cruising, psychogeographical peregrinations, urban orienteering, flaneurialism, parkour, town trails and urban dérives all suggesting different ways of exploring how the city is made and remade tactically, "from below" (Pink et al. 2010)

This approach to walking and exploration in towns and cities provides a useful context for the current study. Indeed, the "situationist international" and flânerie with "insightful reflective gaze on urban realities" (Aroles and Küpers 2022, 399) aspired to destabilise the status quo by integrating play, spontaneity, intuition and critical thought (Andreotti 2000; Sadler 1998; Vanolo 2018). This in turn brought attention to the potential of playfulness to instigate a creative urban investigation that is "*able to see textures and details in the cityscape that the modern type is too harried to notice*" (Dodd and Wajcman2017, p. 20 quoted in Aroles and Küpers 2022).

Middleton (2010) argues for more creative methods of engaging with surroundings, activating, and supporting pedestrian practices that could have practical relevance for planning policies. Various initiatives encouraging waking through artistic performances (see Urban Earth 2007; WRIGHTS & SITES 2006, Islington Council 2007) calling for "re-engagement" with places posit different perspectives on how people could move in the city. Paying more attention to the urban environment and places city residents frequent in creative, sensory ways (Ricketts Hein, Evans, and Jones 2008) provides "a manifesto for the active and creative pedestrian" (WRIGHTS & SITES 2006, 121).

Solnit (2001, 6) also suggests that it *"is the movement as well as the sights. . .make things happen in the mind"*. This implies that the body's walking movement can facilitate greater insight into the inner world of a walker being aware of their body and its movement and surroundings while walking (Belkouri, Lanng, and Laing 2022; Calvert 2015). Furthermore, Oppezzo & Schwartz (2014) established that walking increases people's creative thinking possibilities (Calvert 2015, 44). The act of urban walking, therefore, has been considered a tool in engagement and divagations of the capabilities of urban design context in the light of new technologies.

2.3. Visual parallelism

It has been argued that using immersive virtual reality techniques results in enhanced engagement from participants (Zhu, Guo, and Zhao 2020) and creates less stressful processes in participatory urban planning and design activities (Zhu, Guo, and Zhao 2020). Hence, in this study, we engage in experimentation with point cloud visualisation and discussion of mobile methods that may support grasping the experience of walking in the city and deliberating urban space in search of urban rediscovery of spaces and their alternatives. This study utilises the images of the urban environment captured by the scanning device showing very abstract, artistic impressions of the city, often resembling sketches and charcoal drawings. Those results were achieved almost as a side effect – an offspring of laser scanning. Simultaneously, the abstract imagery depicted the actual context – often underused – giving the impression of places that one should avoid rather than utilise as a shortcut and unobvious connection when walking in the city. However, the "*city always contains more than any inhabitant can know, and a great city makes the unknown and the possible spurs to imagination*" (Solnit 2001, 171).

A variety of visual representations of the artistic values of the city could attract and evoke immediate reactions in viewers – "bridge the gap between visual art and urban design" (Amoroso 2010, p. xii). The strength of graphics and poetic quality of certain modes of representation could be measured by the manifestation of reaction to the mapped objects. Attractive visual materials can encourage telling the story of a "new" city as well as influence perceptions of the urban environment. A visual translation of the urban realm that is "both accurate and elusive" and can inspire reactions – conversation between the image and the viewer (Amoroso 2010, xii).

Tufte (1997) argued that our ways of seeing, absorbing, and our capacity to compare and reflect could be significantly improved by direct spatial relationships via simultaneousness – parallelism of either multiple views of seemingly analogous objects or places and even comparison of depictions held in memory (his quoting of work by Minard providing a good example of layered information, Figure 3). The effect of enlightenment due to the visual parallelism could potentially be observed when presenting alternative visions of places in the city contrasting either a photograph of the space or a remembered vision with the abstract point cloud images. Visual explorations would possibly enforce understanding of the environment, reinforce the act of insight and cause an effect of allure and curiosity of the place as the familiar is presented through abstraction.

This project sought to engage "*wanderings through which movement speaks*" (Vannini 2015, 222), a free interpretation of actual surroundings through constant re-negotiation affording an ephemeral view of the city where spaces can transform into unexpected visual phenomena. Ordinary routes through the familiar city context like passing by urban car park structures may unfold unusual perspectives. Drifting through the streets and interpreting the physical and abstracted realms with a creative mindset can potentially trigger new insights into familiar cityscapes. Unexpected discoveries can be translated into unhindered urban possibilities as *"wanderings are also wonderings which seek out the interweaving storylines binding self, others, places, and times"* (Vannini 2015, 222).

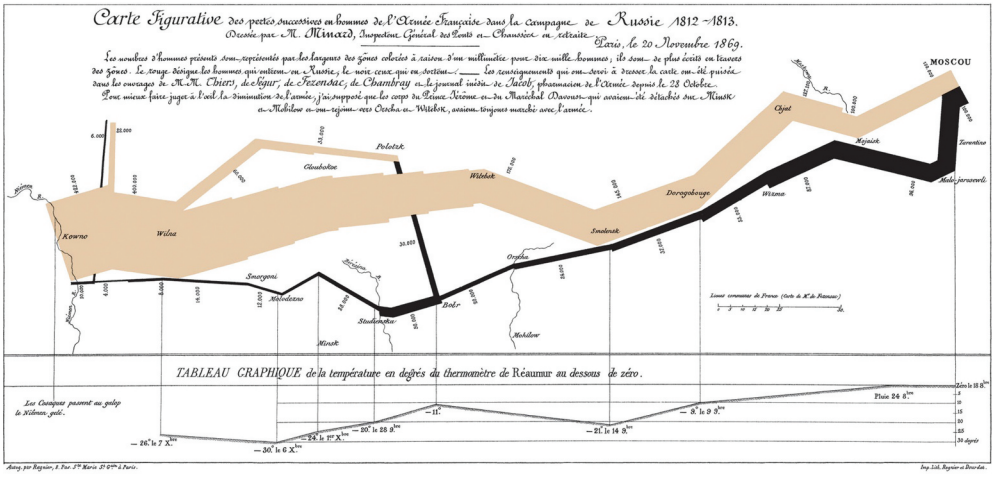

Figure 3. Charles Joseph Minard's carte figurative (Charles Minard (1781–1870), public domain, via Wikimedia Commons).

3. Research design

> By making the familiar strange, we familiarize ourselves anew with the familiar. (Sheets-Johnstone 1999, 143)

To explore people's perception of the city and how walking might be encouraged (and positively influenced by the urban environment) by regarding the city from the abstract perspective of the virtual point cloud the study draws from "ethno mimesis" and "empathic witnessing" (O'Neil and Hubbard 2010) methods with the assumption that research participants are prompted to pay attention to the nuances of the surroundings and reflect on the specifics of the urban context. In that sense, walking is used as a prompt for reflection and "active consideration of how strange environments can be made familiar" (O'Neill and Hubbard 2010) or how new meanings could be ascribed and re-encountered through walking and creative co-creation by associations and parallelism of visual data at specific points on the route. Our overall research process is illustrated in Figure 4.

The research concerned the way the use of virtual representations of urban walking routes, and specific locations, might be utilised as a mechanism to provoke reflection and insight through abstraction of the actual space.

If it had been the case that the research was simply exploring the effect of inserting such digitisation into an existing social experimental setting, then the study could have potentially utilised a between-groups or repeated measures design, wherein walks would be undertaken with the "use of digitisation" being the main independent variable. However, this approach was rejected for two reasons, these being the uncontrollable nature of the supposed "dependant" variables and the holistic integration of digitisation in the study.

Previous studies which successfully utilised between-groups or survey-based design to study the effects of changeable conditions either within a digital

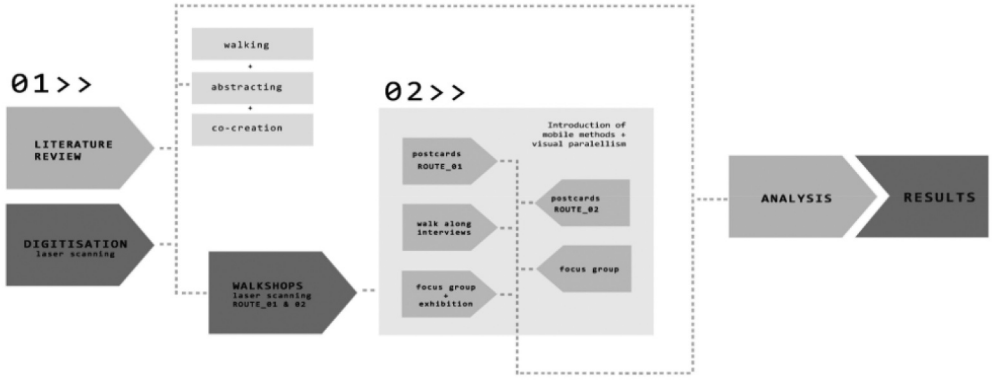

Figure 4. Research design.

environment (Laing et al. 2009; Smalley et al. 2023; Tabrizian et al. 2018) or regarding the interface (Wang and Vu 2023) have tended towards doing so using research designs where the focus of the research is on the digital/virtual space itself. The researchers were also aware of the difficulties inherent in attempting to control the walking environment and the conditions of the experiment – weather, noise, unplanned incidents, and the preconceptions of the participants themselves. In the case of weather conditions, for example, previous studies have shown that this in itself can significantly affect perceptions of safety (Hipp and Ogunseitan 2011) as well as levels of actual crime (Thomas and Wolff 2023). One could argue that even a "within subjects" design (Lyu et al. 2023), where respondents could be asked to undertake the walk with/without digitised materials – perhaps in randomised order – would only be "controllable" at a theoretical level, due to the number of variations present in the "real" environment. Of course, such studies could be undertaken, but would arguably best focus on exploring the digital, rather than the experience of walking and mobility.

In the current study, however, with the focus being on an exploration of urban walking, we instead employed an approach which used a qualitative approach to explore the holistic experience, including sensory effects beyond the visual, the effects of which were elaborated on through semi-structured group discussion before, during and after the walk itself.

3.1. Digitisation of walking routes – phase 01

The data collection was divided into two sequential parts. The initial phase (Phase 01) included digitising urban routes within the case study city with a mobile laser scanner. Key areas in xxxx where possible urban interventions could be feasible were identified and a 3D portable laser scanner was used to record the streetscapes, architecture and spatial relationships encountered on the (real) walked journey. The routes, shortcuts, and underpasses around historic areas were utilised as a complex setting and laboratory for scanning. Output from the scanner was then imported to dedicated point cloud editing

software (cloudcompare, an open-source program), to position the 3D scenes and provide high definition renders.

The limits of scanning technology in recording the environment were thus extended and utilised to address whether an abstracted digital construct of less obvious city routes, generated by tracing the journeys with the scanner, could alter the perception of space and subsequently influence people's choices of walking.

Two-dimensional maps are associated with a simplified, flat quality whereas visualising point cloud maps appeared to enable a more comprehensible understanding of the urban context and its experiential aspects. Thus, scanning allowed the study to experimentally represent the urban environment in a manner which supported transparency – appearing almost as x-rays of urban space. The data collected by the device was processed and visualised into images showing abstracted city forms, holding the potential to yield inspiring new perspectives, perceptions and imaginative design initiatives. By capturing reality, weak spots in urban design were highlighted and opportunities to improve them by utilising the practical aspects of laser scanning.

Yet, although images from LIDAR scanners are often branded "ghostly" (Chapman et al. 2018) it could be argued that this transparent perspective provides all-embracing viewpoints containing information that could either be hidden behind the physicality of boundaries or our perception. The dispersion of the point clouds at the edges of the drawings could suggest that the images are unfinished. This combination of the visualisation of actual context with the artistic value of the drawing provides the viewer with possibilities for further interpretation, to build a personal visual story as mapping can be seen *"as a productive instrument, a world-enriching agent, especially in the design and planning arts"* (Corner quoted in Amoroso 2010, 99).

3.2. "Walkshops" – phase 02

Phase 2 encompassed organising an exhibition of point cloud visualisations with focus group discussions followed by a group walk to explore how the combination of emerging data capture technology and visual (re)presentation could create a fusion of journey and discovery, thus establishing new thinking patterns and reintroducing the city to its citizens. Within the stationary workshop stage, the research themes were tested by introducing semi-structured focus group discussions moderated by the researcher exploring peoples' perceptions of space within the city. The focus groups, on average, consisted of a small number of participants (between 4–6 participants).

The initial stage of the workshops encompassed a short introduction and presentation by the researcher, setting the scene for the next couple of hours and presenting the workshop timeline. It was then followed by the presentation of research themes – overlapping walking, scanning and urban design and the explanation of the main purpose of the workshop and research questions. The point cloud images and a map of the potential walking route showing the intermittent stops along the way where the previous activity of walking and scanning by the researcher had taken place were also presented at this stage (Figure 4).

The group discussions included open questions about the abstracted, seemingly unfamiliar places in the city as seen in the presented images. The questions oscillated around the technology used to produce the imagery but also people's attitudes and

experiences of the exposed areas in the city. This activity was followed by walk-along semi-structured interviews – "walkshops".

The researcher then introduced the participants to the "postcard" method, where the informants were asked to share their thoughts on the cards (Figure 5) containing images representing certain scanned areas within the city on one side and a question on the reverse. The postcards were given out to everybody before venturing out on a walk.

The research has investigated how and whether a place – real and abstracted – could act as a trigger to produce novel ideas and unfold thoughts in a participatory way. Collecting data on the spot and while walking accorded with this research focus – a deeper understanding of the context and reflective immersion in the space while taking both the researcher and research informant on a journey through the city. The "walking and talking" activity would potentially better facilitate answering research questions: whether the alternative/parallel versions of the city and novel use of technology could inspire walking in the city and generate new design ideas. It can be argued that "*the person – place co-ingredience*" (Anderson 2004) creates unique opportunities for unstructured conversations where "*[as] a consequence, the knowledge produced is importantly different: atmospheres, emotions, reflections and beliefs can be accessed, as well as intellects, rationales and ideologies" (Anderso*n 2004*)*. Likewise, and following work by the likes of Shr et al. (2019), it was felt likely that preferences (as in the case of the cited work) and depth of engagement would be strengthened through the combined use of the real, the virtual, abstracted images and activity.

The interview participants' insights and reflections on the physical and abstracted urban realm were then recorded and synthesised by the researcher. How this connected

Figure 5. Map of the walking route (author owned, 2022).

with the perception and promotion of walking – a notion created through the interlinkages between motion and (visual) perception of the environment as an aesthetic experience – was critical.

4. Walking and talking study analysis

The "walkshops" aimed at facilitating embodied experiences of data-collecting technologies in citizens' own environments that could then be discussed from everyone's individual perspective. It could be argued that walking provokes deeper insights and reflection on the environment, which policymakers and urban designers could use effectively for urban planning purposes. Therefore, this study facilitated semi-structured interviews and participant observation to co-create knowledge in the specific geographical context by utilising the "postcard method" as described step by step in the next subchapters.

Following Hein et al. (2008) and De Leon and Cohen (2005), the mobile method of walking and interview can generate a more participant-focused process and put forward the idea of "material probes" (for example photographs, or images as in this study) to encourage the informants to reflect more on the surroundings and discuss issues of place and built environment in the specific contexts.

4.1. In this section, we will sequentially describe the "walkshop" phase in detail focusing on the analysis of the questions asked at each stage of the journey

4.1.1. Stop 1: why might walking be important to you?

During the first stages of the urban walk, participants were striving to position themselves at the actual spots of the point cloud frames from the postcards (shown in Figures 6–8). This prompted a conversation on the use of scanning technology in an urban context as well as its representation. The group discussed the surroundings via the lenses of point cloud noticing the multilayers and interesting juxtaposition of the built environment revealing the shortcut and staircase leading the group to the next stop.

At this stage one of the participants also mentioned that walking is important to him as it provides "mind space, people watch, create fictional stories of the buildings and people you see". The context paralleled with point cloud images gave a wider perspective and ignited an interest in what used to be a hidden route through the familiar spaces to some of the participants.

The meditative, cognitive elements, as well as therapeutic aspects of walking, have also been mentioned by the participants treating walking as an opportunity to "clear the mind", "get fresh air and light, to understand the city through experiencing it – a healthy transition between being inside buildings" and to find solutions and explore unexpected places (Figure 5).

4.1.2. Stop 2: imagine paying acute attention to the surroundings. Would it affect where and how you walk?

The second stop along the way was prompted by a detailed scan of the back elevations of buildings running alongside a very well-known route in the city centre. The point cloud image depicted the rear facades, outlines of gable walls and ornamental details of window surrounds spanning two floors up – an unexpected condensed architectural

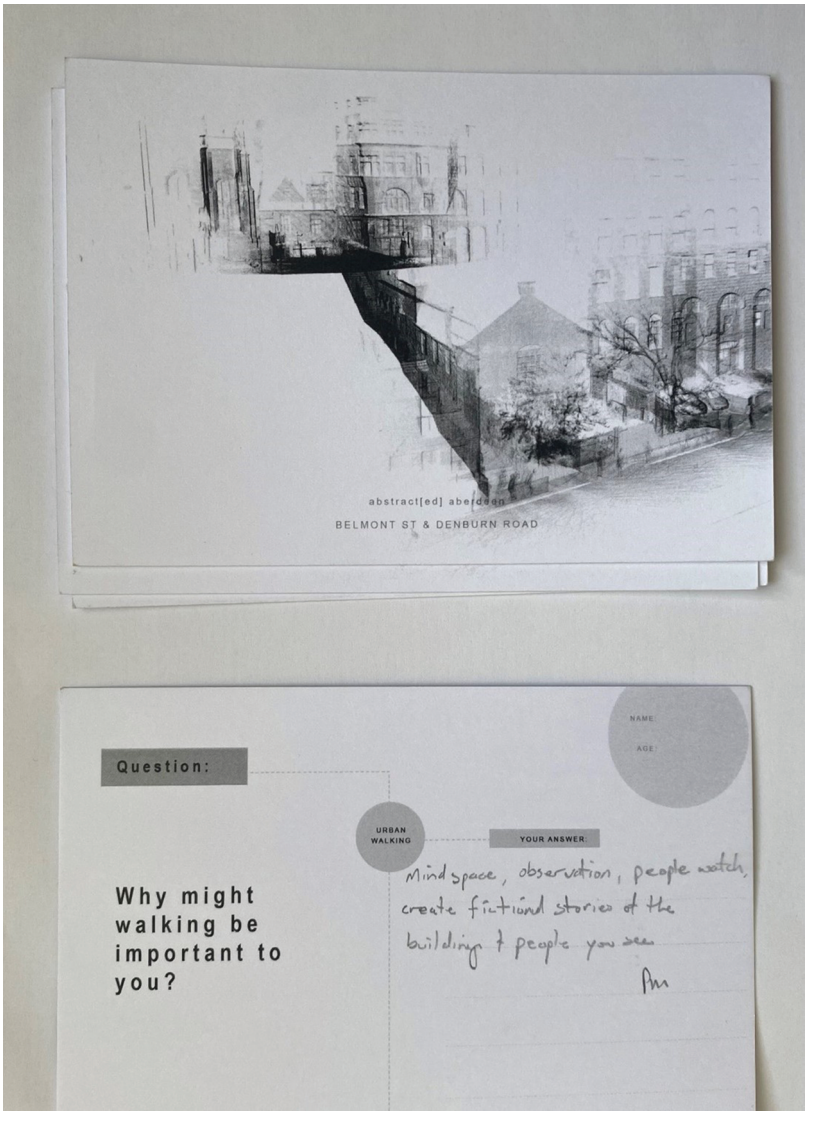

Figure 6. Postcard example – filled in by one of the "walkshop" participants (author-owned, 2022).

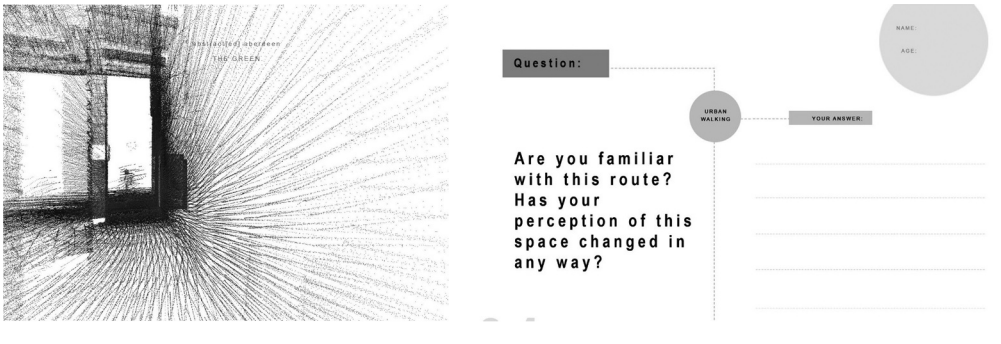

Figure 7. Postcard example (author owned, 2022).

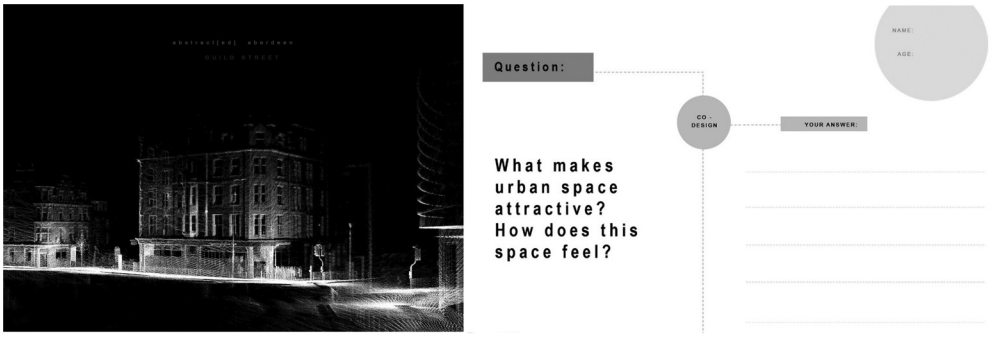

Figure 8. Postcard example (author owned, 2022).

tapestry of secondary elevations. The scan also encompassed the existing trees as well as people walking along this route before. This again led to the question of the importance of being very attentive to surroundings.

The participants' answers were inspired by the area and the idea of the unexpectedness of what they discovered. They suggested wider pavements, more greenery, "urban wildering", landscape noise barriers (e.g. cars speeding on a nearby busy road were felt to be quite a nuisance), and the potential for creative lighting (e.g. putting an accent on the underside of a bridge). The practical aspects, as well as aesthetics of space, were picked up as the scan turned participants' attention to visual qualities beyond the mundane existing context - *"[d]epending on the scenery, a pleasant surrounding would 'produce' pleasant feelings and the opposite" and "[w]hen there is something engaging you look up, meaning head up & shoulders down => immediate mood improvement. If what you're looking at is pleasant, you respect where you are more"*.

4.1.3. Stop 3: do you notice anything new or surprising that you have not experienced or seen before?

The majority of participants had never walked the study route before and mentioned how noisy, narrow with many obstructions, street furniture encroaching onto usable pavement space and how unpleasant it was. "Smell, lack of usable front path. Obstructions – furniture. Noise reverberation. Fire exits. Poor lighting" -

the darkness was observed with immediate suggestions that having more street lighting would be beneficial for the area. The art posters pasted onto the walls of the viaduct somewhat provided the space with more significance adding to the uncanny atmosphere of the space as we were beginning to be enveloped by the built environment as we moved underneath the viaduct.

Almost all of the participants commended the fact that this unobvious route provided a useful and direct shortcut uninterrupted by pedestrian crossings to popular city areas.

4.1.4. Stop 4: are you familiar with this route? Has your perception of this space changed in any way?

Although the majority of the participants had not previously walked this part of the route, the pauses to take in the surrounding environment were longer here than at other stops. We noticed unusual patterns on the walls and bio-generated

build-ups of material attached to the underside of the viaduct, reminding us of stalactites in caves. The urban artworks (posters, graffiti) were also noticed and the potential of this space to be used as "some kind of 'art walk' practice" was suggested by one of the participants.

The overall atmosphere was interesting with elements of excitement prompted by the discussion on the point cloud images contrasting with the actual surroundings. As the images were produced from the extended and wider perspective they showed the area comprehensively contrasting with the feeling of being enclosed by the structures and bounded by the constant (dynamic and noisy) barrier of the nearby fast-driving cars. The group noticed the light coming through from the opening above and talked about the rhythms of the underside of the concrete structure and the sizes of beams holding up the construction above. The closeness of the city gardens was also discussed. The overall feeling of relief was somewhat felt when the group approached the building's corner leading to a wider opening inviting the group to the more familiar space as one of the participants mentioned: "this always looked like a dead end to the rest of the city".

The participants' perceptions of the surroundings changed by the fact of walking through it and pointers provided by the researcher on the potential of this space as an abstracted entity. The participants noticed how dark, noisy (due to the traffic), and uninviting the area was.

Walking through this part of the city provoked past personal memories for one of the participants, remembering someone from his previous office designing details for the car park railings. It can be said that the access to past experiences and memories inspired by the act of walking deepens the experience of the walker and creates minutiae of intimate bonds with the surroundings (see Calvert 2015 on data collected and ways in which pedestrian inner worlds interact with the city). Moreover, Casey (2001, 199) points out, *"places [can] possess us – in perception, as in memory . . . insinuating themselves into our lives"*. Thus, the deliberately "aware" approach to walking within the study would seem to hold the potential to similarly create new associations and memories, in turn affecting perceptions and the values attached by individuals.

4.1.5. Stop 5: what makes space attractive? How does this space feel?

The urban area discussed at this point was a busy intersection near the main bus and train station and a large shopping mall. It was noticed that it was an extremely busy place dominated by cars and buses. People were displaced onto narrow pavements often encroaching onto the road to accommodate the incoming flow of pedestrians. This was in stark contrast with the xxxx area – a quiet zone, quaint, and much more pleasant.

The attractiveness of this space, it was felt, would be much improved with the enhanced cleanliness of streets and buildings, perhaps with a seating area to provide a respite and to emphasise that the space has been designed and designated for pedestrians with "[u]rban trees; places without cars, lightness, privacy, vibrancy, purpose, aesthetic".

One of the participants mentioned at this point that walking makes him use his mobile phone less and that he sees this as a positive effect. Perhaps, because of the use of entertainment and social media on smartphones, the move is relatively limited – walking retains the elements of a more analogue and austere approach to the ever more demanding attention of the digital era.

4.1.6. Stop 6: has your perception of the real context [enriched by the point cloud images] changed in any way?

The final stop on the route was depicted as the scan of part of the iconic façade of a building undergoing demolition. This prompted an interesting discussion of the built heritage and its extension to cultural heritage and longing for something that was no longer there (Gregory and Chambers 2021, commented on the prevalence of lost built heritage narratives, both in print and especially on social media). The practicalities of the building's demolition and aspects of sustainability were discussed. Those divagations prompted some ideas of how this space could be used differently and potentially better. The reminiscence of the previous building and the now blank canvas of this urban infill site inspired participants to reimagine the space as a large plaza, with one of the participants even offering a design sketch for the area. Not only was this the last stop on the route but also the longest pause along the walk. The urban alternatives and possibilities proved to be a fruitful subject of discussion with many practical applications and ideas for urban spaces (Figure 9). As participants were familiar with the surroundings, the idea of the point cloud image and the fact that the architecturally the site changed dramatically, evolved into a voluntary and impromptu co-design exercise.

Figure 9. Participants filling in the postcard survey during one of the "walkshops" (author owned, 2022).

Participants commented on the artistic values of images and the fact that they sparked curiosity and stimulated spatial imagination resulting in complex thinking and ideas generation on urban space. One of the participants commented: "*My perceived disconnect between different areas in Aberdeen has definitively changed. The point cloud has allowed me to appreciate the architectural components of Aberdeen a bit more*".

The moments in between the stops brought further subjects to discussion on the use or underuse of unexpected and unobvious routes through the city as well as a new appreciation of these areas.

5. Emerging methodological considerations and recommendations

> Walking with someone is a powerful way to communicate experiences, as people become attuned to one another and connect in an embodied way, opening up a dialogic space where embodied knowledge, experience and memories can be shared. (O'Neill and Hubbard, 2010)

Analogies can be drawn between the "postcard" method proposed in this study and photo-elicitation whereby the researcher produced, in this instant, not the photographs but point cloud images of strategic places often mundane, understated urban areas (either buildings, objects, structures – tunnels or external stairs etc) on the walk and then related the questions to the place or a moment captured. The chosen areas were intentionally inconspicuous yet functioning as legitimate shortcuts in city navigation. Yet, it was recognised by the researchers that the images presented could have polysemous nature with different levels of significance and meanings ascribed to them by participants (Rose 2016). The study method was however used to evoke responses from interviewees that static and only verbal interviews would not potentially achieve, as photographs are an "opportunity to gain not just more but different insights into social phenomena, which research methods relying on oral, aural, or written data cannot provide" (Bolton et al, 2001:503 quoted in Mannay 2015).

It can also be argued that an ordinary interview can touch on various and broad subjects, contemplating an image or a drawing with participants could "prompt" talk about different things, things that researchers hadn't thought about [. . .](what Allen 2011 – quoted in Mannay 2015- calls "unknown unknowns").

The questions corresponding to the images – digital representation of context, were divided into urban walking, new perspective, and scanning categories. The participants were encouraged to look around and approach the city with "fresh eyes" and behave as if they were moving through the forest where they carefully place their steps. The mindfulness mode of the walkers was encouraged to support thinking about the urban experience in an abstract way and perhaps to look for meanings and interpretations never considered before to question and explore the re-design potential of urban spaces.

Limitations of the methodology can be widely considered in terms of access to technology and (post)processing of the data as well as the cost of the scanning equipment. Yet, recent technological advancements democratise the laser scanner providing applications to smartphones and tablets (Apple iPhone and iPad Pro). Still, it could be argued that point cloud maps and the activity of abstracting the city could be achieved by more conventional means – the photo-elicitation method of video representation,

abstraction and conceptualisation. The review of alternative and comparable visual methods could form part of further research.

It can also be argued that both sides of the methods – abstracting and walking in place, have elements facilitating a reconsideration of each other enabling reassessment of the experiential enacting of spaces. The point clouds benefitted from being contextualised – in place – therefore, it can be argued, that the mobile scanner has immense potential when both sides – the digital and embodied coexist and converge. We would argue that the abstracted representation of space created through the virtual version, used here as a prompt and precursor, may enable even those familiar with a space to view it afresh. It was interesting to note that many aspects of the discussion with participants spoke not of physical buildings or objects, but of sensory effects (smell, noise, light) and dynamism and movement.

The walking itself had been elevated to the urban mindful passage where the abstraction was reconsidered in the context of real buildings often providing the new perspective needed to reappreciate mundane spaces that hold the potential of being reused or creatively adapted. The explorative approach where there was an intermeshing of the two approaches to the experience of space (digital/virtual and analogue/walking in the real), uncovered new meanings and valuable insights into co-design possibilities by *"[. . .] conceptualising apparently placeless spaces of mobilities and mundanity in order to facilitate both an interrogation and an exploration of their re-design potential as public spaces for embodied mobilities"*. (Lanng 2015). Indeed, following Zhu et al. (2020), the central strand of the methodology – where digital visualisations of the spaces were presented – appeared to provide an opportunity to reach higher and more thoughtful levels of participation in the discussion.

6. Conclusions

In the design of the study, we have intertwined elements of digital representation, walking as research and design method as well as parallelism of virtual and real contexts. This is significant in the exploration of how virtual representations of the real urban environment can enhance and deepen levels of participation and debate among interested parties. Within the context of the research, this applied to study participants but could be extended to include much wider communities, groups and individuals (within, for example, collaborative urban design practice). As noted in the paper, it may also be interesting to undertake forms of "between group" study, albeit in the understanding and recognition of difficulties associated with controlling the environment experienced by participants.

Indeed, although our results were based on a small sample of workshop participants as opposed to examples of other methods using immersive Virtual Reality to collect data from online surveys (Kasraian et al. 2021), the study yielded rich qualitative data touching on issues including attention while walking, the discovery of new environments, changed behavioural perspectives and perception of an urban environment. Although many of the study materials are derived from highly quantitative data collection (mapping and HD laser scanning, in particular), the overall approach is qualitative, as our intention was to explore the reality as experienced by participants. This can be regarded as

complementary to the many previous studies exploring, for example, the use of digital surrogates, some of which are cited.

The results also provided insights into what an attractive urban space is and how it could be improved on the spot by participants' ideas generated while walking. It can be argued, that the critical observation and engagement of study partakers have been enhanced and prompted by the use of quality visualisations and a juxtaposition of digital technology to appreciate and capture the experience of urban walking practices, rather than utilising the technology to only produce an accurate geometrical record. Instead, the innovative tools were used to enhance human capability to reflect, extend the realm of experience and perceive beyond the mundane and visible city – re-discovering it, and reconfiguring the familiar, generating co-creation elements whilst walking and thinking about spatial design (Belkouri, Lanng, and Laing 2022).

We anticipate that the further study of connections between walking and a sense of attachment to the environment (as also seen in Lee and Ingold 2006), and participatory research – exploring urban alternatives by parallelism with digital images could inspire investigation and the development of creative methods of inquiry into imaginings of different urban alternatives. Following Hein et al. (2008), the intention will be that the simultaneity of mobile methods and experimenting with new technologies presented in this article will be of interest to urban planners and policymakers investigating the ways people value and use the places around them to capture more inclusive and sustainable ways of planning the future solutions for our cities.

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