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Digital creativity in urban interventions: using technology as an engagement and idea inducing tool

Daria Belkouri¹[0000-0003-0712-2062] and Theodoros Dounas²[0000-0002-2731-0493]

¹ Robert Gordon University, Aberdeen AB10 7QB, Scotland

² University of Antwerp, Prinstraat 13, Antwerpen 2000, Belgium

Abstract. The urban planning discipline is increasingly turning to specialized technologies to better understand the multiple and complex processes within cities. Automation is already reshaping infrastructure and urban ecosystems. This study seeks to reconcile technological agency and creative research methods by utilising laser scanning technology to increase community participation in planning and speculate about urban possibilities of using walking and pedestrian viewpoints as drivers for urban design. This research employs hybrid methods, on the one hand the simple act of walking and on the other hand visualising the urban space using a 3D laser scanner. This mixed technique makes it possible to increase the perception of individuals with respect to urban space, becoming more aware of it and coming into greater contact with it generating ideas about spaces encountered on the route.

Keywords: Laser Scanning, Urban Walking, Participation, Urban Design

1 Introduction - technology as creative agent

Digitisation is everywhere [1]. With the proliferation of (often Artificial Intelligence [A.I.] generated) data there seem to exist a concern that it can be misleading, inaccurate, emotionless and dull [2]. Automation is already reshaping and altering our economy, culture, and urban ecosystems [3] yet, its potential might rest in employing the technology to augment and complement our ability to solve problems, ignite progress and utilise technology to create equitable, inclusive and just urban environments.

There are numerous instances of art and design installations that represent the hybrid of digital technology and real objects integrating the digital into the physical, challenging existing paradigms in a creative and critical way. For example, the artists Heinrich and Palmer have used laser scanning in architectural immersive installations combining point cloud data, video projections and sound effects [4, 5] treating large architectural objects as porous membranes to show the fleetingness of scanned objects and to reveal and explore different interpretations of existing spaces by often showing them rescaled and from unexpected perspectives. Thomas Pearce's [6] study, on the other hand, explored the phenomena of fictional point clouds in a three-dimensional laser scan created by split dimensions at the edge of an object. Faulty measurements were utilised as

productive points that enabled designers to actively create the edge noise, via precisely perforated screens. The artists utilised the errors to convey experiments in actual urban context [6] where fictional geometric content was elaboratively placed into supposedly “realist” point cloud data set. By challenging the practicability of the technology, new meanings and possibilities of spaces were revealed through experimentation producing a hybrid yet deeper understanding of the context.

These examples of artistic experiments with technology served as an inspiration to this study. On one hand the truly inclusive view of creativity would encompass the agency of both humans and technology [7]. Yet, is there still space for utilising this hybrid creativity in an algorithmic future and age of digital reproduction? The coupling of humans’ creative agency with the torrent of possibilities provided by the technology should serve as a hybrid tool to optimise the work processes and provide space for new sustainable developments and innovation ([2] on application in urban planning). Thus, nurturing our agency to embrace the technological advancements in urban narratives, we introduce our study that uses laser scanning to elicit ideas and speculate about urban possibilities via the analysis of the act of walking within the urban space and its ability to increase community participation.

2 Context - using technology as an engagement tool

The urban planning environment is increasingly turning to specialized technologies to address uses related to sustainability, society, security, transportation, infrastructure and governance [2] to better understand the multiple and complex processes within cities. Yet, in the current digital world, there can often be observed a shift disengaging from the operational towards the sensorial and sensitive engagement with the physical world [8]. What frequently becomes a focus of research attention ‘are the different sensorial qualities and embodied affordances’ with further explorations into subjective ambiances and spatial possibilities generated by those reflections that we could experience while inhabiting our cities [8].

It can be argued that this ‘permeability’ with surroundings could potentially be endangered by the algorithmic agency depriving citizen participatory and co-creation voices. This research therefore seeks to reconcile technological agency to induce participatory and creative mobile practices – conjoining the active mobility and laser scanning technology. It investigates how co-creating urban walkability may be enhanced through a method in which digital representation of the walking experience and immersion in both real and virtual settings offer a novel approach to participatory urban design. While part of a wider study, this paper presents findings from engaging primary school children in the research, based on the presumption that ‘[a]lthough we make all kinds of conscious decisions around the nurturing of our children, it seems that the way in which they are travelling receives only limited attention’ [9]. Including children in research meant that the scope of the study was enriched with creative yet important voices. Therefore, this research seeks ways of inclusive urban designing and imagining

to avoid the reality where people ‘are reduced to patterns of data’ in automated planning processes [10] through the lens of engaging gamification in urban context, and the potential relationships between civic gaming processes, digital technologies and smart urbanism [11, 12, 13, 14].

From the situationist “derive” and “flânerie” with ‘insightful reflective gaze on urban realities’ [15, p.399], which aspired to challenge the status quo by integrating play, spontaneity, intuition and critical thought underlining gaming’s revolutionary and rising potential [11] to indeed, a number of cities throughout the world [16, 17] that are currently generating ideas aimed at meaningfully engaging the public in the planning and design processes by utilising digital technology to foster connections between people and the urban areas - they highlight the significance of play and enjoyment to activate a creative urban investigation [11, 18].

3 Aim and objectives

This study explores the complexity of experiential aspects of walking through creative use of technology to establish whether the re-discovery of often familiar context would strengthen the idea that the process of deepening the connection to and subjective ‘interpretation’ of our cities could possibly improve our experience of inhabiting urban spaces [19, 23].

This research looks at how we perceive space when walking. It investigates how the urban environment may promote and positively affect walking by seeing the city from an abstract perspective and employing novel technology and qualitative data gathering techniques. Walking and mapping is used as a study tool to record reality and uncover new ways of appreciating the urban environment. The study’s objectives include testing the response to technology and the feasibility of its application, as well as recording the experience to the real and abstract urban contexts while walking to develop an enhanced understanding of context and inspiration for urban solutions.

4 Methodology

Our method extends the impact of the point cloud representation, beyond the technical survey, where accuracy and consistency are the scope. Through the point cloud data, we have created a highly precise yet abstract rendering of the city, which acts as an ephemeral representation. This has been created with the use of a portable laser scanner, rather than a stationary device. The act of creating and gathering the data takes place through walking, where the activity of walking does not conform to simply getting from one place to another but is itself an engagement integral to perception of the environment. Hence the output from laser scanner - point cloud image - becomes an artefact that encapsulates the new knowledge generated by walking, but also acts as a further

focal point of engagement in the second part of our methodological apparatus, where we engaged in “walkshops” with local school children.

The data collection was divided into two sequential parts. The Phase 1 was performed solely by the first author where the journeys in the city were recorded and captured with a mobile laser scanner to depict the experience of walking in the city. The data output was then processed by the first author and presented in various visual forms to act as a springboard to test the response to digital technology and feasibility of its application. The objective for using the laser scanning in a novel way was to expand human ability to perceive the context beyond the initial visible elements – discovering the city anew, recomposing and reconfiguring the experience of being in the city, potentially triggering creativity and co-creation element.

Phase 2 encompassed organising ‘Walkshops’ for primary school children to expose participants to the re-imagined visions of the city in order to explore potential change in walking behaviour. The existing urban environment was presented in an unexpected way [25, 26 on visual parallelism and artistic qualities of mapping] to promote city discovery and inspire children’s own visions for the space. This activity was complimented by the walk-along semi-structured interviews that encouraged contemplation and observation of the immediate surroundings. The first author also developed the ‘postcards’ method where the informants were asked to share their thoughts on cards containing images representing certain scanned areas within the city on one side and a question on the reverse (Fig.1). This task was envisaged for the walking and talking aspect – ‘walkshops’ to evoke responses that static and only verbal interviews would not potentially achieve.

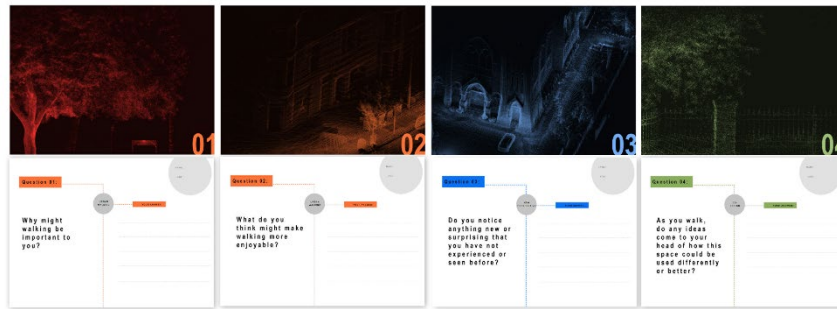


Fig. 1. Examples of postcards [modelled and drawn by the first author, 2022]

The school participating in the research was recruited following a positive response to the email explaining the research subject and inviting children to participate in the study. Once the school was identified the first author pre-recorded the walking routes in the area with a portable laser scanner and strategically defined the length of the route (to last no more than 45min to accommodate the sensory abilities of pupils) and to follow the looped route surrounding the school grounds. The route was then visualised on the map to mark the ‘stops’ and sent to the school for approval. The consent forms

were emailed out prior to research activities and distributed by the teachers who also handled organisational aspects such as a number of pupils per adult. The children were equipped with high vis vests - as per school's health and safety requirements. The first author was present at all times explaining and reiterating the rules of the 'walking game' at each stop. Breaks were strategically chosen with sufficient surface area (pavement or green patch) to allow for all of the children to gather safely together and have room to pause and write down their answers (Fig.2).

On the day of 'walkshops' the first author introduced the technology to the children in the classroom explaining that the activity was arranged to resemble an outdoor urban game. The first stop along the route was outside the school building with postcard depicting a scan of a mature tree which served as a conversation prompt to talk about the importance of greenery in urban areas. The children were tasked with finding the exact frame of the scan in the real-world environment. The playful approach to interview combined with walking encouraged children to share their thoughts and feelings in an unusual way. The walkshop facilitator's instructions promoted active, reflexive absorption of surroundings, reflection on the intricacies of the context that might elicit emotions, and resonance with earlier experiences throughout the journey. During the walks children commented on the exact spots where they catch 'Pokemon' – alluding to PokemonGo! urban game of augmented reality whereby children (as well as adults) walk the city streets and look out for virtual elements placed in the exact points referable on the actual map of the surroundings [20]. It could be argued that this activity of playful cartography and augmented reality applications found a huge resonance in children and adults alike (with myriad of mapping games, applications, social networks or locative artworks etc) where connection is found between technology, people, spatial surroundings and maps [14].



Fig. 2. Map of the route and children at first 'stop' [drawn by first author, 2022]

Some children also reminisced on old nursery when walking past it or identified shops where they used to go with parents and where they would often meet their friends. The study revealed that friends and memories associated with physical spaces

encountered along the routes are inextricably linked and critical to each other. 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 personal bonds with the surroundings [21]. Thus, the combination of abstracted space through point cloud images and deliberately ‘aware’ approach to walking within the study would seem to hold the potential to similarly create new associations and memories, in turn having an effect on perception of surroundings and the values attached to them.

During the next stages of the ‘game’ the children were striving to position themselves at the actual spots of the point cloud frames from the postcards. This prompted a discussion on the use of scanning technology in an urban context as well as its representation. The first author encouraged a dialogue with the surroundings via the lenses of point cloud images revealing the juxtaposition of the familiar buildings and streets and leading the group to notice surprising elements of the context (Fig.3). The children picked up on the nuances that can be observed while walking (‘a dog in the window’, ‘noticed flowers are growing again’) as well as details of the church that was depicted on the postcard mentioning ‘ornaments on the top’, ‘spiky bit on the top [of the church], or a ‘cross at the top of the door’. The context paralleled with point cloud images gave a wider perspective and ignited an interest in the route through the familiar spaces to some of the study participants. The children mentioned that they like playing games while walking ‘like I spy and unlucky 13’ or the possibility of just talking to a friend or buying an ice cream from local cafes indicating the importance of sociality of walking with possibility of pleasant intervals - like treasure hunts or just being playful ‘I would just run on my hands’ or ‘turn into giant and go very fast’.

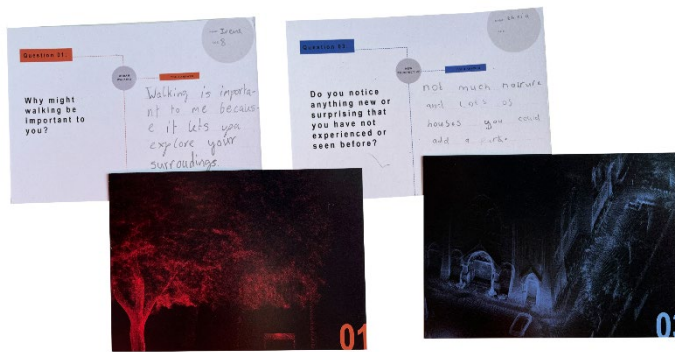


Fig. 3. Examples of postcards from ‘walkshops’ [drawn by first author, 2022]

Environmental consciousness triggered by walking could also be observed as words like ‘environment’ and ‘ecofriendly’ were in abundance and suggestions that ‘maybe instead of cars people could use roller skates, roller blades, bikes and skateboards’. The surroundings characterised by ‘more trees less cars’ were of significance as well as meditative, cognitive elements – somewhat therapeutic aspects of walking, have also been mentioned by the children treating walking as an opportunity to clear the mind, find solutions and explore unexpected places - ‘you see more of the city’. When asked,

while walking, about any ideas of how the space could be used differently the creative potential of children was truly unfolded as the suggestions apart from ‘planting more plants and talking area’, ‘speed bumps or no road only pavement’ (in front of the school), ‘café in the playground’, ‘gymnastics obstacles’ included ‘water slide’, ‘ice cream van’, ‘fountain with fresh water’ and ‘tree houses with video games’. Yet, these answers prove that there is a torrent of practical improvements and creative ideas (some more realistic than others) but grounded on awareness of surroundings and observation of smells, textures, material aesthetics that were induced by the slow rhythm and potentially playful approach to engagement.

5 Discussion

In this study, we investigated an experimental approach to participatory design by combining environmental capture in laser point clouds and walking as a method of inquiry. We employed a combination of ‘postcard’ survey approach in which participants were asked to immerse themselves in the context while walking and considering the parallel point cloud visuals created of the same context. We merged components of digital representation, walking as a research and design tool, and parallelism of virtual and actual surroundings in the study's design.

Our results were based on a relatively small sample of workshop participants as opposed to other techniques of collecting data via online surveys employing immersive VR [22] yet, yielding rich qualitative data on discovery of new spatial qualities, aspects of playfulness, changed behavioural perspectives and perception of urban environment. The results also provided insights into how urban spaces 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 by the creative use of technology to appreciate and capture the experience of urban walking practices, rather than utilising the technology to only produce a precise geometrical record. Instead, the innovative tools were used to enhance human capability to reflect 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 [23]. It is recommended that the influence of augmented and virtual reality as well as gamification on how we research but also perceive and potentially design the urban environment gives opportunity for further exploration [24].

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