Co-Designing Active Parks with Teenage Girls in Birmingham Using Digital Technology

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1 Introduction

The unique needs and wants of girls and young women are almost completely ignored in the process and products of architecture and urban planning (Kern 2019). As a result, the city that is produced presents a range of physical, social, economic, and cultural barriers for women and young girls, influencing their daily experiences in predominantly gendered ways (Barker et al. 2024).

This doctoral study focuses on teenage girls, a particularly overlooked group that is 'designed out of public spaces' (Theocharides-Feldman 2022). Girls from the age of 8 years old tend to stop participating in public spaces (Grech 2024, Global Utmaning & UN-Habitat 2022) such as parks and green spaces. The existing disparities in the use of public spaces by teenage girls and boys are attributed to both exclusionary design processes and products. The absence of accessible, gender-sensitive active spaces for teen girls has a direct impact on their engagement in physical activity and on their psychological wellbeing. Sport England's (2024) yearly Active Lives report shows that teen girls are less likely than boys to meet the Chief Medical Officer's daily physical activity recommendations, particularly among those facing multiple disadvantages. Women in Sport (2024) also found that boys increasingly dominate the playground with football and tend to be both verbally and physically aggressive, which intimidates their female peers.

These findings highlight the importance of the presence of active parks where girls can feel both comfortable and empowered to engage in various physical activities, including but not limited to sports. To understand and design these spaces, it is essential to adopt a collaborative, data-driven design approach. This research will involve a generative co-design process, actively engaging teen girls from diverse backgrounds from the outset and throughout the process (Grech 2024, Ng et al. 2024), with their participation occurring at various stages of the research, starting as early as the front end of design (such as the data collection period for analysis). This research engages teenage girls not just as consultation subjects but as experts in their own lived experience, acknowledging that deep, meaningful engagement requires listening to the diverse voices of those for whom these spaces are created (Smaniotto Costa et al. 2020), rather than reducing them to a homogeneous group with stereotypical interests and needs

To enable both an effective participation process and meaningful products, the research also looks at the role and potential of Information and Communication Technology (ICT) and its digital tools in the context of collaborative and inclusive city planning. Various metaverse technologies are emerging and becoming more accessible compared to a decade ago, among them are components and devices of gamification and immersive technologies like virtual reality (VR) and augmented reality (AR) (Yaqoob et al. 2023). Given the recent emergence of these technologies in placemaking practices and their ability to enable immersive exploration of virtual spaces, this research will explore the potential of digital tools in co-designing inclusive and active parks with teenage girls.

1.1 Research questions

1. What do inclusive active spaces informed by the perceptions, experiences and aspirations of teenage girls in Birmingham look like?

2. How can immersive technologies and gamification enable the participation and co-production process of inclusive active spaces?

1.2 Literature Review

The literature review focuses on three interrelated themes: teenage girls, outdoor public spaces, and digital technology in planning and design. It explores the complex relationship between teenage girls and active public spaces, examining how these spaces reflect existing societal dynamics and how they can be reimagined to better serve the needs of teenage girls and foster their active participation.

Public spaces are the settings for mental, social, and physical development. It is well documented that teens and young people are some of the most frequent users of public spaces (Travlou et al. 2008). These settings provide an outlet for independence and exploring one's freedom away from their caregivers' eyes. They offer a place to show skills, socialise and make connections with peers, but also to self-isolate when needed (Subramanian & Rice 2023). Teenage girls face numerous barriers to engaging in active public spaces, many of which stem not from exclusionary design choices but from the existing societal dynamics that shape them.

The literature shows that the disengagement of teenage girls from public spaces begins at an early age, often around eight years old, as boys increasingly dominate outdoor settings such as playgrounds and sports facilities (Grech 2024, Global Utmaning & UN-Habitat 2022). Local authorities' budgets for public outdoor spaces often prioritise amenities like skateparks, football pitches or multi-use games areas, which are designed with boys in mind or used "practically entirely by boys and young men" (Theocharides-Feldman 2022). According to Grzesikowska (as cited in Subramanian & Rice 2023: 45), the design of these spaces also relegates girls to passive roles as observers on benches or in surrounding areas, reinforcing the sense of exclusion and marginalisation in accordance with the hierarchy of power. This spatial exclusion is compounded by the attitudes of male peers, who may exclude girls from games and sports due to gendered perceptions of reduced competence, as demonstrated in an experiment on basketball (Slingerland et al. 2013).

Research also identifies safety as the most significant factor shaping teenage girls' relationship with public space. Poor lighting, unsafe or secluded areas, poorly maintained urban furniture, single-use facilities, and the absence of essential amenities like public toilets further discourage girls from using public spaces for activities (Henning Larsen 2023). Alongside these physical factors, harassment and intimidation in parks and playgrounds remain pervasive: Girlguiding's (2021) survey found that half of teenage girls had experienced unwanted sexual comments in public spaces.

The literature also shows that girls have a wide range of needs, perceptions and aspirations that must be addressed in the design of successful outdoor active spaces. The Girls Just Wanna Have Fun research report (Subramanian & Rice 2023) shows that girls and boys differ in their play preferences, reflecting in varying physical activity levels, types of play, and criteria for choosing playmates. For instance, the report states that teen girls generally prefer play that is imaginative, collaborative, structured, smooth, and requires whole-body coordination. As for their choice of playmates, the report shows that girls

prioritise peer group compatibility, whereas boys base their choices on mutual interests (Subramanian & Rice 2023). While both genders value open spaces, greenery, and play facilities, girls place greater emphasis on well-maintained and safe parks compared to sports facilities (Mertens et al. 2019). Girls also prioritise features such as aesthetic appeal, vibrant colours, greenery, historical elements, and quiet spaces (Van Hecke et al. 2016).

Context-specific consultations are particularly important; what works in one place may not necessarily be effective in another. For instance, while a gender-sensitive play space in Malmö was intended to be inclusive, it was perceived as 'for boys' by a female participant in West Yorkshire (Barker et al. 2022). Additionally, some focus groups in the same study felt the Malmö and Stockholm spaces were open and overlooked, while two other groups noted that the Stockholm space appeared dark with hiding places (Barker et al. 2022). Birmingham, with its youthful population, diverse ethnicities, and varying socioeconomic backgrounds, and a multitude of green open spaces under decline (Birmingham City Council 2022), naturally presents its unique challenges in designing outdoor active spaces with teenage girls who live there. These examples and the specific context of Birmingham highlight the need to involve local girls as both consultants and active participants in the design process of their outdoor active spaces.

Co-design by nature should be easy, accessible, and intuitive for all users including non-experts without technical barriers and training (Dane et al. 2024). Digital tools have emerged as essential for participatory design, transforming urban planning processes by enhancing engagement and interaction among various stakeholders. Digital interventions help transform physical public spaces into hybrid spaces, enabling more inclusive and responsive environments (C3Places 2021). Through interactive and gamification features of VR and AR and real-time feedback capabilities, these tools allow for flexible, large-scale data collection and offer significant potential in urban design practices. These tools enable the integration of these models into participatory design sessions, fostering active and meaningful engagement from participants in the design of urban spaces (Dane et al. 2024). Both VR/AR and gamification tools have proven effective in engaging diverse age groups and expertise levels, offering immersive experiences that increase empathetic engagement, motivation, and design testing (Dane et al. 2024).

While recent initiatives have begun to include teenage girls in participatory design, these processes often remain limited in scope and rely on traditional analogue tools, which risk reproducing existing patterns of exclusion (Make Space for Girls 2023, Plan International 2020). At the same time, digital technologies

such as VR, AR, and gamification are increasingly recognised in urban planning for their potential to enhance participation and engagement (Dane et al. 2024, C3Places 2021), yet their application to the co-design of active public spaces with teenage girls is almost entirely absent. This highlights a double gap: teenage girls continue to be underrepresented in the design of outdoor active spaces, and the transformative potential of immersive technologies in enabling their meaningful participation remains unexplored. Addressing this gap is the core contribution of the present research.

2 Methods

Breaking down the research objectives, there are two main strands: the first is related to current conditions of spatial relationships between girls and active spaces, perceptions and experiences; the other strand is a novel state requiring testing, sketching, and experimenting using analogue and digital tools. The study employs a staged, mixed-methods design with a strong participatory focus, engaging teenage girls aged 12–16 as co-researchers. The methodology is structured across three interconnected phases:

Phase 1: Perceptions This phase explores how teenage girls perceive and experience active public spaces. Surveys will be administered in schools to capture breadth, including park usage, barriers, and aspirations. Focus groups with small groups of 3–5 girls per school will expand on survey findings, exploring narratives of public space use. Walk-and-talk interviews will be conducted in parks identified through surveys. Groups of 6–10 participants will annotate printed maps, use stickers, and take photographs while walking through spaces, situating their reflections in the environments they use.

Phase 2: Co-design This phase translates participants' lived experiences into design ideas. Workshops will combine analogue and digital activities, including participatory mapping, collages, and mood boards. Visual diaries or zines will be created by participants over two weeks to document reflections on public space through drawings, collages, and photos. These hybrid tools capture both personal experiences and themes for group discussions.

Phase 3: Digital prototyping and feedback The final phase explores the use of immersive technologies in the design process. VR/AR workshops will be hosted at Birmingham City University, where participants will use accessible 3D software and VR headsets to create and test digital prototypes of park designs. Alternative tools such as sound rooms will be available for those less comfortable with headsets. The workshops will enable participants to manipulate virtual

spaces by adding, removing, or modifying elements, and designs will be shared through pictures, presentations, and electronic posters for refinement.

3 Anticipated contributions

One of the core contributions of this research is its assessment of available active spaces in Birmingham from the perspective of teenage girls. This will provide novel insights into teenage girls' spatial experiences outdoors and the types of activities they engage in, alongside a framework for digitally co-designing active spaces with their needs in mind. Digital tools and gamification approaches will also be analysed for their potential to enable and inspire teen girls at different stages of the project.

The research will culminate in a completed thesis, offering policy recommendations and guidelines for practitioners and local communities to better design and plan active parks with teenage girls. Additionally, this work will contribute to theoretical debates on gendered spaces and activities, shedding light on the importance of involving users in the design process from early on and how the design of active spaces affects teenage girls' empowerment and wellbeing.

Ethical approval has recently been granted. Therefore, new findings will be available by the time of the conference. than a tool for promoting equality and inclusion.

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