Design principles for co-creating inclusive and digitally mediated public spaces

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Abstract – *New media technologies present spatial designers with a host of new tools, both for broadening civic engagement in the design process itself, and for inserting these technologies into public spaces. Designers can, thereby expand the diversity of groups that these spaces can cater to, through offering a variety of experiences. Moreover, such technologies offer new tools for generating co-created and shared value, and consequently an increased sense of ownership of these spaces by the public - a (re)valuing of the commons through meaningful investments. Digital devices increasingly mediate many of our daily social interactions as well as the way we interact with, and navigate, our cities. This chapter presents the outcomes of a four-day training school programme in Lisbon, where the primary goal was to develop a list of key principles that could guide urban planners and designers in the production of inclusive and co-created public spaces. These design principles inform the general structure of this report, giving rise to six broad themes of enquiry: participation, quality, diversity, accessibility, flexibility, and hackability. Adopting these principles in the design of public spaces is intended to harness the capabilities of digital technologies in providing diverse experiences and broad usability.*

Keywords - Inclusiveness, design principles, new media technologies, meaningful experiences, participation, quality, diversity, accessibility, flexibility, hackability

INTRODUCTION

Aside from the morality and ethics of producing public spaces that are broadly inclusive, there are a range of social, economic and political reasons that make 'inclusiveness' compelling. Inclusive design for public spaces implies that products and services address the needs of a diverse population, regardless of age, ability, gender

or ethnicity ("Inclusive Design Education Resource | Design Council," n.d.). Rather than designing for specific subsets of the population, which frequently results in satisfying the needs of majority groups or 'generic' users, this approach adopts a holistic view including all current and future users in the design process (Clarkson & Coleman, 2015). Adopting a user-oriented approach to design and involving users in the design process from the outset is considered fundamental for realising public spaces that genuinely include a broad range of users and their heterogeneous demands. As Rishbeth (2001) suggests, ethnic and cultural minorities may have profoundly different experiences of, and demands on, public spaces. The same can be said for different socio-economic groups, with homeless individuals and wealthy families placing very different demands on public spaces. In quantitative demographic terms, the user population could be represented as a set of bell curves, where the central bulge denotes an 'average' or 'generic' use employed by a majority of users, while the tails on either side represent more marginal uses or population sizes (Clarkson & Coleman, 2015). As most designers generally emerge from a central bulge, they commonly present inherent schematic obstacles with regards to designing for people at either end of this curve. Incorporating co-creation into the design process presents opportunities for including these 'tail-minorities' in both process and outcome, catering to all who make and remake public spaces on a daily basis. Co-design refers to the combined efforts of trained and non-trained designers working hand-in-hand in the design process (Sanders & Stappers, 2008). A successful example of co-design is the Gulliver project in Cologne, where homeless people were the sole participants involved in the design of a homeless survival station. Following this line of thought, Holmlid (2009) argues that genuine public participation is central to the co-creation process, and to achieving public spaces that are truly inclusive. In grounding this notion, we need not look further than our profession's moral compass to learn that "cities have the capability of providing something for everybody, only because, and only when, they are created by everybody" (Jacobs, 1961: 236). The ways in which we understand 'participation' and the social landscape today are dramatically and continually transformed by digitally mediated interaction. While on the one hand digital media has the potential to include a wider range of voices in the co-creation process, it also has the potential to impose an inflexible structure and inorganic undertone on the ways in which this public participation can take place, excluding those who are not tech-savvy enough to participate, or those who are resistant to technological uptake (Bojic, Marra, & Naydenova, 2016). Digital technologies employed in public spaces must therefore remain sensitive to not generating further barriers to access.

Juxtaposed with concerns regarding the potential for digital technologies to construct further barriers to participation and inclusion, new media technologies also hold the potential to inject increased dynamism and ephemerality into public spaces, as well as into processes of civic engagement and public representation. This dynamism,

however, also makes it difficult for planners to incorporate new media into design, particularly when considering the fast pace of change and the sheer variety of technologies at our disposal, combined with the interactivity that these devices afford (Townsend, 2004). According to Low *et al.* (2014) and Amin (2008), new media has transformed a previously situated public realm into one that is fluid and ambient, permeating multiple spheres of urban life. Public spaces have been acknowledged as key sites for safeguarding socially inclusive future development in cities, and digital devices offer new tools for activating and enhancing the inclusiveness of these spaces. However, the ubiquity of digitally mediated interactions also carries with it the potential to divert interactions away from meaningful experiences in public spaces. The digital devices employed in public spaces should therefore exhibit novel and dynamic characteristics that both intrigue and remain relevant. As these dynamic yet highly scripted forms of mediated social interaction become enmeshed in daily life, it is worth considering the extent to which citizens are able to appropriate and adapt digital platforms and devices for new purposes and self-gain. Concerning their scripted nature, all digital applications are supported by complex algorithmic foundations, with each reflecting the particular agendas of their respective developers (Schouten *et al.*, 2014). Awareness of this urges us to tread carefully when 'smartening' our cities, being careful to embed digital technologies that reinforce progress towards 'smart societies' instead.

METHODOLOGY

Embodying principles of co-creation, twenty young professionals from around the globe met in Lisbon during a training school programme, regarding the design of inclusive and co-created public spaces. The programme involved a series of lectures interspersed with intense workshop and presentation sessions, with the aim being to develop a list of concise and relevant principles that could function as a checklist when designing digitally mediated public spaces. This chapter's discussion is the expansion of those principles. A range of research and design thinking methods were employed in the process, such as highlighting the poverties of desktop research as opposed to fieldwork, or employing role-play as an integral component. This chapter presents the findings that emerged during these sessions, and is structured as follows: section 2 describes the methodology applied for arriving at these design principles; section 3 provides an overview of engaged stakeholders' perspectives regarding the design and delivery of these public spaces; section 4 illustrates the final outcomes of the training school, and finally, section 5 provides some concluding remarks and recommendations for further research on this subject.

The primary method of enquiry and collaboration employed during the workshops was role-play, with the relevant mechanics of this illustrated in Figure 1 below. Two other methods included guidance from senior academics and professionals in the fields of urbanism and digital media technologies, and tactile urban planning,

comparing the virtual to the lived experience. Role-play is an interactive method for establishing mutual understanding and knowledge transfer among participants, and is particularly effective when involving multiple stakeholders with different skillsets and perspectives. Druckman & Ebner (2007) trace back the documented literature on role-play more than half a century; contemporary role-play, however, often augments realism through programming in role capabilities and parameters for action, and designing roles for specific participants (Schouten *et al*., 2014). Most studies have shown that role-playing not only enhances participants' interest in the topic at hand, but also offers them the opportunity to put theory into practice through active participation in an enjoyable and interactive experience (Efron & Munin, 2017). The main objective for using role-play in this instance was to put participants in positions that would facilitate engaging with multiple perspectives and their subsequent responsibilities in the design process. Tackling this challenge from the perspectives of the three main stakeholders involved in public space design (citizens, professionals, and administrative officials) helped to broaden the scope of enquiry and enhance the depth of knowledge co-produced. Further, seeing a planning and design challenge from multiple angles facilitated a breakaway from rigid professional boundaries, enabling participants to adopt alternative viewpoints, and think beyond each of our own professional enclaves. The applied elements of this research approach involved intense interaction, communication and negotiation sessions, enabling a refinement of principles as well as the collective intelligence of the group (Yardley-Matweiejczuk, 1997).

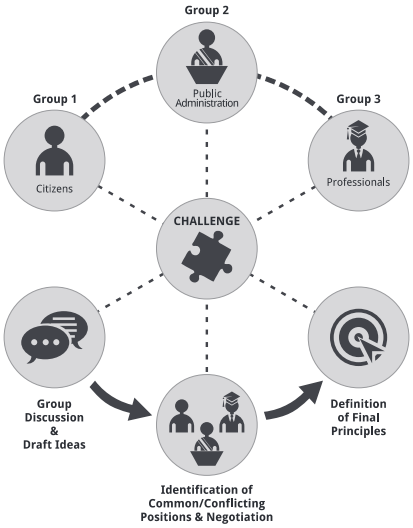

Fig. 1: Role Playing Methodology for Creating Principles[1].

[1] Some iconography was adapted from the 'Noun Project': https://thenounproject.com.

Three different roles were assigned to participants: (1) citizens, (2) public administration, and (3) professionals. Professionals included any fields of expertise related to the subjects of public space design and digital technology, such as urban planners, architects, ICT experts, engineers and so on. Citizens included all other people residing in the city, while public administration reflected the role of government agencies (local and national) charged with managing urban development. Each participant was randomly assigned one of these three roles, and groups of equal size were composed (6-7 people per group). The role-play process comprised three distinct phases, with guidance from academics enriching the debate in each group. The first phase involved initial discussions amongst group members and aimed to develop some draft ideas regarding the principles that should inform digitally mediated public space design. During the second phase, participants were shuffled and new groups were composed, including 2-3 persons from each of the three previous groupings. In these new groups, the challenge was to share knowledge produced in the previous phase, and then to identify points of convergence as well as where relevant powers and responsibilities lay on each one of these points. In the final phase of role-play, participants incorporated the cumulative feedback and lessons learnt during the two previous phases, as well as outside of the role-play process, in order to arrive at a set of principles that public space designers could employ. It is to these principles and stakeholder perspectives that the next section now turns.

OVERVIEW OF STAKEHOLDER PERSPECTIVES

Each of the three stakeholders is addressed in terms of roles and responsibilities, as well as appropriate jurisdictions. From the **citizen's perspective,** positions are generally defined by broad early involvement in the design process, ensuring that the public is able to influence a development's design. This is reinforced by the assertion that public spaces should be knowledge spaces and hold greater functional resource value for public space users, facilitating a move away from the 'tragedy of the commons' scenario and towards one where common co-created value inspires an enlarged sense of public ownership and belonging.

From the **professional's perspective,** while embracing the potential for ICTs to enhance the inclusion of civil society, the practices of civic engagement should be carried out by professional bodies that are accountable. At the same time, it is crucial for institutions and administrative bodies to be flexible to the rapid changes in both technology and society – from a regulatory standpoint.

From the **administrative perspective,** a reduced role is in line with current trends towards political decentralisation and shrinking administrative cabinets. This reduced role sees administrative responsibility primarily as one of oversight regarding public participation processes in all urban development projects, with continuous review procedures in place for this, in order to safeguard the public interest at all times. As

an extension, broad inclusivity should be encouraged by the ICTs installed in public spaces, customising the interfaces and experiences to diverse publics.

Thematic Analysis

Figure 2 illustrates the stakeholders involved in the design and management of public spaces, as well as the thematic categories of principles derived.

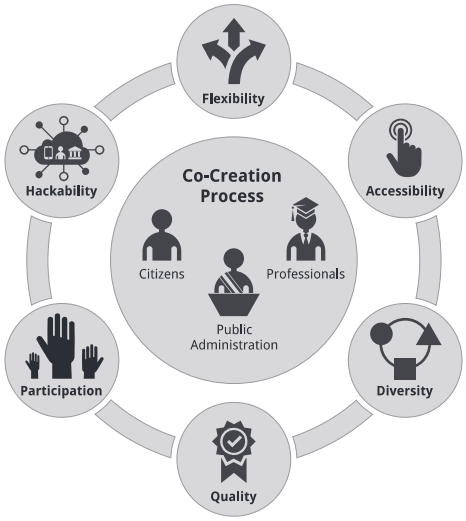

Fig. 2: Main Agents and Themes for Co-Creating Inclusive and Digitally Mediated Public Spaces.

Participation

Genuine and meaningful co-creation requires broad participation from all public space users from the outset, ensuring that the public are able to influence spatial planning and design. This is an essential component if public space design is to adequately reflect user needs. From an administrative perspective, moderate investment aimed at facilitating genuine and broad civic engagement in the design process is strategic, as it affords public officials the ability to offset the increased costs associated with re-designing and re-programming a public space. While administrative bodies should be responsible for overseeing all public participation processes, on-the-ground strategies should be carried out by professional bodies skilled in civic engagement practices.

The involvement of citizens goes beyond simply capturing their spatial sentiment and feedback, and includes generating meaningful attachments to places and a sense of ownership among the public, empowering citizens through their ability to contribute towards co-created spaces when given the tools to do so. This inclusion of the public at all levels of the design process is intended to encourage improved self-governance and maintenance of public spaces and their accompanying digital devices. The notion of ownership will be returned to and elaborated on in the section discussing

hackability of public spaces. As public spaces are ephemeral and re-made by their users each day, the co-creation process is ongoing, with digital platforms enabling a permanent and healthy flow of dialogue between different actors, fostering increased transparency in design processes.

Through employing a variety of digital platforms and applications, planners and designers of public spaces are able to disseminate information on a scale previously unmanageable. At the same time, these tools enable them to gather input from the public, which may be more genuine due to the relative anonymity afforded by smartphones when compared with attending meetings in person and negotiating inherent power imbalances. Digital devices thus show promise for removing barriers to participation, but they must also be sensitive not to erect new ones (Bojic, Marra, and Naydenova, 2016). There are numerous examples of mobile applications that offer users the ability to voluntarily contribute towards a public opinion database. The WAY CyberParks application[2] is an example of such a digital tool that is tailored specifically to public spaces. This digital application (smartphone plus internet) can be used to monitor how people use and experience public spaces, providing an interface for direct exchange between users and planners, increasing our understanding of the needs and preferences of users, and equipping public space designers with a tool and information for being more responsive to users. Feedback is relayed via geolocated paths, audio or video recordings, as well as via uploaded photographic or written accounts. The only barriers to participating in this digitally mediated manner would include ownership of a smartphone, enough data to download and run the app, and the willingness to both learn the ins and outs of the application and contribute to the public database. Some advantages of participatory crowd-sourcing applications such as this, relate firstly to the capacity for real-time data gathering and processing, aiding the maintenance of an up-to-date database of public space experiences, and secondly, to the potential for a dramatically increased scale of data capture. The latter is a product of removing barriers and empowering citizens with alternative methods of participation that are flexible and meet the public more on their own terms. OpenStreetMap[3] is considered a prominent example of volunteered geographic information and is a living proof of the sheer pace at which data can be recorded when participation is enacted from the comfort of one's own smartphone and when tools are made accessible to a diverse audience.

Quality

The quality of public spaces, commonly perceived as a measure of the quality of urban life (Beck, 2009; Dines, Cattell, Gesler, & Curtis, 2006; Smaniotto Costa *et al.*, 2017), was also recognised as a core principle in the discussion for co-creating inclusive and mediated public spaces. Woolley (2004) asserts that high quality parks, public

[2] www.cyberparks-project.eu/app.
[3] https://www.openstreetmap.org/.

spaces and landscapes contribute towards enhancing public value through the development of shared economic, social and environmental value.

From the citizens' perspective, high quality public spaces were perceived as Montgomery's (1998) 'successful urban places', combining activity and meaning with a physical setting. Firstly, activities enacted in a public space inscribe meaning and are particularly important to the public's perception of these spaces (Gehl, 2011; Jacobs, 2013); they constitute a social force that encourages others to 'activate' these spaces. While initial activity generates further activity, maintaining a diversity of activities enables not only accommodating different groups across a range of temporalities, but also encouraging a shift towards a larger number of outdoor activities and a more healthy and vital urban life. Secondly, public spaces are subject to the cumulative meanings and memories ascribed through generations, and they commonly play a significant role in the perceptions of a city's identity, such as Hyde Park in London or Central Park in New York. In this context, digitally mediated public spaces reinforce the role of meaning in place-making (Karacor & Akcam, 2016). Lastly, the physical setting refers to a diverse assortment of public space elements, with each affecting a space's usability and functionality. These include the degree of comfort and cleanliness, protection from weather elements, physical safety, and the overall quality of infrastructure, and physical/virtual connectivity. As a point of departure, people are more likely to spend time outdoors if there is a clean and comfortable place to sit, which is safe, and offers protection from the weather. New media technologies have shifted the focus away from usability and functionality, and towards social interaction and experience (Schouten *et al.*, 2014). Digital devices should take their cue from here, exploring the kinds of ICT services that would encourage people to spend more time in public spaces, engaged in meaningful experiences. Services as simple as freely accessible Wi-Fi and charging stations could go some of the way, but whichever devices we choose to install, it is important that we consider the combined role of novelty and quality in attracting public usage, as well as the modularity and longevity of implemented technologies.

Similarly, professionals underlined the need for high quality design in public spaces. Taking into account the new demands that the introduction of ICTs has generated in public spaces, urban design needs revision to reconcile these demands. More specifically, public spaces should be of value to users, accommodating the use of electronic devices and satisfying the user's contemporary needs in an age of digital mediation (Abdel-Aziz, Abdel-Salam, & El-Sayad, 2016). At the same time, professionals highlighted the potential for digital technologies to enhance elements already present in public spaces in order to strengthen the place's identity and create points of contemplation, interaction and serendipity.

Regarding the use of ICTs as tools for enhancing a place's identity, public administration drew special attention to the challenge of subtly infiltrating ICTs into the

urban fabric without disrupting the form and continuity of their surrounding environment. However, the key role of public administration employees concerns the maintenance and management of public spaces, which is intrinsically bound up with the perceived qualities of public spaces (Beck, 2009). In order to sustain high quality public spaces, ICT hardware requires constant maintenance by skilled professionals, while software must be updated frequently to reflect ongoing technological advancements. Finally, high quality, vibrant, and attractive public spaces are viewed as sites of social integration that foster neighbourliness and community while, at the same time, contribute to reducing criminality (Carmona, Magalhães, & Hammond, 2008).

Diversity

Ethnic and cultural diversity adds richness to a society. Public spaces are sites of mixing and integration, contributing towards vibrant and socially connected communities. This heterogeneity is reflected in the diversity of uses that a space can be put to, reinforced by the diverse ICT services employed in it. For example, different kinds of technologies may attract the intrigue of children when compared with adults, or of able-bodied users versus disabled users. This represents an opportunity for urban designers to implement ICT services strategically in ways that cater to multiple users. This can be done in two ways, and preferably through a combination of the two. Firstly, by installing 'generic' and flexible ICTs that can be used by a very diverse audience and can be appropriated for their own specific needs. Some examples of this would be charging points and free Wi-Fi - services that all users can utilise, whether it is charging a mobile phone, camera, laptop or power-bank, accessing social media platforms, or taking part in an online course. ICTs and the supportive hardware in these instances present very few barriers to accessing and appropriating them. Secondly, the installation of niche-user ICT services targeted at specific users could address problems of exclusion for population groups at either tail of the curve (Clarkson & Coleman, 2015). For example, digital devices and technologies that are tailored specifically to wheelchair users or people with Down syndrome, which are unlikely to suit the needs or abilities of other users. These niche services have the potential to encourage far more social diversity in the activation of public spaces, as well as to include more voices in the design process itself.

ICTs in public spaces should aim at bringing people together in the same physical space, encouraging their engagement with one another and producing shared experiences, regardless of age, gender, ethnicity, or ability. Digital technologies make it possible to interact with one another in interesting and unexpected ways, opening up possibilities for more inclusive communities and public spaces. Technology has the ability both to bring people together and to bring people into closer contact with their physical environments, enriching the experience on both counts through digital mediation. This is where the real value lies for ICTs in public spaces, facilitating and nurturing connections and experiences. ICTs in public spaces should aim to produce

social interaction and engagement, contributing towards an improved and meaningful experience of public spaces, and reinforcing existing natural resources through improved public connection and ownership. Acknowledgement and support of cultural diversity should form the basis of digital additions in public spaces, with a view to building inclusive and participatory societies that are equipped with the tools to act.

Accessibility

Accessibility is an important structuring element in the design of public spaces, and of cities, more generally (Lofland, 1999). In this context, accessibility is largely defined in terms of spatial configurations, connections, and distances to places. However, ICTs have transformed the ways in which we organise ourselves, how we connect with one another, and the speed with which we can communicate with others and access information, mediating physical distances with digital proximities (Ampatzidou *et al.*, 2014). Concepts of accessibility have been made more fluid by the addition of virtual accessibilities. This should inform design schemes for public spaces that include digital services, programming these services into public spaces in order to facilitate enhanced accessibility. ICT services that aim to bring people closer to natural resources in public spaces have the potential to generate fuller experiences for users unable to access these experiences without digitally mediated assistance. This includes physical separation from public spaces, which can be made virtually accessible, as well as physical obstacles that render some of a public space's services inaccessible to the disabled. Digital technologies offer possibilities for facilitating virtual experiences of these inaccessible spaces.

Accessibility is a pillar of democracy and inclusion, simultaneously structuring and reflecting a city's stance on socio-economic and political equality. For example, higher quality and more accessible public spaces are often located in closer proximity to residents who are financially better off. This translates into weakened social capital for citizens that are unable to physically mix and interact in these spaces. But as social networking is increasingly mediated by digital platforms, how we accumulate our social capital is being transformed and diversified at an alarming rate. Madanipour (2010) argues that the way in which the boundaries of public spaces are constructed is of great significance to the quality of these spaces. However, as Ruchinskaya (2017) reminds us, accessibility is not only about physical access to the space, but also access to the experience. ICTs are important tools for achieving that, both through public installations and via open platforms that aid spatial management.

When programming ICT services into public spaces, their design should consider the diverse needs of all user groups. Interventions that contribute towards improved safety or navigation can be appropriated and enjoyed by all, aiding the physical accessibility of public spaces. Regarding the virtual accessibility of these spaces, all data collected and utilised in the operation of public space ICTs should be open and accessible to download. Compared with virtual platforms for interaction, urban public

spaces facilitate - to a greater extent - the possibility for spontaneous interactions and experiences. Technologies employed in CyberParks should aim to enhance those qualities of public spaces related to publicness, accessibility, safety, and integration, while supporting the need for meaningful interactions and experiences.

Public spaces should punctuate the urban landscape at regular intervals, bolstering physical connection with virtual connectivity, so that these spaces remain accessible to a wide variety of users. An assortment of amenities and infrastructures will facilitate diverse applications, accommodating a wide variety of needs and interests. Public space interventions are opportunities for providing information and knowledge concerning the ICT skills needed to utilise and optimise a park's services. Public spaces are always deeply integrated with the environments and fluxes of cities, making their study particularly revealing of a city's connections, flows and dynamics. Shrivastava (2013) asserts that public spaces communicate a lot about a city's functions, cultures, and attitudes towards its citizens. Harvey (2008) makes the argument that the 'right to the city' refers to a right to change ourselves by changing the city, and depends upon the exercise of a collective power. From an environmental perspective, public spaces are the lungs of urban environments, maintaining ecological balance, and from a social or economic perspective, they are the arteries that keep things moving and people working. These are also sites of play and relaxation; providing spaces for pause in a world that is obsessed with efficiency.

Flexibility

Public spaces should be flexible to being changed and appropriated by the users themselves, with technology facilitating this and reinforcing a sense of ownership of these spaces. Given the reduced role that political decentralisation allows for public administration powers, flexibility is key for public administrators to maintain efficiency and relevance. Just as digital technologies have radically transformed the ways in which we organise ourselves and conduct social and economic transactions, political flexibility ought to be programmed in to match this dynamism. Urban and social policy cannot function as closed static systems, but should be open to concessions and adaptations that allow for the creative use of public spaces and of the digital technologies employed within them. As the body responsible for oversight and evaluation, public administrators should create actionable fields of intervention and offer direction to other development stakeholders involved with urban development projects, while also allowing for non-planned interventions to emerge organically. Making space for non-planned interventions or for alternative uses of public spaces simultaneously makes room for community-based, bottom-up interventions to emerge. With the engagement of urban development professionals, digital technologies afford us the ability to monitor, map and manage public spaces, creating opportunities for gathering fresh insights about hyper-local needs and desires, and to act upon these insights. Digital technologies have the potential to narrow the implementation gap that often exists between research, design and action.

Flexibility is an important theme in the discussion regarding co-created and inclusive public spaces, both in terms of regulatory flexibility in order to make innovative interventions possible, and in terms of technological flexibility required to accommodate ongoing modifications and updates. Regulatory flexibility is particularly important from the perspective of professionals charged with designing public spaces, in order to allow ICTs services to remain current. In other words, digitally mediated public spaces should not be rendered unusable or out of touch as technologies are upgraded. In this sense, the flexibility of public spaces and their respective ICTs can be likened to the urban planning concept of 'resilience', enabling public spaces to maintain their relevance over the long-term. While this extreme dynamism represents a challenge to design and to development, these constant changes inspire opportunities for innovative uses of public spaces, which may lead to better solutions for managing resources and reaching common goals (Bala-Miller, Cagnin, & Cipolla, 2008). Interventions should be subject to constant review by public administration authorities in order to ensure that the services installed meet the needs of all users. The creation of a digital platform is suggested to facilitate this ongoing review of public spaces and their services and to make space for the effective engagement of all public space stakeholders.

Hackability

Hacking as a cultural practice re-frames participation, collective effort and co-creation in urban design. In the context of the city, hacking can be understood as the opening up, appropriation, iteration and improvement of placemaking. The influence of urban hacker culture includes the appropriation of disused spaces in skateboard culture (Borden, 2001) and the re-skinning of urban space as a 'playground', as in Parkour (Alfrink, 2014). We can also observe related forms of culture jamming, such as graffiti, guerrilla advertising, and pervasive games (Montola, Stenros, & Wærn, 2009), remixing context and meaning in the production of public spaces. In recent years, hacking has become a more mainstream methodology in civic participation. 'Hackathons', organised around the betterment of public services, bring together a mix of professionals, service users, designers and coders, to co-create and prototype innovative solutions (Johnson & Robinson, 2014). The use of digital technologies in these initiatives would seem to provide further justification for the efficiency of the 'Smart City'. However, of more interest in the context of this discussion, is the emergence of bottom-up 'Smart Citizen' inspired initiatives (de Waal, de Lange, & Bouw, 2017).

'Friends of The Flyover'[4] was conceived by three friends who identified a new use for the earmarked decommissioning of a flyover (an elevated road) in Liverpool. As an alternative to its planned demolition, and with a public purse saving, a unique urban park and venue was proposed. Through the crowdfunding platform 'SpaceHive'[5], the

[4] http://friendsoftheflyover.org.uk.
[5] http://spacehive.com.

campaign went viral, with over 200,000 social media interactions, and enough money was raised to commission a feasibility study. In 2015, the collective set up a community interest company, and after securing additional funds, took on part-time staff. Last year, on-site events were programmed, and planning permission was acquired for the first phase of the occupation, 'Urban Workbench', giving locals the opportunity to learn making and construction skills. These kinds of projects are being initiated across Europe by a mix of community organisers, architects, designers and start-ups, which employ digital platforms to coalesce around interests, crowdsourcing projects with the intention of re-designing urban space for the public good (Ampatzidou *et al.*, 2014). Hackable citymaking initiatives provide a powerful lens for re-imagining urban design practices as thoroughly co-creative endeavours, and constitute an alternative to traditional forms of community participation (Kagan, Burton, Duckett, Lawthom, & Siddiquee, 2011).

Hackable citymaking empowers active citizenship: The democratic process of city-making should be open to transformation from the bottom up, engaging citizens in the initiation, design and development of public space. Hackable citymaking has the potential to empower new forms of active citizenship, employing digital platforms to re-invigorate co-creation processes. Hackable citymaking should be democratised and legitimised from a political standpoint, as well as elaborated and unpacked from a social perspective in order to make these tools accessible to a diverse public. This includes support for new media literacy skills, enabling individuals to appropriate digital platforms and tools in service of citymaking. Digital platforms are able to facilitate collaborative hackable citymaking between all stakeholders and at scale - connecting people towards a future that is both co-created and inclusive.

WORKING PRINCIPLES

The twenty principles below are intended to operationalise the achievement of the six broad themes illustrated in Figure 2, providing a roadmap for the use of digital technologies by public space designers.

1. Genuine public participation should be present from the outset in all developments impacting the public.
2. Digital technologies should broaden the scope of participation.
3. Digital technologies should explicitly aim to activate public spaces.
4. Professional bodies should be responsible for carrying out adequate public participation processes.
5. Digital technology should facilitate increased transparency in the participation and design process.
6. Long-term common good should guide all planning decisions regarding public space design.

7. Contributing towards a high quality public realm should be prioritised in all development projects.
8. Public spaces should be knowledge spaces and be of value to the public.
9. Visions for public spaces should be constantly reviewed against the objectives laid out for each space.
10. Public spaces should cater to a wide variety of population groups.
11. A variety of digital technologies should be employed in CyberParks to ensure their broad usability.
12. Public spaces with diverse amenities should punctuate the urban landscape at regular intervals.
13. All public spaces and their digital devices (including captured data) should be openly accessible to all.
14. Digital technologies should be employed to enhance the accessibility and usability of public spaces for all groups, particularly marginalised ones.
15. Public space interventions should function as opportunities for teaching the public the ICT know-how and skills needed to appropriate a park's services.
16. Administrative regulations should be flexible to hyper-local public space design needs.
17. A digital platform should be in place for evaluating public space design and negotiating on regulations.
18. Digital technologies employed in public spaces should be highly adaptable to be able to accommodate constant technological and knowledge innovations.
19. Public spaces and their digital technologies should be able to be appropriated for self-gain.
20. The digital technologies used in public spaces should encourage a sense of ownership for these spaces amongst the public.

CONCLUSION

Designing public spaces that are inclusive and co-created requires taking a user--oriented approach to design; one where genuine civic engagement is the basis of all design motives and departure points. Digital technologies present us with an array of new tools, both for engaging citizens on design issues via digitally mediated platforms, and for producing meaningful digitally mediated interactions and experiences within public spaces themselves. Digital technologies are able to facilitate participation processes and public space experiences that are more diverse, more interesting, and more autonomously driven. During the training school, twenty concise principles were developed for designers and future researchers to take further. On the whole, there was a general sense of optimism in the potential for ICT services to enable more inclusive and co-created public spaces. While there are some definite concerns

regarding the ubiquity of digital technologies in our lives, cyber-securities and the inflexible algorithms on which these platforms rely, these are topics for future research, to be undertaken by a more technologically centred group of researchers.

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