

# USING AN ONLINE PARTICIPATION TOOL TO COLLECT RELEVANT DATA FOR URBAN DESIGN

*The construction of two participation exercises*

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**Abstract.** This paper discusses the design of an online digital participation campaign, developed as an academic research project in Singapore. In order to develop appropriate exercises which fitted the tool and the context, we addressed several questions: how can online participation tools maintain a negotiation and education power? What data generated by citizens, in the form of a design proposals, is useful for urban design? We created two different exercises, at different scales: one exercise asking people to design proposals with functional blocks and one where citizens could decide the equipment and furniture in a public space. For each exercise we discuss the scale, the elements, the educating and mediating impact, but also the way we intended to use the gathered local knowledge in urban design. The exercise did not receive the expected contributions, gathering little attention from internet users. More results were obtained using an offline experimental setup. In conclusion, we reconsider the weakest points of the design in a critical analysis and provide direction for future online participation tools.

**Keywords.** Participation; urban design; online tool; engagement.

## 1. Introduction

This paper presents an online participation campaign, implemented to support the redesign of a neighbourhood in Singapore. The participation campaign is described as a process including the tool and its functionality, the website and its information, and the way collected data has been used. The development of the exercise, being online, required multidisciplinary expertise from user experience,

to user interface, digital marketing, etc. Those aspects will be shortly described, to be explored in future publications, but the paper focuses on the exercises, as ways to support the urban design of the area, from an academic point of view.

The questions which lead the process are:

1. How can online participation tools maintain a negotiation and education power?
2. What data generated by citizens, in the form of a design proposals, is useful for urban design?

Singapore is a particular case study, as it stands for a data-rich and data transparent country ([data.gov.sg](http://data.gov.sg)), which is a clear indicator of a transparent governance. Its predominantly top-down decision system is currently giving more space for participation processes, creating a perfect dimension to study the interface between data and participation.

The paper begins with a short overview of positive and negative aspects that must be considered when shifting from a traditional to an online digital participation process, as highlighted from the literature. Then, it describes the tool and the participation process, together with the two exercises, which are currently accessible online at the following address: <https://ideasfortanjongpagar.com>. Finally, it gives an overview of an ongoing research of data-informed urban design.

## **2. Online tools for participation: advantages and disadvantages.**

Participation has proven to support urban projects by creating processes to mediate and connect different stakeholders, discussing mutual interests and goals, and gathering local knowledge (Wates 2000). Digital Participatory Platforms (DPPs) are defined as “a specific type of civic technology explicitly built for participatory, engagement and collaboration purposes that allow for user generated content and include a range of functionalities (e.g. analytics, map-based and geo-located input, importing and exporting of data, ranking of ideas)” (Falco and Kleinhans 2018). To further specify this definition, we would like to focus on DPPs that are used online, and hence likely accessed independently by users.

Several authors have discussed expected advantages and supposed difficulties when dealing with digital and online participation tools, relative to more traditional forms of participation:

- Falco and Kleinhans (2018) identify different levels of government and citizens relationship, from information sharing, to co-production or self-organisation. The digital online tools support more co-creation processes extended in time, as it is possible to establish a two-way communication channel.
- Co-production is widely regarded as a “solution to the public sector’s decreased legitimacy and dwindling resources by accessing more of society’s resources” and as a means “to reinvigorate voluntary participation and social” (Brandsen & Honingh, 2016). In this sense co-creating should mobilise social resources and social cohesion, intended as the mediation among different social groups. On the other side, the informing dimension, defined by Linders (2012) as Government as a Platform,

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is intended as the processes in which governments equip citizens with data needed to make informed decisions. The informing dimension needs to be redefined in light of the online and digital nature of the DPP. Participation processes based on online digital tools lose the human connection. Hence, the mediation among different groups and the education about general goals must be explicitly addressed in the design of the tool (Mueller et al. 2018). The DPP employed in the participation exercise described in this paper is a co-creation platform, and the exercises are dialogues between the users and the DPP, in the form of tasks, hints and suggestions to answer with proposals. But the dialogue is not open, it follows a specific framework and it does not include the possibility to obtain, from the users, other information rather than the ones that were planned beforehand. This aspect definitely resizes the possibility of action of the DPP, but at the same time, manage to get uniform information, shifting the attention to the data collected, to be compared and use in further analyses (Hasler, Chenal, and Soutter 2017).

- Digital and online tools for participation processes have greater outreach and enable to collect and compare more information; implying a shift from the gathering of discrete local knowledge to big data (Hasler, Chenal, and Soutter 2017). In combination of emerging procedures of data-informed planning and design, the DPP can be considered as source of local knowledge data. In addition, DPP should not replace conventional participatory methods, but be a combination of online and offline techniques (Seltzer and Mahmoudi 2013).
- Participatory processes outcome depends on the trust about the agency of the process: intended primarily as open governance, as a dialogue between citizens and government, the success of a participatory process depends largely from the perceived impact of people's (mostly) voluntary actions. The trust about the agency might reduce the outcome of participatory processes, in the presence a more complex pipeline, where people's contributions stand as data in an academic study (Evans-Cowley and Hollander 2010). In the specific case of this exercise, while initially the campaign was only online, it became a soon part of some workshops and of an online course, which proved to have a better outcome, in term of trust of the agency, giving better results in terms of outreach. The presence of a workshop facilitator or the teacher avatar in the online course, did not change the informing dimension of the exercise, as the facilitator did not intervene in the exercise, beside technical support.
- Internet and social media are media which support specific reading time, mode (hyperlinks) aesthetic, and interaction (Manovich 2000). The DPP should not be considered as the translation of participation processes into a web interface but need to rethink the way people interact with the tool and among themselves.

### 3. Participation Process design

The participation campaign uses an online 3D composition tool called qua-kit, developed by ETH Zürich. The user lands on the qua-kit platforms through a website which offers different participation exercises related to an urban redevelopment site in Singapore (Mueller et al. 2018). The website provides information and context for the exercises.

Qua-kit is an online design and participation tool that allows to compose and

edit 3D geometries in a 3D environment. The tool supports 3D elements with a base map. The 3D elements can be customised, depending on the nature of the exercise, and they can be picked by users, located in a specific spot and rotated. The 3D elements cannot be resized or modified. The tool records the spatial configuration submitted by the users, together with camera zooms, movements and frequency of elements used. The majority of guidelines and instructions about the use of the tools were presented to participants on the website (<https://ideasfortanjongpagar.com>), while the tool itself has a simple toolbox, which includes a legend with a description of the 3D element selected and a list of all the 3D elements available with reference images (Fig. 1). After completing and submitting the proposal, each participant is asked to answer some questions regarding specifications and details of his design and general information such as gender, education level and age range.



Figure 1. The interface of the qua-kit tool. .

There are clear challenges and advantage to focus on a 3D design tool: non-expert users might not be familiar with spatial thinking and with urban effects of 3D shapes. Confronting them with the task of designing in 3D already carries a lot of education power. Moreover, by asking users to design, we managed to extract local trends in the use of space, which are coming directly from the users, and we did not limit non-expert to comment or rate among existing proposals. For each exercise, we will discuss both the information provided in the website and the 3D element offered in the tool for the composition.

Initially, the participation campaign was only online. The link of the website was shared by some social media accounts: main channels were our institute's Facebook page (Future Cities Laboratory), the Facebook of a non-profit agency (Partecipate in Design) whose main interest is to push participation processes in Singapore and some Facebook groups. There were limited contributions:

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only 40% of people who entered the website decided to click on the tool, and only 10% of people who started using the tool completed the exercise, the overall click-through rate is 1%, which is considered low. To gather more feedback, the online campaign was soon supported by some workshops, with paid participants, which took place in Singapore, at two universities (National University of Singapore and Singapore University of Technology and Design). One of the two exercises became also part of an online course.

The people who participated in the campaign largely depends on the proxy, meaning the way they accessed the tools: either by the workshop, the online course, or by the link available with the social media accounts. There are certain trends: more than 95% of participants have bachelor or higher education, but 77% of participants do not have a specific education in urban design or urban planning, so they are not expert in the field. One third of participants do not have any experience with any 3D software, including video-games, which imply higher difficulties in engaging with the tool. All the participants live in Singapore, but only two thirds are actually resident (which imply also the possibility to vote) while the rest have some immigration pass.

### **4. My perfect neighbourhood**

The exercise focuses on the new development “Waterfront Tanjong Pagar”, a waterfront area of 4.5 sqkm which will undergo major redevelopment. The area currently houses one of Singapore’s largest container terminals, which will be relocated, leaving space for a commercial and residential development in close proximity to the city centre. The area is strategically located in Singapore, serving as a bridge from the recently developed touristic area of Marina Bay, the area of Tanjong Pagar and the west of the island. For the purpose of the exercise, only a subsection of the overall area is considered. The final selection is almost 0.3 sqkm, to let users engage with an urban scale, but allowing them to complete the exercise relatively quickly.

This first exercise has a clear agenda of educating non-expert users. The area undergoing redevelopment has very strong potentials and therefore faces some pressure. Being at the crossroad of a lot of important sections of the city and dealing with a rich coastline, the design of the area will have an impact for Singapore, setting up accessibility, density and land use. Non-expert users might not be aware of the implications of certain design proposals and might not even have an opinion about specific design tasks, which have an impact (e.g. treatment of the coast, treatment of the borders facing parks, etc.).

The exercise objectives are:

- to raise awareness about key points of development in the area;
- to start suggesting people about possible design solutions which might guarantee a more sustainable environment.

In this sense, the proposals submitted by people were not considered in further analysis, because the exercise was not designed to extract ready-made solutions, but had rather an explorative value.

The exercise is composed of three steps of equal importance:

- the guidelines;
- the composition exercise with compulsory items;
- the questionnaire.

By entering in the main page devoted to the My perfect neighbourhood exercise the user is confronted with a short description of the area and of the tool. Then there is the introduction of the elements together with some reference pictures. Before landing to the main tool page the user is confronted with five guidelines which pose specific questions that are key points of the area. The specific questions regard the interface with existing parks, the role of the coast line and the interface with existing shopping venues, the importance of green networks, the roles of public spaces and buildings, the importance of mixed use functions. The users have to go through all the guidelines before being able to start the exercise.

After landing on the qua-kit page, the participants find a map and a white area, representing the space they need to design. The elements they can interact with represent different land use destinations. They can pick among mixed use, dense mixed use, residential, office, commercial, cultural facility, park connector, park, open paved space, and entertainment park. Each element is represented by a 3D geometry that symbolises the specific land use occupancy with a circular base. There is a legend with reference images from Singapore, so that people could immediately relate to the urban environment they were proposing.

When starting the exercise, the users find some elements already placed in the white area. As explained in the guidelines, they first need to reorganise those compulsory elements and, only after, place new ones. The compulsory elements include mixed use objects and parks, and were selected to let users engage with those specific land uses. The combination of the guidelines and the compulsory elements is the core of the exercise, raising awareness among people of accessible friendly solutions that could confront the specificities of the areas. After submitting the exercise, the participant is requested to answer a questionnaire regarding the reasons supporting the design and his profile (gender, education, age, etc.).

The exercise had very relevant results. The solutions submitted by people consistently propose to develop specific ideas for the coastline and respond to the border facing the park connectors. Almost 70% of design proposals suggested a series of public parks or public access buildings facing the sea, and majority of proposal responded with a park to the existing Park connector (Fig 2).

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Figure 2. Three examples of participant proposals. They all respond consistently to the coastline, proposing a linear park or open paved public space. They also react to the park connector North West.

### 5. My perfect public place

My perfect public place is the second exercise. The exercise does not represent an existing area; it is however based on the Singaporean context. The scale is the one of urban design and more specifically design of a single public space.

The goal of this exercise is to extract local knowledge from people. Public space design is context specific; different cultures have different perception of public spaces, and might respond differently to space configurations. The exercise is designed to ask local people about their expectation toward public space, in term of equipment and surface design, to support future design developments with data.

The exercise starts with a white rectangular area, surrounded by buildings. The buildings are 3D models with some details that suggest commercial activities in the first floor and residential destination in the floors above. There are no prior guidelines and attention focus, nevertheless there are some focal points that could lead the design solution: the road, a clear symmetrical axis and the commercial activities in the first floor (Fig 3).

The elements the users could interact with are public space equipment and surfaces. The list includes: stage arena, sports field, tree, playground, pavilion, covered walkway, water fountain, tables and chairs, outdoor exercise, benches, green pots, paved open space, green field. Each element is represented in by a circle which approximated its ground occupancy and 3D stylised models provide an overview of the chosen element.

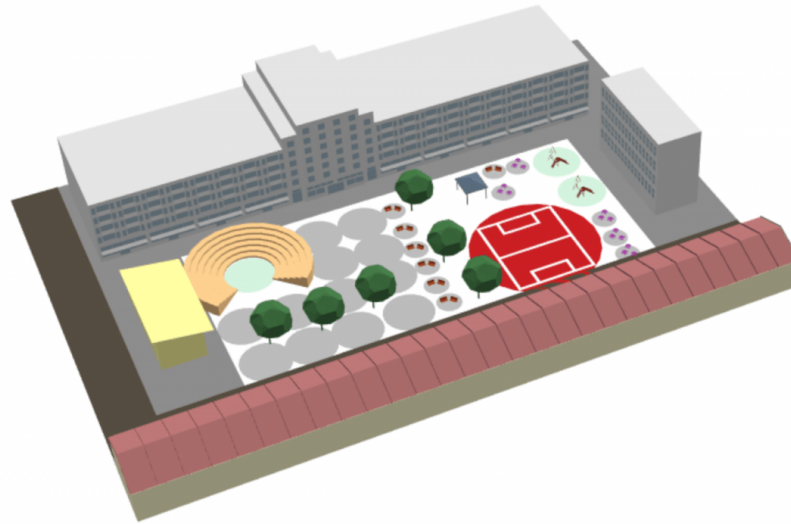


Figure 3. An example of the My perfect public place exercise, showing the fixed context and the circular elements placed in the white area. .

The results of the exercise are meant to be used in a bigger research project on data-informed urban design to help in evaluating and designing public spaces. The idea is to support designers in making urban public spaces that are used and appreciated: informed by people's preferences and use.

More specifically the data-informed design research comprises:

- the collection of multi-modal data. Together with people's preference gained by the My perfect public place exercise, we collected sensor data from different public spaces in Singapore, and social media data. The data collected is context and culture specific (You, Tuncer, and Xing 2018).
- The compilation of a context specific quantitative framework to measure the quality of Public Space in a systematic manner. The Public Space Quality Index (PSQI) proposes different public spaces criteria (enclosure, temperature, presence of specific equipment, etc), which are selected, ranked and quantified by experts during a workshop and validated by data. In this sense, the data collected from the My perfect public place exercise will serve as a dataset to explore and perhaps validate, together with other data, the developed framework of criteria to measure the quality of public space, taking into consideration directly people's preferences (Herthogs et al. with Peijun He 2018).
- The PSQI will in turn be integrated in a spatial interaction model to estimate the number of potential visitors to public spaces, and how public space qualities affect this estimate (cf. Herthogs et al., 2018)

We will give a short overview of the data, providing some insight into Singapore use of space. For the purpose of this overview, the frequency of an element, is not



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based on elements count but on the number of users who decided to engage with the element (how many people decided to use the trees, not how many trees people used in total). The less used element is the planter, green in a pot (36% of users), while the most used is the tree (97% of users). People in Singapore tend to prefer green elements that provide also shade and recover from climatic events. Benches are the second most used element (95%). Fountains and playground have been used by 92% of the participants. Water elements in public spaces are elements of that help climate mitigation, visual quality but also cultural reference; playgrounds support activities which are specific of public spaces. If we sum the surfaces counts, paved open spaces double the green surfaces, giving clear direction of the typology of public space, people might expect. Further analyses are performed in the context of validating the Public space Quality index. In this sense, the data collected by the DPP are used to support a design framework about public space, training it to the specific cultural dimension of Singapore.

### 6. Limitations and future directions

In terms of results the exercise might be considered successful because it managed to achieve exactly the goals:

- To set an online digital exercise able to educate on a sensible upcoming urban redevelopment. The combination of the guidelines and the compulsory elements, together with the decision of dealing with 3D elements, which helped non-expert to engage with urban design, managed to maintain an education power, even if the exercises were online with no mediator. The results which showed specific trends responding directly to the guidelines, support this conclusion.
- To set an online digital exercise able to produce data. In this sense the data produced is useful and relevant for urban design because it manages to: a) identify design trends and people's expectation; b) inform models to evaluate existing and future design.

Some limitations should be retraced in the low click-through rate, which stands for a failure in term of reachability. Those effects might depend from different aspects: insufficient outreach with social media, interface design, interface experience. There may also be a cultural bias: people in Singapore are less used (and willing) to participate. Future publications will deal more specifically with all of those aspects. In this context, it is important to notice how, the exercise proposed in this paper must be considered as one iteration: the interface design and experience, after users and experts feedback, has already a new proposal, which will be implemented in future participation campaigns.

Regarding the exercise design, it is necessary to outline almost an opposite direction: while the use of the exercises to collect data or to educate people, requires necessary steps, like the presence of guidelines, questionnaires, instructions and legends with image references, the low click-through rate suggests to cut out some steps, or simplify the process. This could represent one axis in which to position the exercise design. In both exercises, we decided to rank quite high in the 'informing' dimension, but probably did not invest enough in 'users

experience'. Future iterations should improve the 'users experience' in particular in those exercises, which do not have strictly an education power like "My perfect Public Place". Another important variable of the exercise is the type of dialogue: the tool qua kit allows for a fixed dialogue with users, which easily supports the idea of data collection, but at the same time loses some points in supporting social resources and cohesion, which would be better allowed by an open dialogue, even with different stakeholders. In this sense, the "My perfect neighbourhood" exercise could have achieved more inclusive results, using a different tool. Those considerations set the direction of future research and improvement of the exercise design.

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