

# Digital Commons



## Digital Common(s): The Role of Immersive and Gamification Technologies in Intergenerational Co-design of Public Spaces

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*“Digital Commons is an intergenerational design research project that brings virtual reality (VR) and video gaming technologies to local communities in public housing as design communication tools.”*

### # Digital Inclusivity & Community Engagement

During a series of co-design activities, public actors, designers, and local residents become co-researchers to critically reflect on local public spaces. Participants are empowered with techniques of digital tools that help them to generate shared expressions of spatial needs and develop a mutual understanding of community interests.



### # Intergenerational Design Thinking

While enjoying the fun of video-game, youth and older adults work together to acquire knowledge and skills of how gaming technologies may be developed as a design profession. Concepts of ‘community building’ and ‘placemaking’ are explored to design for socio-economic sustainability.



### # Participatory Outcome & User Experience

The findings and experiences documented in this study demonstrate how 1) 3D interactivity, real-time engagement, and bottom-up perspectives may enhance the potential use of immersive digital twins in cooperative design thinking; 2) a new powerful role of urban designers as facilitator-coordinator of collaborative planning processes; and 3) informants may be taken not merely as passive data subjects, but active contributors in knowledge production by enhancing digital inclusivity - a form of citizen design science.



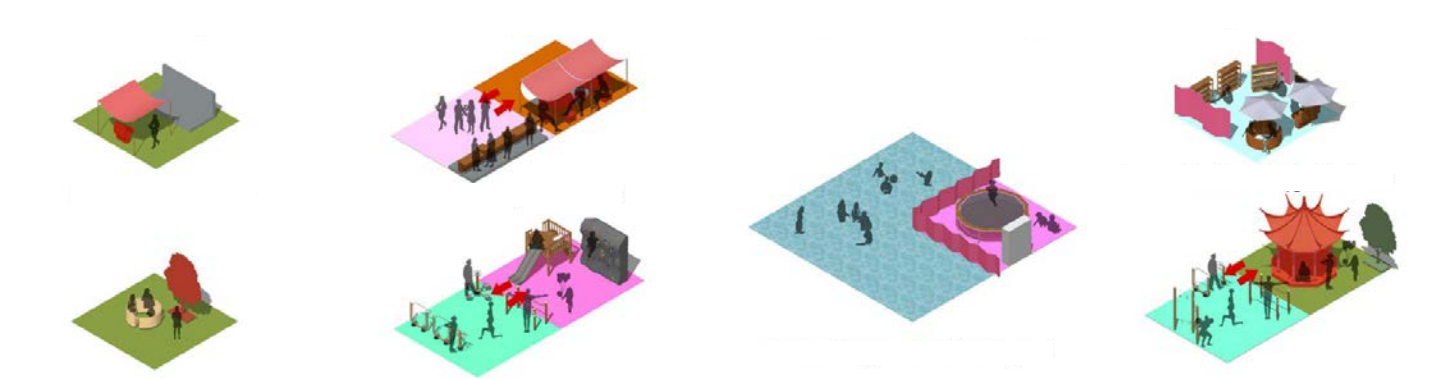
### # Diagonal Communication & Collaboration

The project collaborates with local youth centres and community officers to be implemented on a continuing basis - interdisciplinarily between social workers and designers, intergenerationally amongst youth and older adults.

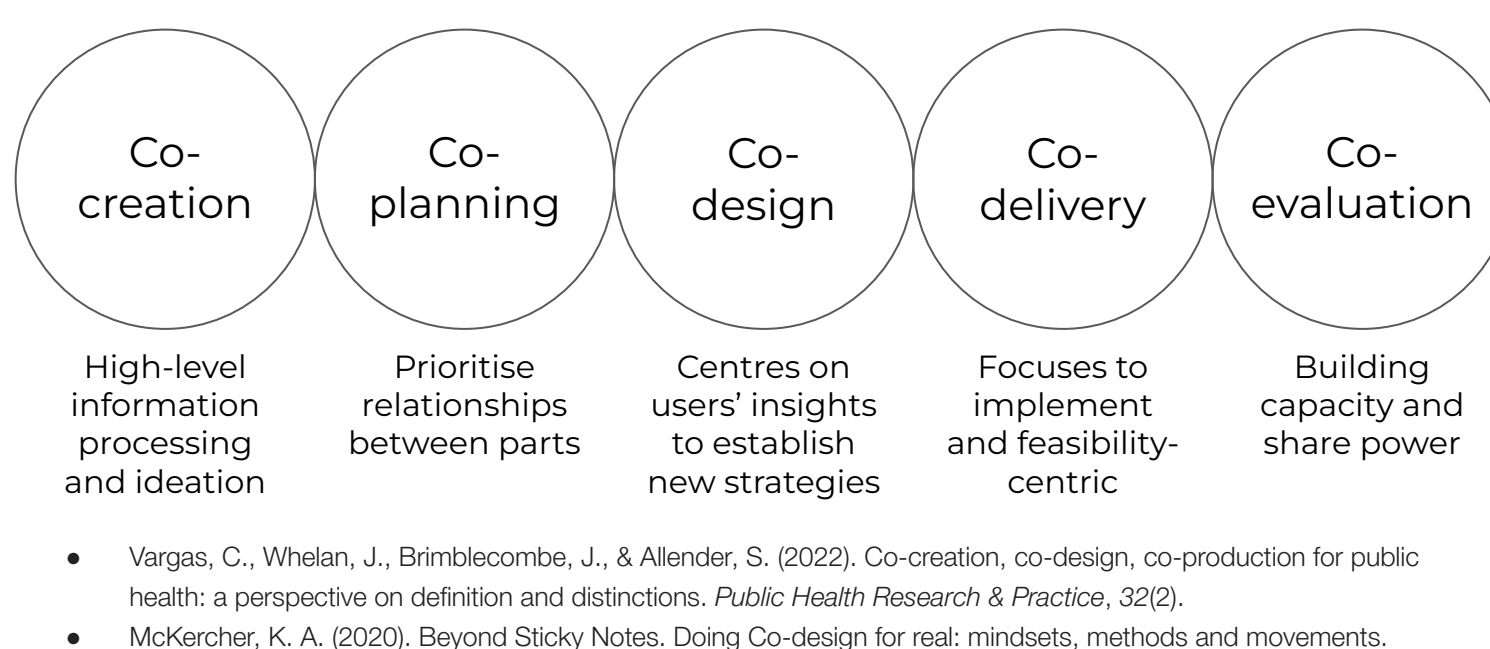


### # Gamification & Virtual Reality (VR)

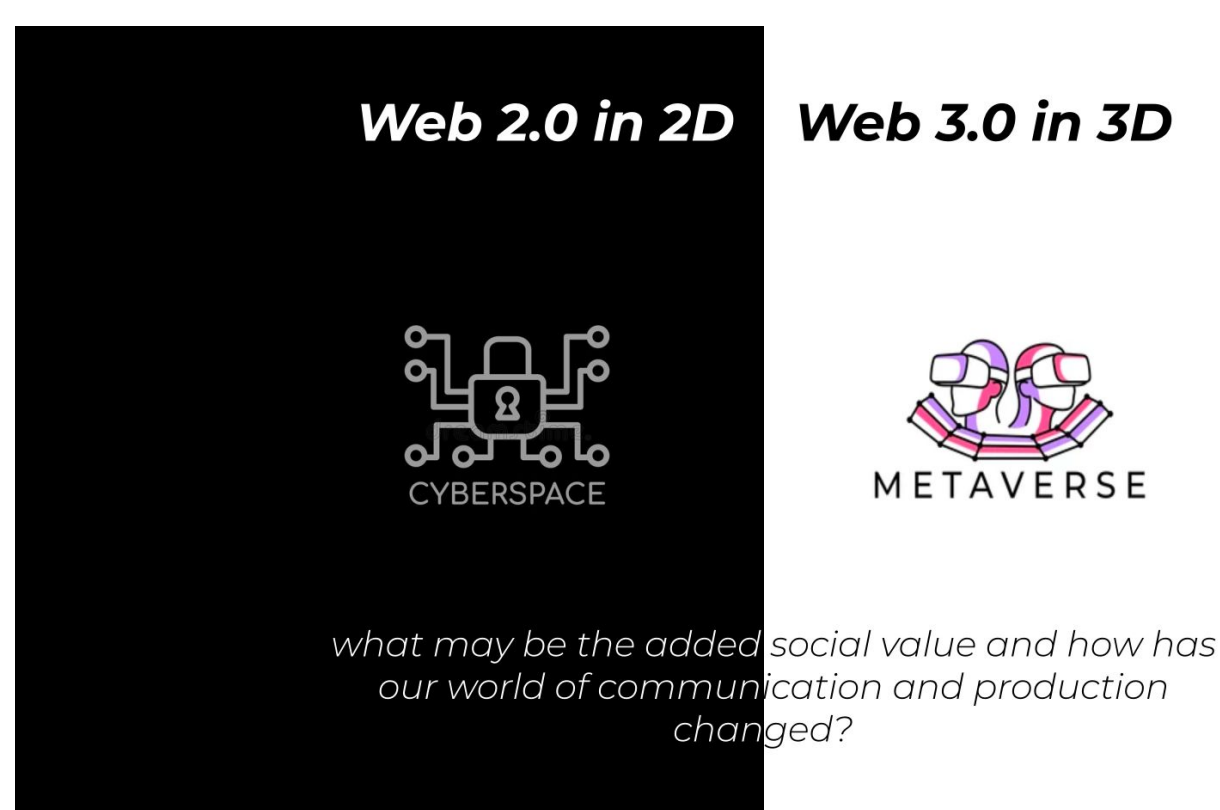
VR tools help participants to orient themselves from users' perspective 3-dimensionally and understand spatial quality more empathetically. Meanwhile, live action role-playing (LARP), peer exercise, and sandbox games help participants to learn and express themselves creatively through the welcoming and interactive environment of gamification.



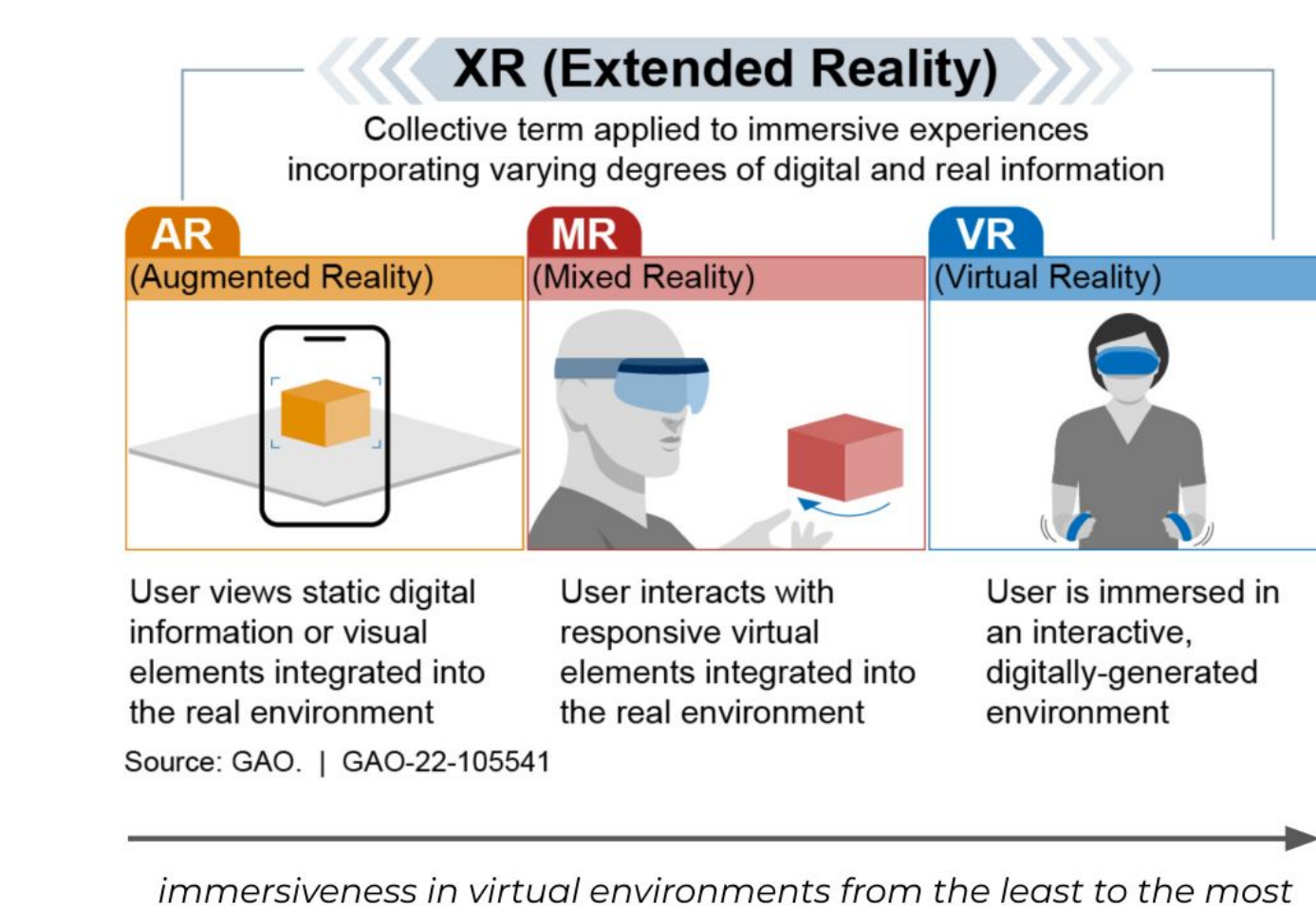
Our research approach is driven by theories of “digital commons” - a notion that democratises control and promotes communication in the datafication of cities (Fuchs, 2021). The technological course of which is increasingly shifted to the use of virtual worlds and 3D gaming tools to generate social capital - a culture of play and seamless media environments, progressively understood as the ‘metaverse’ (Han et al., 2021). The notion may be applied to co-design, posing questions on the collectivisation of spatial authorship and spatial assets.



Co-design is a design method that actively involve different stakeholders in the decision-making process, and centres on users' insight to establish new strategies in improving the final product (Muller & Kuhn, 1993).



Questioning the added social value, this project aims to facilitate the common stewardship of data and information, which are valuable resources in collective decision-making. It tries to enhance digital inclusivity and raise awareness in the conscious use of the technology (UNhabitat, 2021).



The medium of VR stayed largely the same since the late 1980s. The focus is perhaps not so much on the fantasy of the technology itself, but the power of its influence on the social economy, to disrupt traditional client-contractor modes of production. This research experiments with VR to create *immersive digital twins* so as to increase participation of the general public.

Participatory design research combines participatory action research and design research. The latter studies processes of design in developing methods; the former works with informants to understand and improve problems and give agency to the everyday knowledge (Reason & Bradbury, 2008).

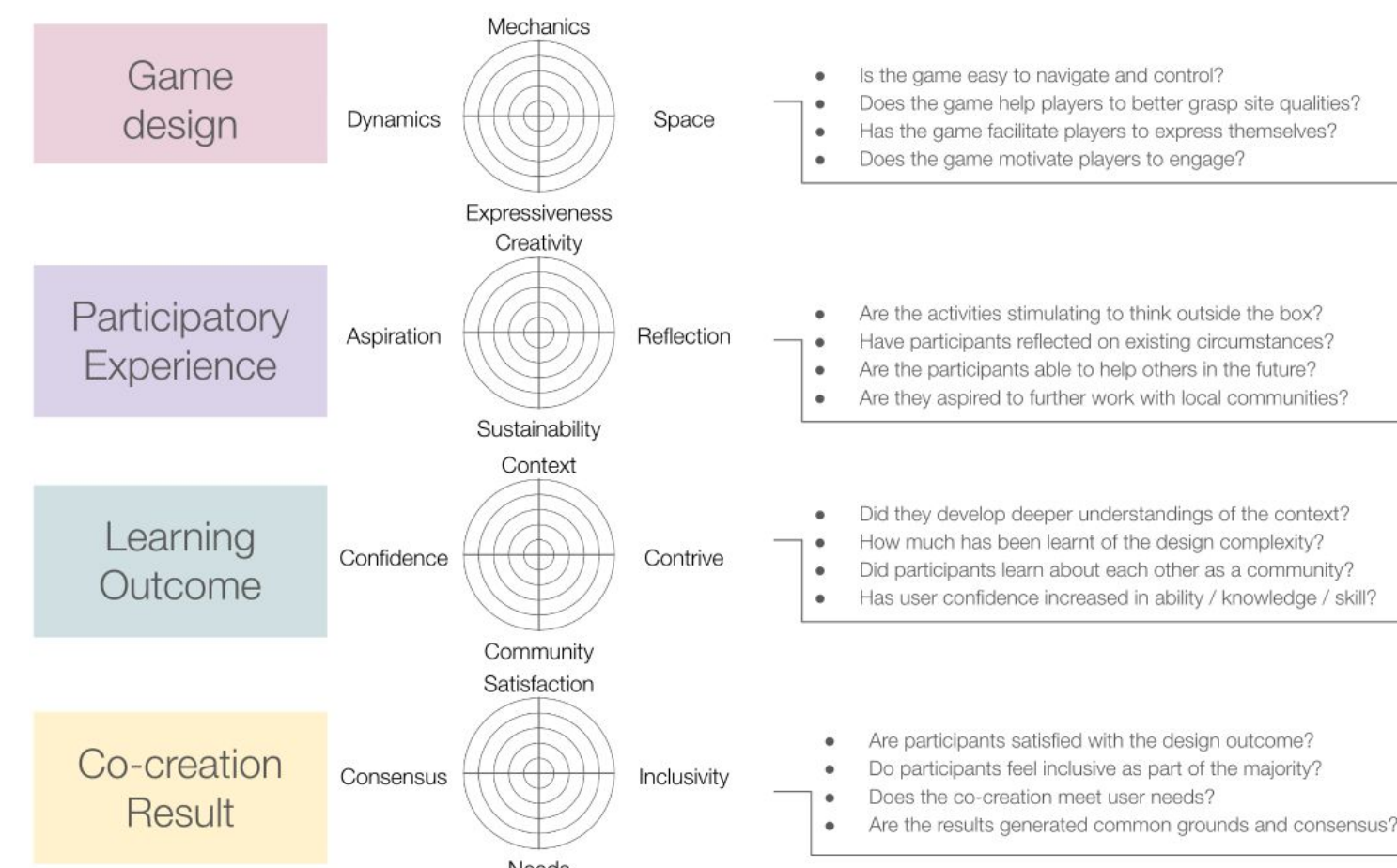


Figure 1. The project is being evaluated with four dimensions and sixteen levels.

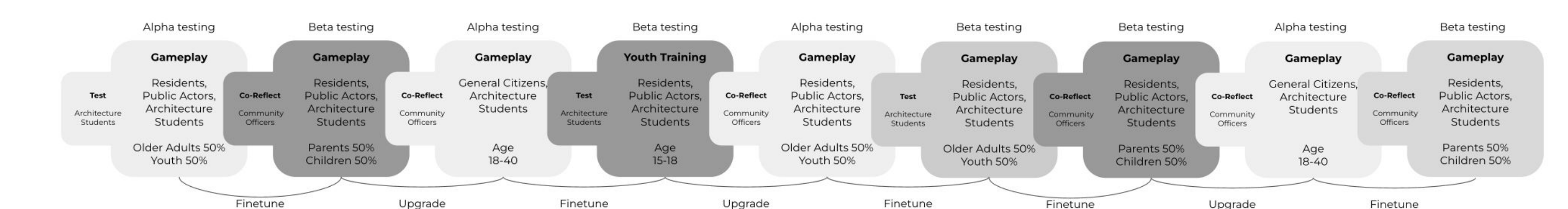


Figure 2. Workshop organisation.

These criteria (figure 1) are being used to design surveys, focus groups, observation logs, and analytical frameworks that collect and analyse quantitative and qualitative data through formal and informal responses. With a uniquely diverse cultural and geographical landscape, how to realise Hong Kong's collective potentials in public space co-design using assistive physical design and analysis tools?

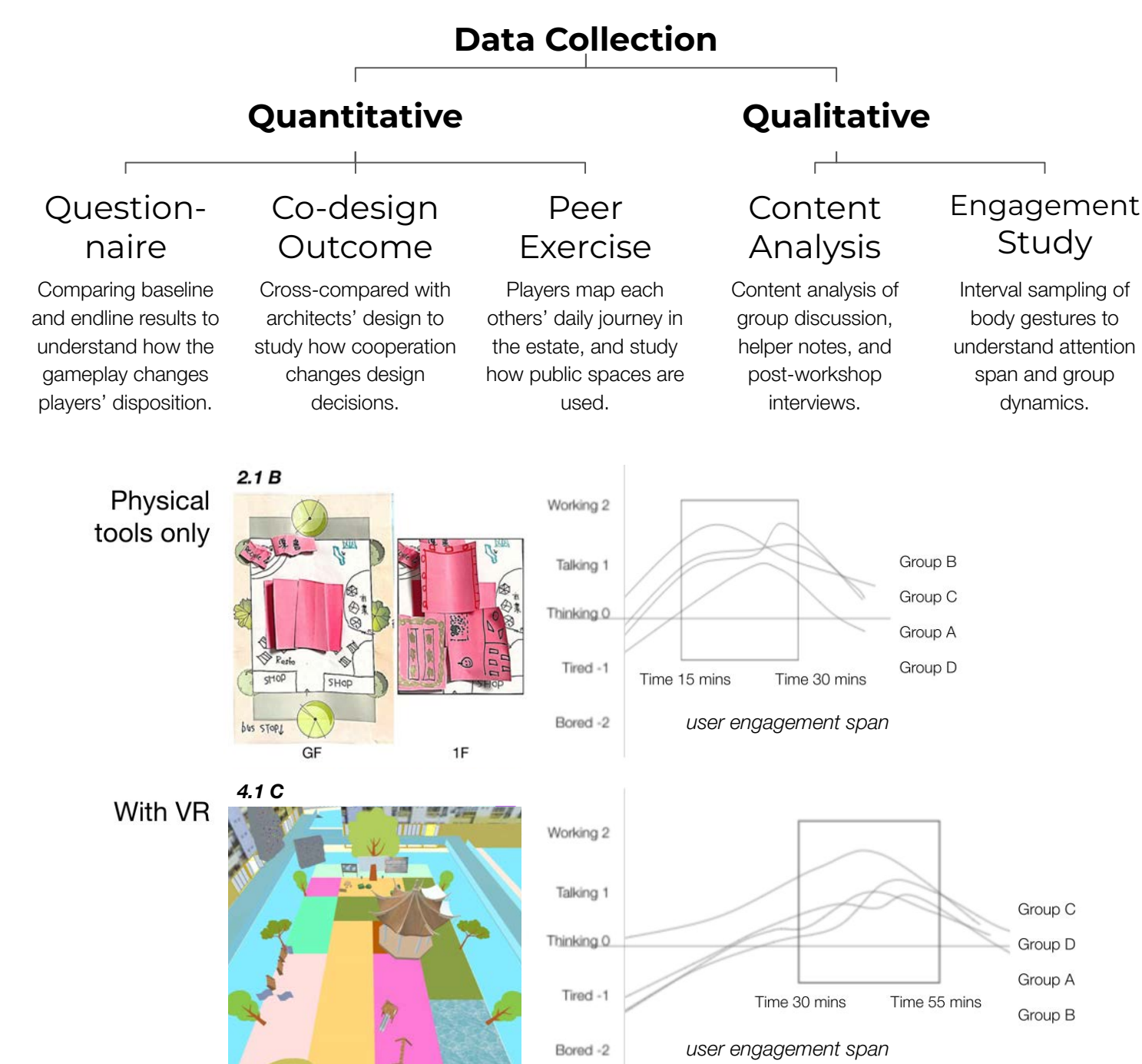


Figure 3. Samples of co-design analysis and user engagement span.

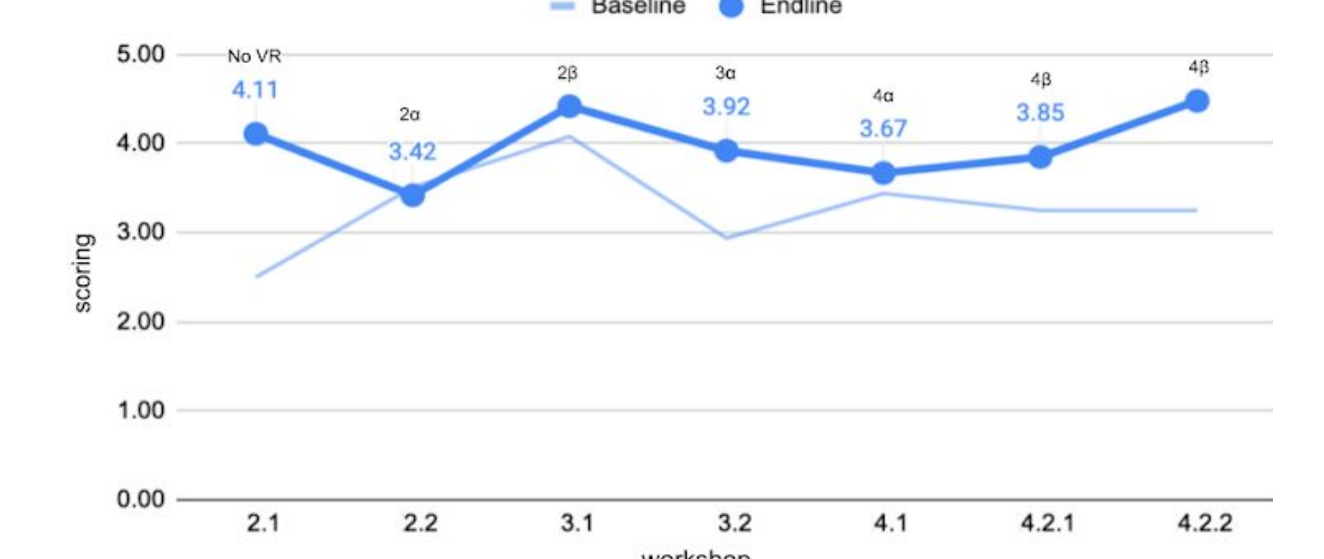


Figure 4. Changes in participants' rating in relation to VR game versions.

Results (figure 3) have shown that, without VR, participants started to fully engage in designing after 15 mins. With VR, participants' attention span was longer, but they also needed twice more time to start engaging and finish the design. This demonstrates how VR tools might be effective, but not necessarily efficient from the user point of view. Nonetheless, it is efficient for the overall planning process, as it relieves the reliance on designers to translate large amounts of textual information into a 3D design, thus, increasing transparency, minimising human error, and streamlining the decision-making process. Overall, the feedback was largely positive (Figure 4), on a scale 1-5, all dimensions scored 3/+, 66.7% scored 4 or above.

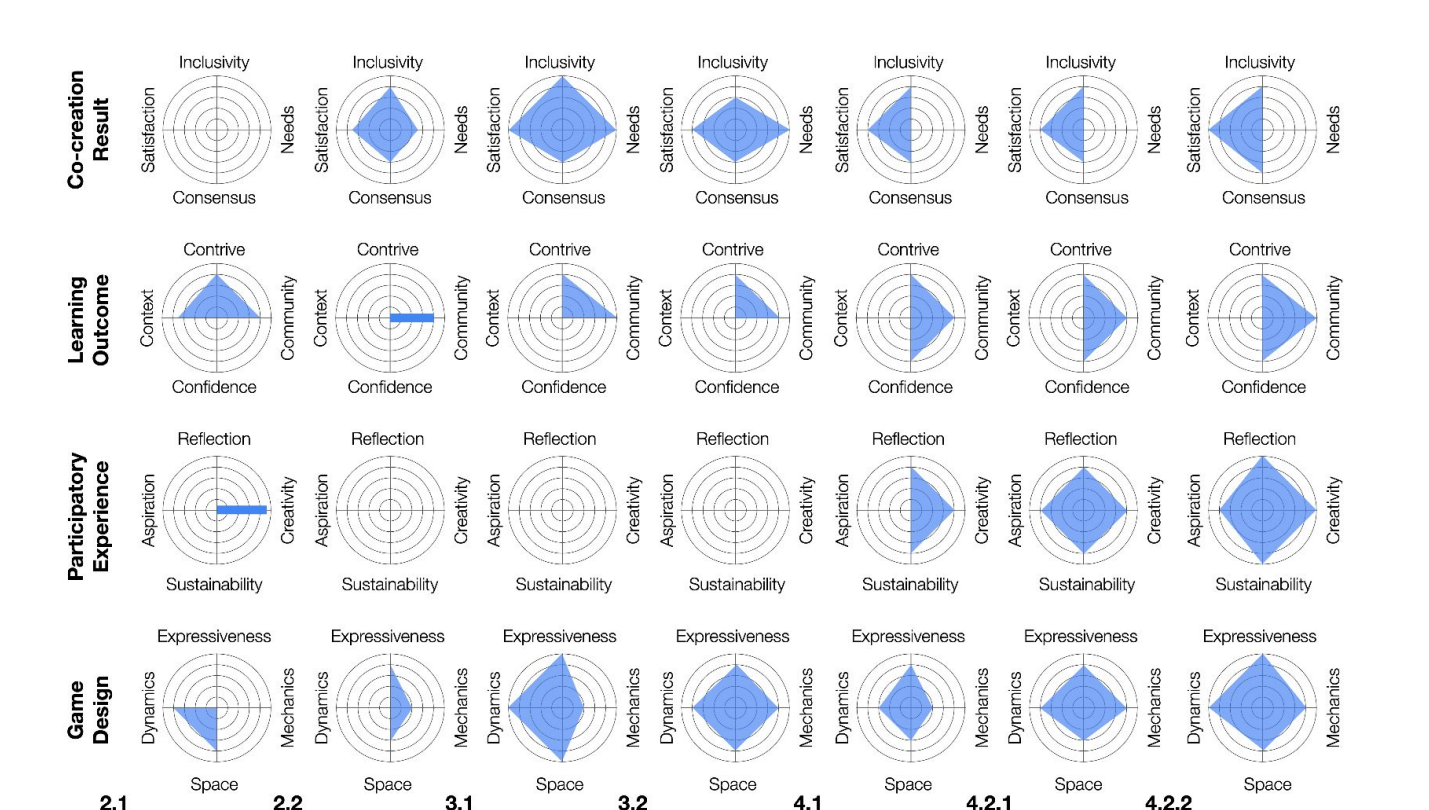


Figure 5. Project evaluation by participants; zero = no data

From the horizontal comparison (figure 5), workshops with a mix of older adult residents generally had higher ratings than workshops with only architecture students. This shows how cooperation between user groups enhances the overall participatory experience. Vertically, all dimensions achieved positive changes in participants' disposition. 'Learning outcomes' had the most significant impact (~30% increase). The lowest performance was 'game design'. Nonetheless, workshops with beta testing of the VR game all had higher endline scoring than those with alpha testing. This means that the troubleshooting and interventions at each phase were successful, and there was an overall increase in gaming performance along all workshops.

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## PROJECT OVERVIEW

## BACKGROUND & GOALS

## METHODS

## FINDINGS



Special  
Thanks

中大  
School of Architecture  
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Graduate School

I-CARE Centre  
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社區發展主任  
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香港中文大學圖書館  
CUHK Library

Learning Garden  
& MakerSpace

All helpers,  
volunteers, and  
participants