

# Participatory Design of Community Spaces using Virtual Reality

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# Participatory Design of Community Spaces using Virtual Reality

THIS IS A VIDEO CLIP

Please watch it in [Annex A - PDVR Intro Video.mp4](#)



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# Participatory Design in HDB



## CHALLENGES IN EXPERIENCE

- × Not all Residents can read plans, nor visualise outcomes
- × Few Residents can draw
- × Plans fail to convey sense of scale, space, and constraints

## CHALLENGES IN OPERATION

- × Consultants are needed to interpret feedback, and craft proposed designs
- × 2-3 Months between Ideation and Validation



## Remaking Our Heartlands Toa Payoh



*co-designing existing spaces to  
give them a new lease of life*

# Remaking Our Heartlands

## Woodlands



## HDB Build-a-thon MacPherson Spring



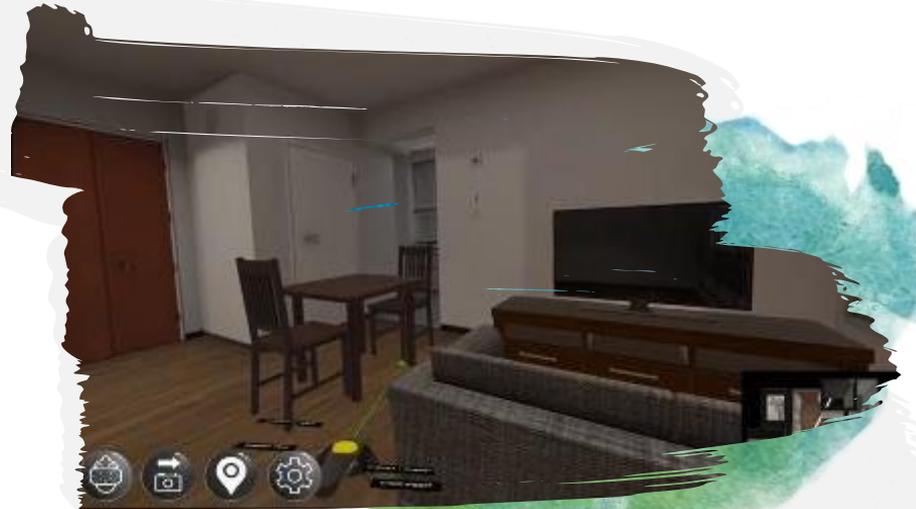
*providing residents a rapid  
prototyping tool*



## MyNiceHome Roadshows MacPherson Spring



*helping residents visualize the  
BTO flat they purchased*



# MyNiceHome Roadshows

West Quarry



## SERS Engagement MacPherson



*helping residents visualize and  
choose proposed BTO designs*

# Key Outcomes

## 2-3 Months

Shorter Engagement Process



## >90%

Residents' Satisfaction



# Learning Points on Public Engagements with VR

## Application

Things to consider in the VR Application Design

## People

Ways to better handle users

## Operations

Deployment considerations for smooth delivery

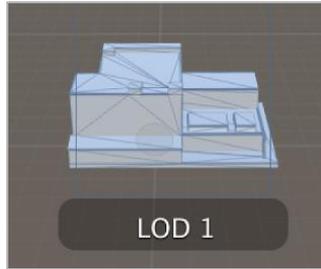


# Learning Points on Public Engagements with VR

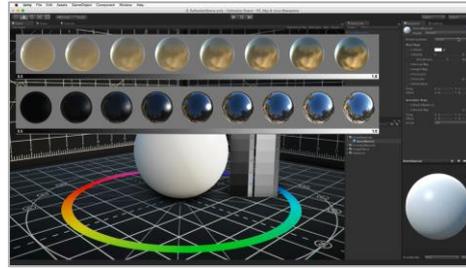
**Application** | Things to consider for the VR Application Design

1

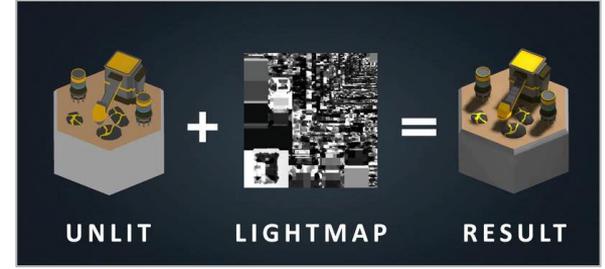
## Maintain Healthy Frame Rate



★ Level of Detail (LOD) Modelling



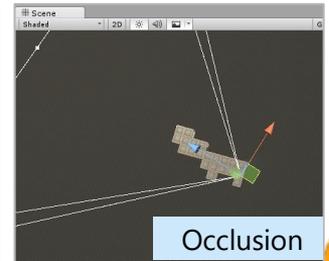
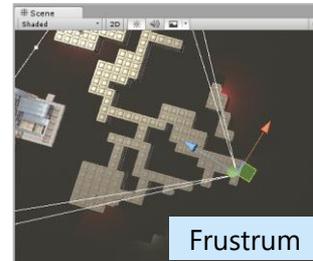
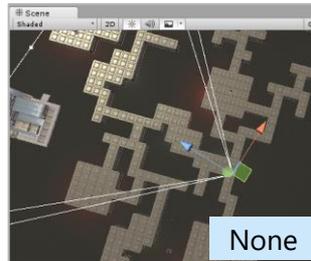
★ Lightweight Shaders



★ Baked Lighting



★ Use Texture Atlases



★ Leveraging on Frustum and Occlusion Culling

# Learning Points on Public Engagements with VR

## Application | Things to consider for the VR Application Design

### 1 Maintain Healthy Frame Rate

- ★ Level of Detail (LOD) Modelling
- ★ Lightweight Shaders
- ★ Baked Lighting
- ★ Use Texture Atlases
- ★ Leveraging Frustrum Culling
- ★ Using Occlusion Culling

### 2 Camera Smoothing for External Viewers on Secondary Screen



### 3 Simplify User Controls, Design for Self-Help, Build-in Backend Controls

- ★ Integrate tooltips / tutorial in-app
- ★ Ensure VR experience can be user-controlled, or handler-controlled



# Learning Points on Public Engagements with VR

**People** | Ways to better handle users

- 1 Walk Through the Controls Before Putting on the Headset**



- 2 Make Sure the Guide can See What User is Seeing**

# Learning Points on Public Engagements with VR

**People** | Ways to better handle users

3

## Broadcast the Experience to a Wider Audience via a Secondary Screen

- ★ Extension of reach in engagement
- ★ Entertainment for waiting participants



# Learning Points on Public Engagements with VR

## Operations | Deployment considerations for smooth delivery



### 2 Choose the Right VR Delivery Platform

- ★ Tethered VR Solution for Interaction
- ★ Mobile VR Solution for Viewing



### 1 Choose Well-Shielded Locations

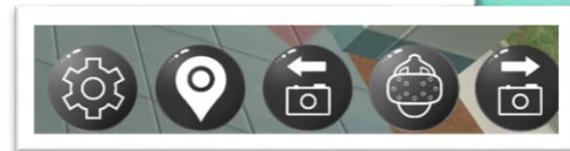
- ★ Cordon off play space where possible
- ★ Avoid spots with sunlight penetration / possibility of rain
- ★ Avoid spots with heavy AV equipment

### 3 Explain in the Queue to Decrease Turnaround Time

- ★ 2 guides per station – 1 to explain to the current user, 1 to explain to the next-in-line

### 4 Handler to Navigate for Users Preferring Lower Interaction

- ★ If user faces difficulty in using the VR UI, handler to take over navigation (via control panel)





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**Thank You**

Questions are welcome

Special thanks to **Nanyang Polytechnic – School of Interactive & Digital Media**  
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**NYP** **NANYANG**  
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