

Bringing Virtual Reality into the property classroom

30 November 2018
ERES Education Seminar

Dr Michael Rehm
Prof Deborah Levy
Dr Olga Filippova
DEPARTMENT OF PROPERTY

- Potential benefits of VR – your thoughts?
- AACSB report
- What we are doing at University of Auckland
 - Media interview
 - How we went about it and why it happened?
 - Google cardboard
 - Capturing and editing content
 - Publishing on line
 - Examples
 - Having a play...
- Discussion and your thoughts going forward

Potential benefits of utilising Virtual Reality in education?

Go to www.menti.com and use
code 36 85 72

- Inspire creative learning
- Delivery not possible in real world (dangerous, expensive, impossible)
- Help understanding complex subjects
- Complementary Learning tool for complex subjects
- Increase student motivation
- Foster social integration
- Encourage active learning
- New opportunities for assessment
- Benefit different learning styles
- New opportunities for recruitment
- New options for distance learners
- Immersion of students in social and cultural events
- Virtual attendance at events

Media interview

<https://i.stuff.co.nz/business/property/106166157/vr-heads-into-the-classroom-for-property-students>

- **Virtual reality: abstract/real bridge**
 - Currently VR applications in property are mainly directed at marketing existing properties and those yet to be built



VR: The Technology

- **Virtual reality: abstract/real bridge**
 - 360 degree panoramas and videos viewed with a VR headset (Oculus, Google Cardboard...) creates an immersive experience where users feel that they are inside the actual space
 - Consumer-level 360 cameras and smart phone delivery presents some quality bottlenecks



INSTA
360 PRO



RICOH
THETA V

Consumer-level
4K 360 video/panos →

Professional-level →
8K 360 video/panos

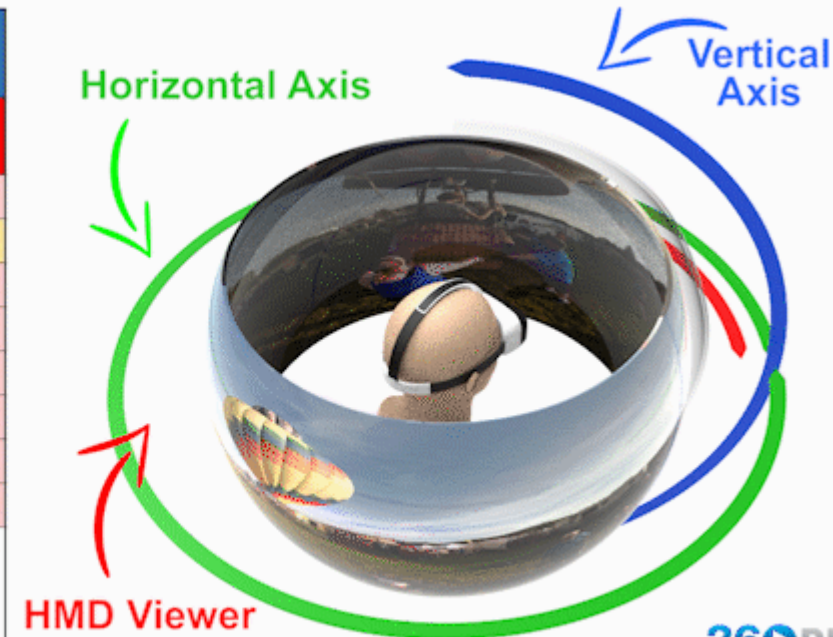
16K 360 required for →
'Real' 20/20 Vision



PANONO

Why 360 Video Output Resolution Matters		
Horizontal Axis	Vertical Axis	HMD Viewer
2,000	1,000	500
4,000	2,000	1,000
6,000	3,000	1,500
8,000	4,000	2,000
10,000	5,000	2,500
12,000	6,000	3,000
14,000	7,000	3,500
16,000	8,000	4,000

360Rize 360 Video Gear starts at 2,000 pixels and goes as high as 16,000 x 8,000 pixels which can provide true 4K HMD viewing



P NEVER STOP NEVER EXPERIENCING

DEPARTMENT OF PROPERTY VR TEACHING INITIATIVE

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**TUESDAY, 31 JULY 2018
VIRTUAL REALITY TEACHING INITIATIVE LAUNCH
DR MICHAEL REHM**

INITIAL MEETING TO DISCUSS VIRTUAL REALITY (MARCH 2018)



DR SCOTT DIENER
Associate Director,
IT Services



DR OLGA FILIPPOVA



PROF DEBORAH LEVY



DR MICHAEL REHM

DEPARTMENT OF PROPERTY



NICK YOUNG
PhD Student

Centre for eResearch
Data Visualisation Facility

LAB VISIT (APRIL 2018)

**LOW-COST GOOGLE CARDBOARD
VR HEADSETS ENABLE
EACH STUDENT TO EXPERIENCE
VIRTUAL REALITY AND DIRECTLY
BENEFIT FROM THE TECHNOLOGY**



PROPOSAL WRITTEN AND PRESENTED TO THE DEAN (MAY 2018)

Proposed use of VR in the Bachelor of Property

This brief proposal outlines multiple applications of Virtual Reality (VR) in the Department of Property's undergraduate courses. The specific courses taking part in the department's inaugural VR initiatives are PROPERTY 102 (Introduction to Property), PROPERTY 221 (Property Marketing), PROPERTY 281 (Building Construction) and PROPERTY 370 (Building Surveying). This proposal outlines how property students would be initially introduced to the concept of VR, the use of the technology in the discipline and will be given their own low-cost VR headset. Within the BProp programme the students will encounter VR multiple times in a range of teaching applications such as virtual student field trips, in-class assessments and take-home assignments.

The proposal explains the hardware and software requirements for VR, the use of outside VR experts for filming and producing VR content and the possibility of doing some of the less complex work in-house. Lastly, a proposed budget is presented that aligns with the suggested path forward to realising the department's VR teaching initiatives.

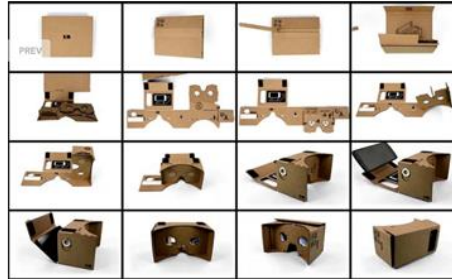
INITIAL INTRODUCTION OF VR TO PROPERTY STUDENTS

Initial exposure to VR will be made in PROPERTY 102 (Introduction to Property) when discussing the valuation of residential property. One concept discussed relates to how externalities, such as appreciable views (ocean/lake, skyline, mountains, etc), can influence a home's value. During an in-class session students will use VR to experience a professionally produced marketing campaign for a New York high-rise apartment development that includes VR walkthroughs of planned apartments. The below screenshot is made from an iPhone of the suggested example that is freely available online. This shows the stereoscopic image that would be projected within the VR headset.

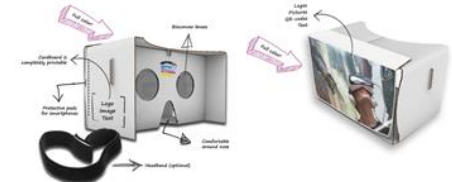


The preceding image is generated from the following webpage, <http://storage.net-fs.com/hosting/2722323/5/index.htm>, which can be viewed on a PC or on a smart phone using the VR view captured above. This particular 360 degree tour of a NYC apartment is an example of a 360 degree panoramic image, comprising several photographs stitched together using specialty software, with interactive features added with the same software.

The proposed VR headset for students to interact with the above example and all other proposed VR teaching elements is Google Cardboard v1, a slightly older model but one that is now at a bulk price point (\$3 each) where it can be given away to students. There are two options to distribute the headsets in-class. One option is to distribute flat pack DIY sets and have students assemble them in-class, which takes less than 1 minute (see the below graphic).



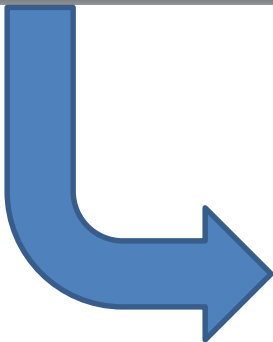
The alternative is to have paid students (e.g. TAs) pre-assemble the units and add low-cost branding (e.g. UoA Business School) by placing one or more stickers onto the generic units. The below graphic is from a website that sells generic headsets and offers such a low-cost branding service. It is also possible of having the students themselves add the branding stickers to the units while assembling them in-class.



A third and final possibility is to bulk order printed, branded units that will arrive in flat packs with the students assembling the pre-branded units in-class. Below is an example of a bulk ordered, pre-branded Google Cardboard headset.



The range of cost per unit is approximately \$6 for an unbranded Google Cardboard v1 to \$30 for a fully branded newer, better quality headset. When purchased in bulk (over 150) the unbranded, older units come down to only \$3 per unit. No quotes have been sought for bulk pricing of branded, newer units but this would likely be around \$15 per unit.



JAYNE GODFREY

Dean, University of Auckland Business School



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WHAT IS GOOGLE CARDBOARD?

WHAT IS GOOGLE CARDBOARD?



Cardboard

[Get Cardboard](#)

[Apps](#)

[Developers](#)

[Manufacturers](#)

[More from Google VR](#) ▾

Google Cardboard

Experience virtual reality in a simple, fun, and affordable way.



Gateway Drugs:
How Does Addiction Start?



GOOGLE CARDBOARD PLANS AND SPECS SHARED TO WORLD FOR FREE

GOOGLE CARDBOARD HEADSETS
FEATURE A CONDUCTIVE BUTTON
THAT TAPS THE PHONE'S SCREEN

APPS DESIGNED FOR CARDBOARD
OFFER A DEGREE OF INTERACTION
WITHOUT THE NEED FOR REMOTE
CONTROLS, ETC.

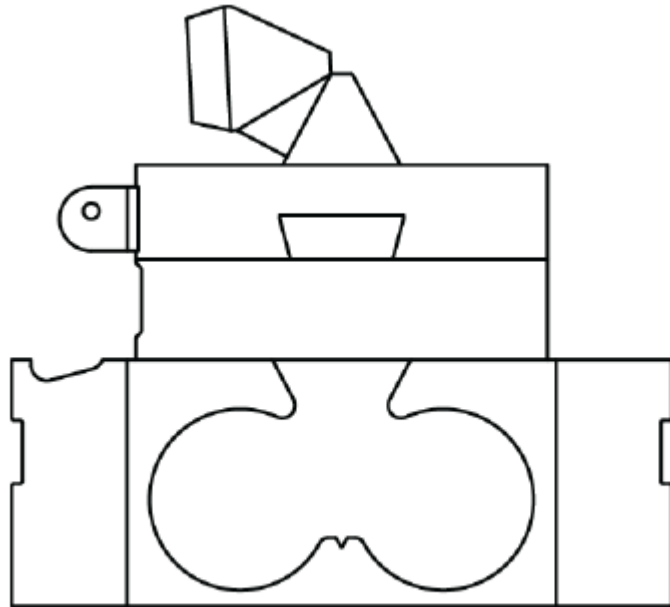
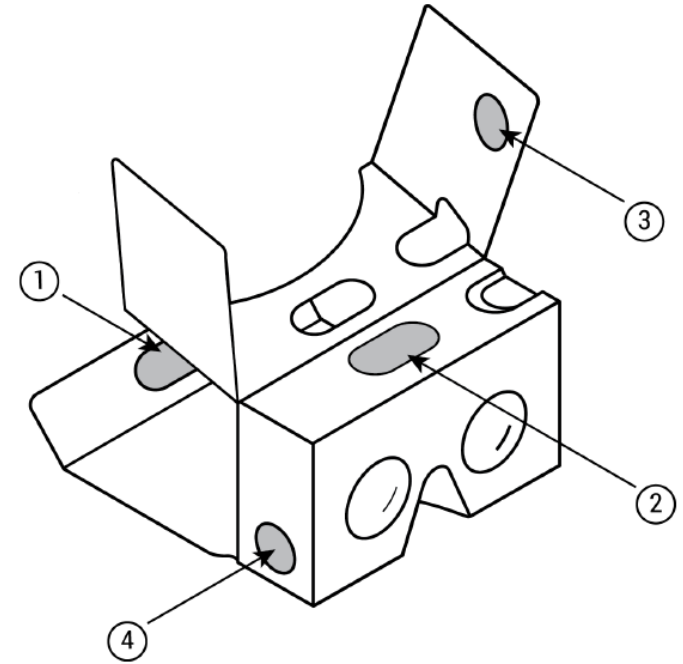


Figure 4. Cardboard mechanical body: "button" part.

**GOOGLE CARDBOARD HEADSETS
RELY ON FRICTION TO HOLD PHONE
IN PLACE AND NOT FALL OUT**

**BE CAREFUL WHEN USING YOUR
HEADSET AS SUDDEN HEAD
MOVEMENTS CAN POTENTIALLY
EJECT & DAMAGE YOUR PHONE!**

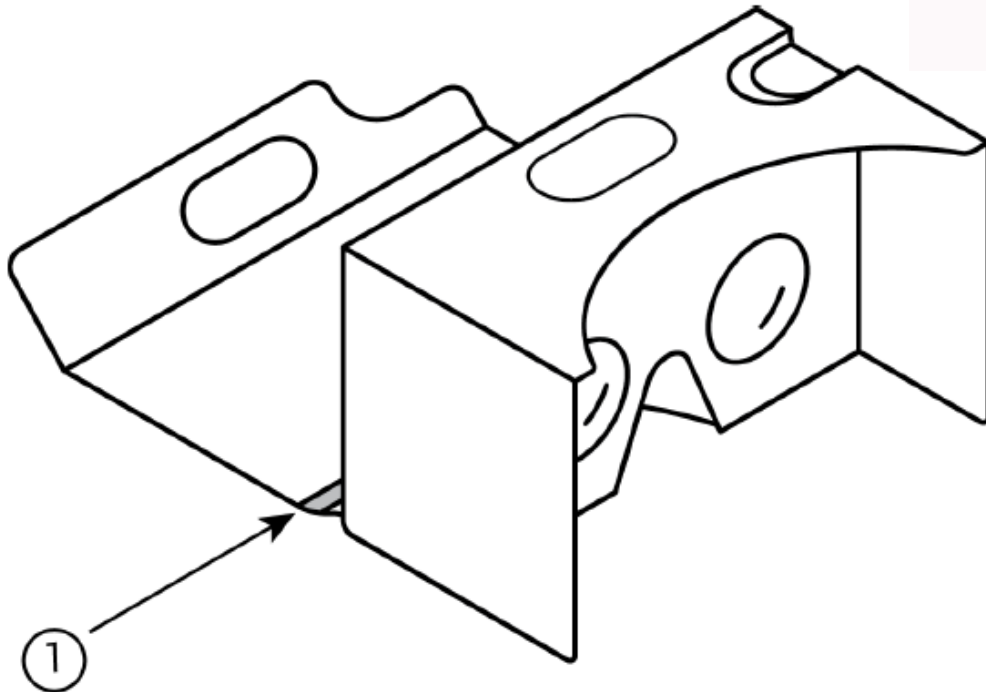


Figure 9. (1) - rubber band location on Google Cardboard

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CAPTURING & EDITING VR TEACHING CONTENT



**GOPRO FUSION
360° CAMERA**



**EYE HEIGHT
POINT-OF-VIEW**

**MIC STAND
AS TRIPOD**



**SMALL
FOOTPRINT**

iRIG LAPEL MIC FOR iPHONES



HARDWARE USED TO CAPTURE 360 VIDEO AND PANOS



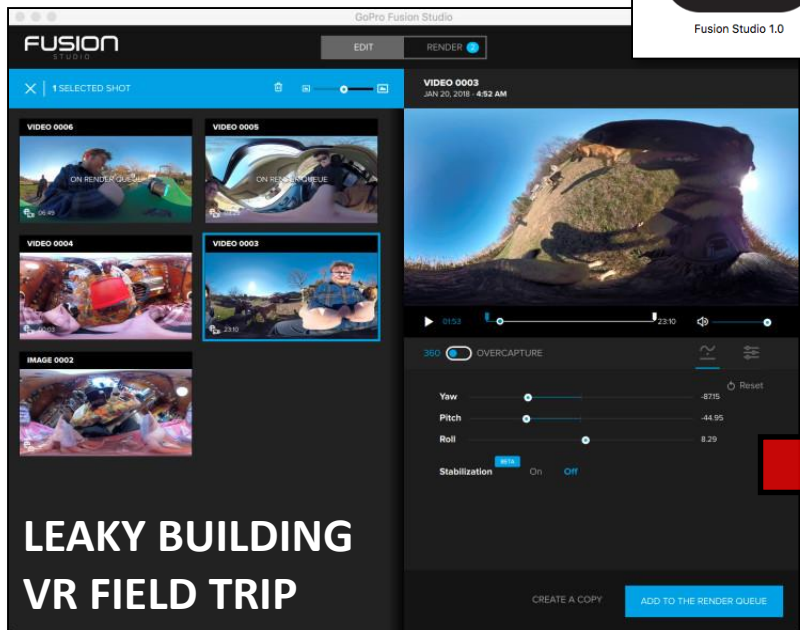
FRONT 180° FISHEYE IMAGE



Fusion Studio 1.0



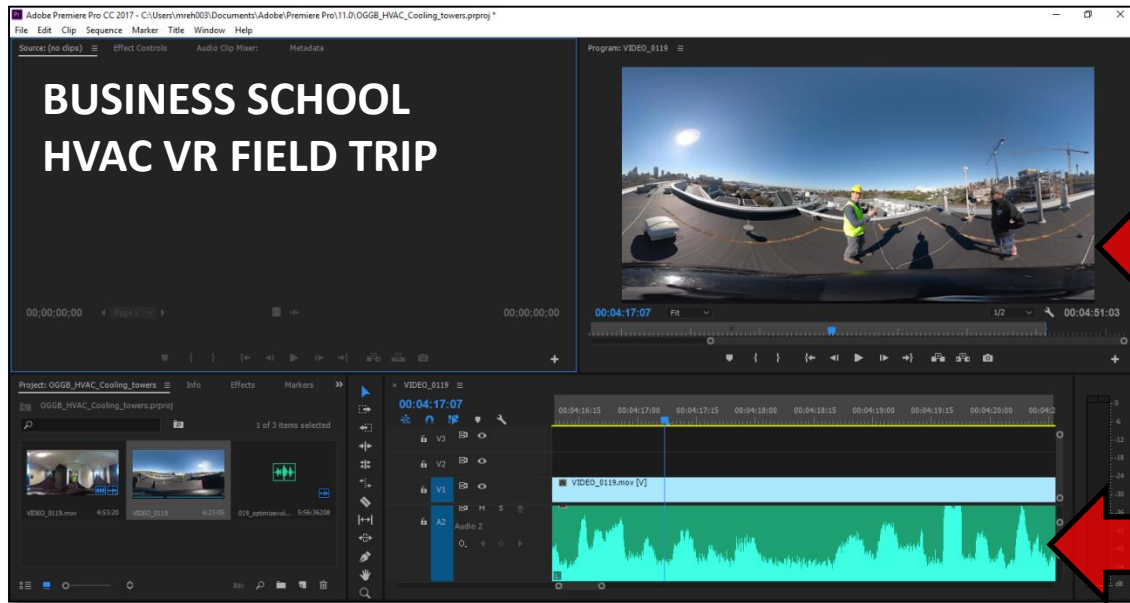
BACK 180° FISHEYE IMAGE



**LEAKY BUILDING
VR FIELD TRIP**



360° EQUIRECTANGULAR IMAGE/VIDEO



**360° VIDEOS REQUIRE
MORE EDITING**

**CUT OUT PORTIONS (BEG/END)
AND RENDER INTO
COMPATIBLE VIDEO FORMAT**

**SYNC LAV MIC AUDIO AND
MUTE FUSION'S AUDIO FEED**



**GOPRO ADD-
ON ALLOWS
VR VIEW
WHILE
EDITING**



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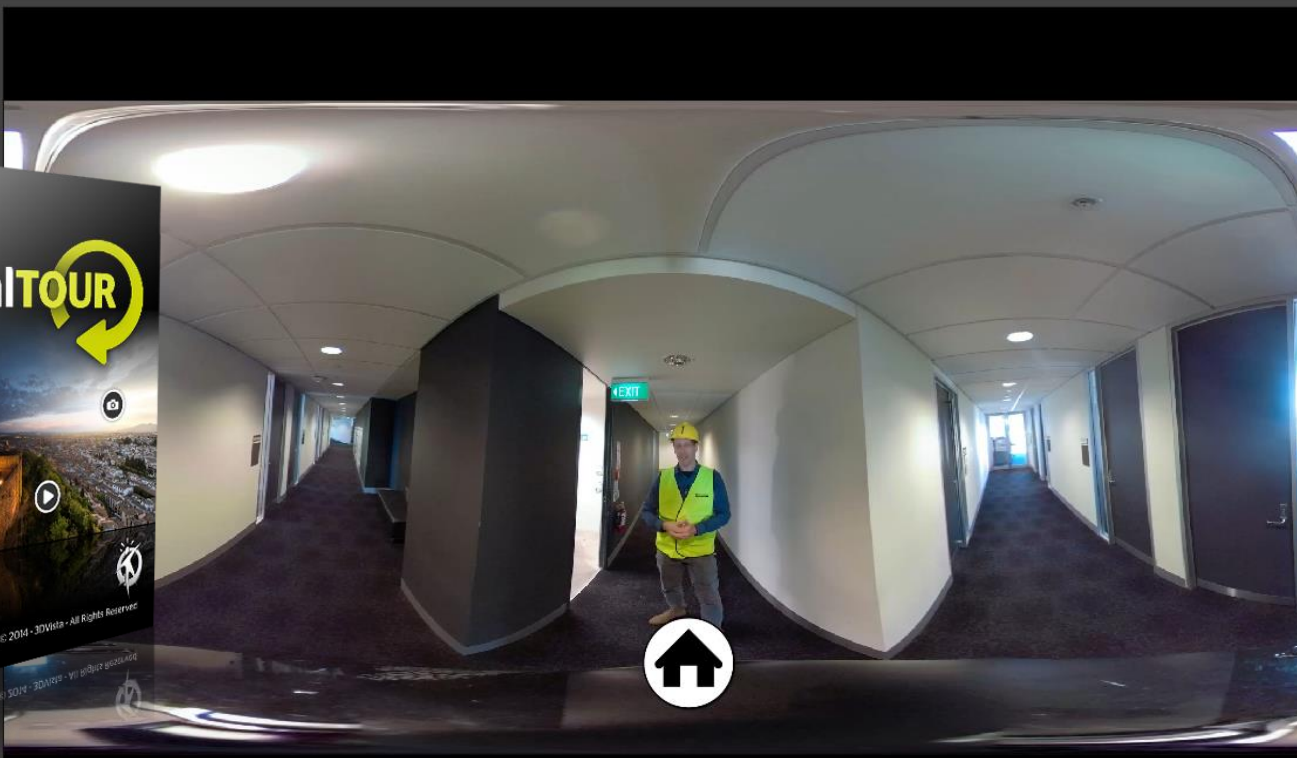
PUBLISHING VR TEACHING CONTENT ONLINE



File Project Options Help

My Tours Skin Panoramas Photo Albums Videos 360 Videos Floor Plans Publish

List Settings Start Hotspots Caps



Hotspots

Image

Add 360 Video

Select a hotspot format on the top right and click

Publish - Select one or several options



For Web

Perfect for sharing online. Select this format if you want to upload your virtual tour to your own server and share it with a link. The program will create a folder with all the necessary content inside. Just upload this folder to your server using an ftp program.



As Standalone Player

Ideal for sharing offline and carrying it on a pen or hard drive. It is one single file that contains everything necessary to run the virtual tour on any PC or Mac. No Internet connection needed. Just open and start using it.



To 3DVista Hosting Service

No need to know anything about servers or how to upload something to the internet. With just one click, your tour will be stored online and you will right away obtain a link that you can share or post on any web or social network. Fast, easy, reliable.

☐ Apply Compression in Windows

Change Splash

Login

Preview

Publish

**3D VISTA VT PRO
ALLOWS USERS TO
HOST VR CONTENT ON
OWN WEB SERVER –
CRITICAL FOR LARGE
360 VIDEO PROJECTS**

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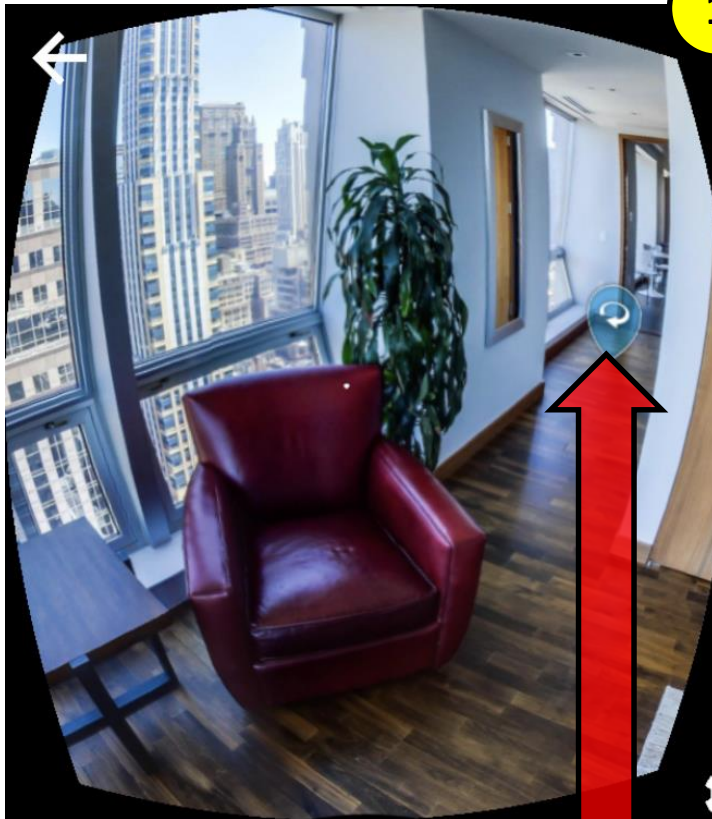
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LET'S HAVE A PLAY WITH VIRTUAL REALITY



1

DISABLE YOUR PHONE'S
ROTATION LOCK &
ORIENT TO LANDSCAPE



2



CLICK ON THE
VR MODE ICON
(WILL ONLY APPEAR
IF YOU HAVE A
VR-CAPABLE DEVICE)

SMALL WHITE
DOT AT FOCAL
POINT OF VIEW
ENABLES USER
TO INTERACT
WITH OBJECTS

4

PLACE FOCAL POINT ON AN
OBJECT TO DISPLAY LABEL AND
FORCE ACTION (E.G. TELEPORT)



3

ONCE IN STEREOSCOPIC VR MODE,
PLACE PHONE IN VR HEADSET

LINKS TO EXAMPLE VR TEACHING CONTENT

PROPERTY 370 (Building Surveying)

360 Degree Panoramas (virtual tour)

In-class VR commercial lease space conditions survey

Link to 'unaffected' example commercial lease space:

<http://video.com.auckland.ac.nz/VR/PROP370VR/>

Link to 'affected' example commercial lease space:

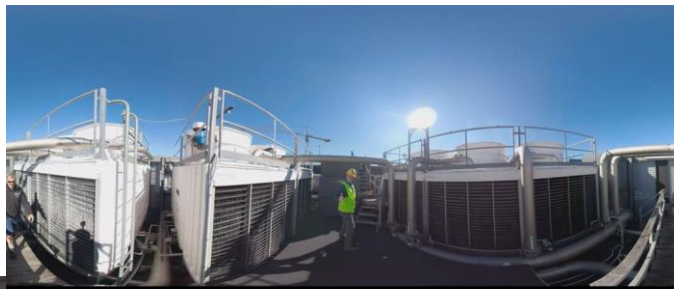
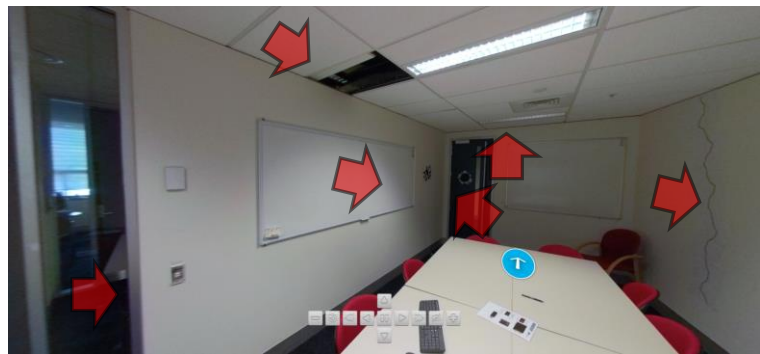
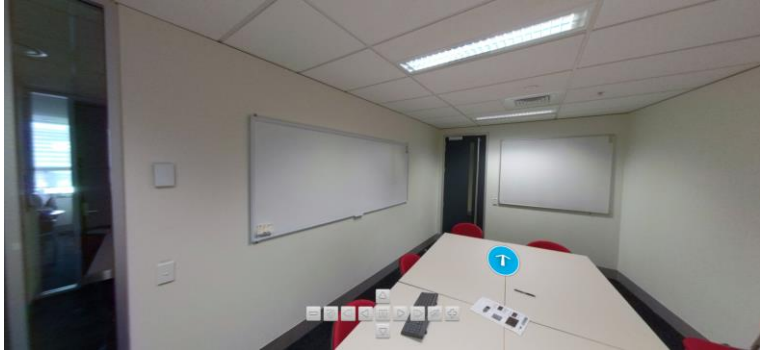
<http://video.com.auckland.ac.nz/VR/PROP370VRTEST/>

PROPERTY 281 (Building Construction)

360 Degree Videos

Link to VR field trip of Business School's HVAC system:

<https://www.bauing.uni-kl.de/ioe/eres/vr>



▶ COOLING TOWERS



▶ CHILLERS



▶ FAN ROOM

Other Links

Link to OGGB VR scavenger hunt game with PROP 102 students to get them used to using the google cardboard

http://video.com.auckland.ac.nz/VR/OGGB_VR_Game_v2/

Link to NYC apartment VR example

<http://storage.net-fs.com/hosting/2727323/5/index.htm>

Summing Up

Opportunities of utilising Virtual Reality in education?

Eamonn's question of the day

What are the key skills of real estate professionals of tomorrow?

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