Introducing Virtual Reality (VR) Techniques into the Learning and Teaching of Physical Geography in Hong Kong Secondary Schools SESSION 2

•步驟一:將你手機連接 WIFI NETWORK

•步驟二:下載 YOUTUBE APP



•步驟三:下載 EduventureVR





步驟四:下載以下 VR APPs (未必兼容所有手機)

Google StreetView



Within - VR (Virtual Reality)

(Requires iOS 8 /Android 5)



Google Expeditions

(Requires iOS 8 /Android 4.4)



Centre for Learning Science and Technologies (CLST) The Chinese University of Hong Kong



Discovery VR (Requires iOS 9.1 /Android 4.2)



Google Cardboard



步驟五:下載以下 AR APPs

1600 By White House Historical Association

Quiver - 3D Coloring App

Aurasma APP

Centre for Learning Science and Technologies (CLST) The Chinese University of Hong Kong









Introducing Virtual Reality (VR) Techniques into the Learning and Teaching of Physical Geography in Hong Kong Secondary Schools



Centre for Learning Sciences and Technologies The Chinese University of Hong Kong http://clst.fed.cuhk.edu.hk/





- 姓名: 文可為 MAN HO WAI · WALLACE BSSc. (HON.) / PGDE (DIST.)/ MEd, CUHK
- 借調: 香港教育局資訊科技教育組 行政長官卓越教育獎秘書處
- 專研: 網絡探究 WebQuest

資訊素養 Information Literacy 教育遊戲 Game-based Learning 網誌教學 Blog-based Learning 移動學習 Mobile Learning 翻轉教學 Flipped Learning 自主學習 Self-directed Learning



Course Website

- <u>http://137.189.165.154/~moodle/course/view.php?id=17</u>
- Login as a guest
- Guest access 密碼: VR!123



Objectives

This course aims to introduce to teachers basic techniques of developing virtual fieldwork resources via the use of virtual reality (VR) in the learning and teaching of physical geography at both junior and senior secondary levels.

After finishing the course, participants should be able to:

a) master the basic skills in capturing the field environment on 360-Degree video using appropriate tools (including 360-Degree camera);



Objectives

 b) upload the 360-Degree video onto the school's server / website / learning management system ready for downloading to students' VR viewing devices

c) plan and design Geography lessons for implementing virtual fieldwork in classroom environment (including the use of appropriate etools and apps).



- Brief introduction to the theories and a field trip that focuses on capturing 360 videos of actual environment.
- Both technical and pedagogical skills will be addressed.
- Participants are expected to master the basic skills in capturing the field environment on 360-Degree video using appropriate tools (including 360-Degree camera);



- 1. The Role and Importance of Field Trip in the Geography Curriculum
- 2. The Field Trip (in CUHK)
- 3. Discussion of Assignment



- This session focuses on the post-processing of 360 videos and how to design meaningful VR learning experience for Geography lessons
- Several pioneering Apps and platforms will also be discussed intensively.
- For example, the EduVenture-VR Project, based on the EduVenture platform which widely adopted in K-12 of HK, that enables participants to access the resource bank hosted by CUHK.
- Participants thus have the chance of learning and trying out the latest VR technologies.



- 1. Discussion and feedback on assignment
- 2. Introduction to the essential concepts of the VR technologies
- 3. Introduction to post-production software
- 4. Discussion on the techniques of delivering the 360 videos onto an online platform (e.g. YouTube)
- 5. Introduction to apps and software for implementing virtual fieldwork in classroom environment
- 6. Discussion on turning VR materials into Geography learning and teaching activities
- 7. Introduction to alternatives of VR resources
- 8. Conclusion, discussion, and Q&A



1. Discussion and feedback on assignment

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1. Discussion and Feedback on Assignment

- Participants will share and present their homework in groups
- Participants will be given a chance to present in front of the whole class
- •Instructor will provide feedback and solutions to the challenges and obstacles that participants encountered during the development of their homework



1. Discussion and Feedback on Assignment



https://goo.gl/CWeqNu



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2. Introduction to the essential concepts of the VR technologies

Virtual Reality(VR) vs. Augmented Reality (AR) vs. Mixed Reality (MR)





When people grow tired of posting photos and videos on social media, what then? Virtual-Reality posts, according to Mark Zuckerberg. - Facebook

Virtual Reality(VR)

- Virtual reality (VR) : computer technologies that use software to generate the realistic images, sounds and other sensations that replicate a real environment (or create an imaginary setting), and simulate a user's physical presence in this environment.
- VR has been defined as "...a realistic and immersive simulation of a three-dimensional environment, created using interactive software and hardware, and experienced or controlled by movement of the body"^[1] or
- as an "immersive, interactive experience generated by a computer



Virtual Reality VR



Properties of VR

- •VR is immersive
- •VR is about transporting users
- •VR is usually a single user experience





Applications for VR

- •Gaming
- •Video
- Education
- •Theme parks
- •Other (non-entertainment)





Virtual Reality VR ECOSYSTEM



Virtual Reality VR ECOSYSTEM



Virtual Reality VR : Input Devices

GoPro Ball	Kodak PixPro SP360 4k x2	Gear 360	Ricoh Theta 360



Virtual Reality VR : Output Devices



Virtual Reality VR : Controller





Augmented Reality 擴增實境

 Augmented reality (AR) is a live direct or indirect view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory input such as sound, video, graphics.

https://en.wikipedia.org/wiki/Augmented_reality



9 24 06:00















and Technologies (CLST) e University of Hong Kong





https://www.aurasma.com/



Properties of AR

- •AR adds Information to a real object
- •AR is about the 'here and now'
- •AR can be a shared experience
- •AR is triggered by markers





Applications for AR

- Mobile companion apps
- Entertainment
- Advertising
- Navigation




混合實境 (Mixed Reality)

 Mixed reality (MR) is the merging of real and virtual worlds to produce new environments and visualizations where physical and digital objects co-exist and interact in real time.



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Properties of MR

- •MR 'extends' AR
- •MR matches the geometric properties of real objects & space
- •MR does not require markers
- Interaction with real space affects virtual space



Microsoft HoloLens







Microsoft HoloLens



Microsoft HoloLens





2. Introduction to the essential concepts of the VR technologies

Head-mounted-displays (HMDs)



Head-mounted-displays

- A head-mounted display, abbreviated HMD, is a display device, worn on the head or as part of a helmet, that has a small display optic in front of one (monocular HMD) or each eye (binocular HMD).
- A HMD has many uses including in gaming, aviation, engineering, and medicine.
- There is also an optical head-mounted display (OHMD), which is a wearable display that can reflect projected images and allows a user to see through it.



Head-Mounted-Displays (HMDs)







Google Cardboard



HK\$10

For all phones Glasses: Merely

- Cheap
- Light
- Acceptable FOV
- Poor build quality
- Limited life span
- Discomfort
- Poor light isolation
- Nausea



For all phones Glasses: OK

- Focal length and pupillary distance customizable
 - Low FOV in some
- modelsLimited light
- isolation
- Heavy

•

Hair Style Tangle

Google Daydream View

НК\$690

Androids Glasses: OK

- Good light isolation
- Good FOV
- High cost
- Only works on Androids



Samsung Gear VR

HK\$510

New Samsung Phones Glasses: OK

- Perfect light isolation
- Good FOV
- High cost
- Only works on particular
 Samsung phones
- "hacking" needed for 3rd party apps



HTC Vive

HK\$6,750

For PC only Glasses: OK

- Perfect light isolation
- Good FOV
- Highly Immersive
- Extreme High cost
- Extra space needed for installation
- Hard to setup and maintain



Head-mounted-displays

- 只要把用戶的眼鏡完全對準顯示器,就足夠創造出 一個半沉浸的虛擬世界了。
- 而VR頭盔為了盡可能的增強虛擬效果,通常要增加 畫面寬度。目前高端的頭盔通常可以做到100或者 110度的視野。
- 而為了讓人得到最佳的體驗,整個畫面的幀率要保 持在至少60幀每秒,當然高級的頭盔可以達到更高, 比如Oculus的90fps,SONY PlayStation VR的 120fps。



2. Introduction to the essential concepts of the VR technologies

Head Tracking Techniques 頭部追踪



Head Tracking Techniques

- Rotational head tracking;
- Positional head tracking;
- Room Scale tracking;
- •Gestural tracking;
- Eye tracking;
- •Inter-pupillary distance (IPD).



Head Tracking Techniques



- 頭部追踪意味著你頭部運動,包括抬頭、低頭、轉頭、搖 頭等等會被一個叫做6DoF(6 degrees of freedom)的系 統記錄下來
- SONY通過在頭盔周邊的9個LED燈泡和PS4攝像頭組件來 追踪頭部運動,而Oculus運用頭盔上多達20個燈泡來達 到頭部追踪的層的_earning Science and Technologies (CLST) The Chinese University of Hong Kong



Centre for Learning S The





2. Introduction to the essential concepts of the VR technologies

Field of View (FOV)視野 and Level of Immersion 沉浸感



- Field of view, or the extent of the observable environment at any given time, is one of the more important aspects of virtual reality.
- The wider the field of view, the more present the user is likely to feel in the experience.
- •There are two types of FOV that work together to form human vision.



- Monocular FOV describes the field of view for one of our eyes.
- For a healthy eye, the horizontal monocular FOV is between 170°-175° and consists of the angle from the pupil towards the nose, the nasal FOV which is usually 60°-65° and is smaller for people with bigger noses, and the view from our pupil toward the side of our head, the temporal FOV, which is wider, usually 100°-110°.



- Binocular FOV is the combination of the two monocular fields of view in most humans.
- When combined they provide humans with a viewable area of 200°-220°. Where the two monocular fields of view overlap there is the stereoscopic binocular field of view, about 114°, where we are able to perceive things in 3D.



Monocular FOV : 100°-110° Binocular FOV : 200°-220°

~200° - 220°





monocular ricia or rici

Binocular Field of View

Field of View Considerations for Virtual Reality Headset Manufacturers

- •When it comes to VR FOV the limiting factor is the lenses, not the pupils.
- To get a better field of view you either move closer to the lenses or increase the size of the lenses.
- •Companies like Oculus and HTC want to make the lightest and smallest headsets possible for ergonomic reasons.



A) Thinner lens, bigger VR HMD



B) Thicker lens, smaller VR HMD





Field of View Considerations for Virtual Reality Headset Manufacturers

- You can use thin lenses that are light in your VR headset but this will increase the distance you need to have from the lenses to the VR headset display and thereby the size of the headset (A)
- You can use thicker lenses (with a shorter focal length for a stronger magnification) and move the display closer but those thicker lenses add new engineering challenges to keep geometric distortion and chromatic aberration under control.
- Due to the stronger magnification a higher resolution display is needed as well to avoid or reduce the screen door effect (in which you see individual pixels) (B).



C) Thinner lens, more distance, smaller FOV



D) Thicker lens, less distance, bigger FOV



Field of View Considerations for Virtual Reality Headset Manufacturers

- Another option if you want to keep the headset at a fixed size is to add more distance between the VR headset lenses and the user's eyes (C).
- This reduces the FOV and is not desirable as well so what we see right now is mostly smaller headsets with thicker lenses that are fairly close to the user's eyes (D).



2. Introduction to the essential concepts of the VR technologies

Haptic and physical feedback





2. Introduction to the essential concepts of the VR technologies

Hardware Specification of 360 camera



Hardware Specification of 360 camera

- Format compatibilities (MP4, AVI, M4V, etc)
- Image transformation
- Resolutions (720p, 1080p, 4K) and their implications
- Double lens (3D) and Single lens (2D) Comparison
- Image merging performance
- Wireless connectivity with mobile Devices (iOS, Android)
- Controller Apps (iOS, Android)
- Comparison between Popular 360 Camera Models



	Nikon Keymission 360	Samsung Gear 360	Kodak SP360 4k Dual Pro
Sensors	21.4 mp x 2	15mp x 2	12.76 mp BSI x 2
Video resolution	3840 x 2160 @ 24fps	3840 x 1920 @ 30fps	3840 x 2160 @ 30fps
Photo resouliton	23.9 megapixels	30 megapixels	16mp
Aperture	f/2	f/2	f/2.8
ISO	100 to 1600	100 to 6400	100 to 800
High speed video	640 x 480 @ 120fps; 320 x 240 @ 240 fps	2560 x 1280 @ 60fps	1920 x 1080 @ 60fps; 1280 x 720 @ 120 fps; 848 x 480 @ 240fps
In-camera stitching	Yes	No	No
Live 360 preview	Yes	Yes	No
Electronic stabilization	Yes	Vertical orientation correction	Yes
Waterproof	Up to 30m	IP53 (water splashes)	IPX5 (water jets)
Dustproof	Yes	IP53	IP6X
Shockproof	Up to 2m	No	Up to 2m with replaceable cover
Freezeproof	Up to 14 F	No	Up to 14 F
Drone mount	No	No	Yes for 3DR Solo
Price	\$499.95	\$349.95	\$899.95
Compatibility	Android, iOS	Samsung flagship phones	Android, iOS



Session 2

- 1. Discussion and feedback on assignment
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How to use common software to carry out simple editing:

- > Windows Live Movie Maker (Windows)
- ➢ iMovie (Mac)
- > Adobe Premiere Pro (Windows, Mac)
- YouTube Editor: <u>https://www.youtube.com/editor</u>





360 Video meta-data:

- •What is meta-data and why it is important to a 360 video
- How to view and embed necessary meta data



- Recognizes and processes 360 photos by looking for camera-specific metadata found in photos taken using 360-ready cameras.
- This information is embedded in photo's Exif (Exchangeable image file format) tags, and if you're sharing 360 photos straight from camera, Facebook should automatically process and present them as interactive 360 photos.



- When metadata has been stripped from pictures or never existed in the first place, Facebook might not be able to tell that your photo is a 360 photo.
- Metadata is stripped during image editing, but other workflows can also strip metadata from pictures.




3. Introduction to Post-production Software

- Here are some common reasons metadata might be missing:
- Emailed, embedded photos (vs emailing as file attachments)
- Exported photos from certain image editors
- Uploaded/re-downloaded photos on hosting or sharing services
- Panoramas created manually (e.g., art, scanned historic photos)
- the correct metadata must be injected into your photos before they can be shared as 360 photos.



Editing 360 Photos and Injecting Metadata

- You may decide that you'd like to edit a 360 photo using your favorite image-editing program like Adobe Photoshop or iPhoto, or any number of photo editors on iOS / Android.
- When you open a 360 photo in an image editor, you'll notice that the photo is likely in equirectangular projection at a 2:1 landscape aspect ratio.







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- YouTube supports uploading and playback of 360° spherical videos on computers in Chrome, Firefox, Internet Explorer, and Opera browsers.
- In order to upload a 360° video file, you'll need to modify the file with an app or script before uploading.
- You can also watch 360° videos on YouTube app.
- For an immersive experience, learn more about using Cardboard.



- 360 cameras are compatible with YouTube
- For the best results, encode your video at a high resolution and according to YouTube's advanced specifications.
- YouTube currently supports 360° videos with 24, 25, 30, 48, 50, or 60 frames per second.
- We recommend uploading 360 videos (equirectangular format with a 2:1 aspect ratio) at a resolution of 7168x3584 or higher, up to 8192x4096.
- You can also create 360° videos using custom camera rigs and third party stitching software, such as Kolor Autopano.



Your video file needs to include certain metadata for 360° playback to be enabled. Follow these instructions to install an app that will add the necessary metadata into a new file for you.

Create a 360-enabled file with an app

- Download the 360 Video Metadata app for <u>Mac</u> or <u>Windows</u>.
- Un-zip the file, then open the 360 Video Metadata app.
- Select the video file.



- Select the checkbox for Spherical and click Save as. Do not select the "3D Top-bottom" checkbox. For more information, refer to upload instructions for <u>virtual reality videos</u>.
- Enter a name for the file that will be created.
- Save the file. A new file will be created automatically in the same location as the original file.
- Upload the new file to YouTube.
- Wait for the 360° effect to process. This may take up to an hour.
- You can also add the metadata using a <u>Python script</u>.



- Before publishing, you can verify that the file has 360° playback enabled by watching the video on your computer. It may take up to an hour for 360° playback to be available.
- 360° videos feature a pan button in the top left, and can be rotated using the WASD keys, so look for these features to confirm your video is in 360.



EduVenture VR

- EduVenture VR (EVVR) is an online platform to carry out Virtual Reality (VR) learning. Using the EVVR composer, teachers can distribute VR content and construct a VR field trip for students.
- They can also add interactive elements inside to enhance students' learning motivation. With mobile devices and tray glasses on hand, students can experience outdoor learning in VR style, which makes teaching and learning more interesting and flexible.



EduVenture VR

- EduVenture VR (EVVR), developed by CLST, CUHK, adopts Virtual Reality (VR) to carry out teaching and learning. VR technology generates a 3D virtual world and simulates student's presence in the environment.
- Students can have better chances to explore the world using VR technology. <u>http://vr.ev-cuhk.net/</u>.



EduVenture VR





Entering EduVenture VR

• Open the browser and enter the URL: http://vr.ev-cuhk.net

Step	Procedures	User Interface
1	Press the button to enter the EVVR Composer	Composer 教作編輯器 (Beta) Version 1.1.19
2	Go to iTunes (iOS) / Play Store (Android) to download the EVVR App	Mobile Apps 手機應用程式 iOS v1.1.18 Android v1.2 iOS Google Play



EduVenture VR Composer

- Using the EVVR Composer, teachers can distribute VR content and create their own teaching materials.
- In order to identify the owner of the VR content, teachers will be given a username and password to login.

Step	Procedures	User Interface	
1	Input username and password,	Login EduVenture-VR	
	then press	Username / Email Password	
		Copyright © 2017. All Rights Reserved Centre for Learning Sciences and Technologies The Chinese University of Hong Kong FORGET PASSWORD	
2	Upon successful login, teachers should be able to see a list of VR contents in the main menu.	2 Ltd LQCLLS, Cente br Learning Sciences and Technologies 0 0 Implementation Implementation Implementation Implementation Implementation Implementation Implementation Implementation Implementation Implementation Imple	

Control Panel

• How to Edit User Account Information

1 Press o at the top, then select "My Info" (name and email).	ł
2 Input the new name, email or password, then press "OK" .	
3 Press "Cancel" to discard everything and return to main menu.	
UI User Information	
School Name Centre for Learning Sciences and Technologies	
Last Login Time 2017-03-02 16:40:48	
Display Name hown on LOCALEs DNDN7	
Email Can be used as login name anc@ccc.com	
CANCEL OK	

Control Panel

Similarly, teachers can also change their password.

Step	Procedures		
1	Press at the top, then select "Change Password".		
2	Input the old password and new password, then press "OK" .		
3	Press "Cancel" to discard everything and return to main menu.		
UI	Change Password Old Password Your original password New Password New password should contain letters and digits Re-enter New Password Re-enter the same password CANCEL OK		

Locales

- "Locale", place or locality, especially with reference to events or circumstances connected with it
- "Locale" is referring to the VR learning materials. Each locale is made up of a series of stages;
- Each stage can either be a 360 movie or a 360 image. These stages can combine together to produce a VR learning experience.



How to Create a Locale

Step	Procedures	User Interface
1	Press "Create New Locale" at the top.	CREATE NEW LOCALE
2	Enter the locale's name and description. Be creative!	LOCALE NameLOCALE descriptionTry to be creativeTry to be creative
3	Upload the locale's cover image (jpg, jpeg, png, gif).	Cover Image. Accepts: jpg,png,jpeg,gif UPLOAD



How to Create a Locale

4	Indicate these 2 settings.	
	"Open to Public": Can all users view the locale?	Open to Public Ready to Publish
	"Ready to Publish": Is the locale ready to be used by public?	

Upon successful creation of locale, a new locale (with the owner's name, the locale's name and the locale's cover image) should appear in the main menu.



How to Edit a Locale

Step	Procedures	User Interface
1	Press the setting button 호 at the right bottom corner.	Tutorial DNDN7@Centre for Learning Sciences and Technologies.
2	Press "View/Edit Detail" .	i View/Edit Detail
3	Edit the locale's name, descript Press "OK" to confirm and "C	tion, public and publish settings. Cancel" to return.



How to Edit a Locale

Step	Procedures	User Interface
UI	Edit LOCALE: Tutorial	
	LOCALE Name Tutorial	LOCALE description Tutorial
	IMG_8187.JPG	Open to Public Ready to Publish
		CANCEL



How to Delete a Locale

Step	Procedures	User Interface
1	Press the setting button 🔯 at the right bottom corner.	Tutorial DION7@Centre for Learning Sciences and Technologies.
2	Press "Delete".	☑ Delete
3	Press "Cancel" to return and "Confir	m" to delete.
UI	Confirm delete LOCALE: 地質探險記 (DEMO)?	CANCEL CONFIRM



Stages

- Stages are the building blocks of a locale.
- A stage can be a 360 movie or a 360 image.
- Inside a stage, teachers can add interactive elements such as tags, MCs and portals.



How to Create a Stage

Step	Procedures	User Interface
1	Press "Create New Stage".	
2	Enter the stage's name.	Stage Name Try to be creative
3	Indicate 360 Movie / Photo (Default: 360 Movie).	360 Movie360 Photo

Upon successful creation, the new stage will appear on the left navigation bar.



How to Create a Stage

- The left navigation bar shows all the stages in sequence
- The right hand side allows teachers to upload their 360 movie / image





Upload 360 Movie / Image for a Stage

Step	Procedures	User Interface
1	Press "Upload" . Movie: mov, mp4, m4v, avi Image: jpg, jpeg, png, gif	UPLOAD
2	Wait until 100%	100%
3	Upon successful upload, teachers should be able to see the thumbnail and the timeline for the VR content.	
UI		
		1 m A



Edit a Stage

• Teachers can further edit the display sequence of stages using the left navigation bar.

Step	Procedures	User Interface
1	Press the 🗸 button.	🔛 Stage 1 🗸
2	2 Press "Move Up" / "Down".	Move Up 🔨
		Move Down 🗸



Delete a Stage

Step	Procedures	User Interface
1	Press the 🗸 button.	🔛 Stage 1 🗸
2	Press "Delete" .	Delete
3	Press "Cancel" to return a	nd "Confirm" to delete.
UI	Confirm delete Stage: Stage 5?	CANCEL CONFIRM



Playback Elements

- Teachers can add interactive elements in the VR world.
- They include tags, MCs and portals.

Step	Procedures	User Interface			
1	Drag the timeline to indicate when the element should appear.	00:01 / 00:06			•
2	Press "Element At This Moment"	€ ELEM	MENT	AT THIS M	IOMENT
3	Choose the element: "Tag", "MC" or "Portal"		● ■ ☆:	Tag MC Portal	



How to Create a Tag

• Tag can display information such as text, voice or enlarged image.

Step	Procedures	User Interface
1	Enter the display text.	Tag Text
2	Choose the tag type.	None O Voice O Image
2a	For voice, upload an mp3. Toggle autoplay or not (Default: Off).	UPLOAD Autoplay sound file
2b	For image, upload these formats: jpg, jpeg, png, gif.	UPLOAD



How to Create a Tag

• Tag can display information such as text, voice or enlarged image.

Step	Procedures	User Interface
3	Drag the pin to indicate where the tag should appear.	
4	Drag the timeline to indicate how long the tag should appear.	Last for 5 Sec.



Create a MC

- Each MC has 4 choices and at least 1 correct answer.
- Teachers can limit how many times the students can attempt a MC.

Step	Procedures	User Interface		
1	Enter the question.	The Question		
2	Enter the 4 choices and toggle at least 1 correct answer.			
UI	Choice A Correct Answer Choice C Correct Answer	Choice B Correct Answer Choice D Correct Answer		
3	Adjust how many times the students can answer this MC.	⊖ Unlimited ⊕		

Create a Portal

- Portal is the transfer gateway to other stages.
- Teachers can set at most select 4 destination stages for a portal.



Review the Playback Elements

• Teachers can review the playback elements they added in the bottom panel.





EduVenture VR App

After installing the EVVR App, students should be able to see the locales that are set public and ready to publish in the composer.





Control Panel

QC		EduVenture VR	S Q 🎝
			T T T 3 4 5≁
No.	lcons	Functions	
1 a		Display the online locales (Can switch to 1b)	
1b		Display the downloaded locales (Can switch to 1a)	
2	C	Refresh the locale menu	
3a		Display all public locales (Can switch to 3b)	
3b	÷	Display private locales only (Can switch to 3a)	
4	Q	Search a particular locale	
5		Configure game settings	
Download a Locale

Step	Procedures	User Interface	
1	Press the locale to download		
UI	C EduVentur 「 通 正 正 正 正 に に に に に に に に に に に に に	e VR C Q 章 能描明教術科考察:疾追格 作:Mak Pr. Mak Pr. Mak Pr. Mak Pr. Mak Pr. Mak Pr. Mak Pr. Mak Pr. Mak	
2	Press "Yes" to download and press "No" to return.	Total size is 166.3 MB, continue? No Yes	
3	Press to stop downloading if necessary. Otherwise, wait until 100% downloaded.	× Connecting to VR World	



Download a Locale





Inside the VR World

How to Reverse/Play/Stop the VR content

When the students look downwards, a control panel will pop up.



- There are 3 actions: reverse, pause/resume and stop the 360 movie / image.
- To perform these in the VR world, simply move the pointer to the button for 2 seconds.



How to Respond to a Tag

Either text, image or voice tag will be displayed (according to the composer's database).

Туре	None	Image	Voice	
UI	Other Fried Food	Stones	Voice	
Step	Procedures			
1	N/A	Point to the thumbnail image for 2 seconds.	Point to the play button for 2 seconds.	
2	N/A	An enlarged image will come out eventually.	The sound will be played eventually.	

How to Respond to a MC

The number of chances, the MC question and the 4 choices will now be displayed (according to the composer's database).





How to Respond to a Portal

Students can teleport to other stages through portal. The portal title and destination stages will now be displayed (according to the composer's database).

Step	Procedures
1	Move the pointer to the destination stage and wait for 2 seconds. The portal will then teleport to the destination stage.
UI	Which stage to go? Stage1 Stage2 Stage4
	Centre for Learning Science and Technologies (CLST)

The Chinese University of Hong Kong

How to Continue to Next Stage

- After finishing a stage, a "Continue Panel" will pop up.
- The student can either replay, continue or quit, by moving the pointer to the option.





Quit Panel

- After finishing all stages, a "Quit Panel" will pop up.
- The student can either replay, restart or quit, by moving the pointer to the option

I IT	Quit?	
	Replay Restart Quit	
Actions	Meaning	
Replay	Replay the current stage.	
Restart	Restart from the first stage.	
Quit	Return to the main menu.	



- 1. Discussion and feedback on assignment
- 2. Introduction to the essential concepts of the VR technologies
- 3. Introduction to post-production software
- 4. Discussion on the techniques of delivering the 360 videos onto an online platform (e.g. YouTube)
- 5. Introduction to apps and software for implementing virtual fieldwork in classroom environment
- 6. Discussion on turning VR materials into Geography learning and teaching activities
- 7. Introduction to alternatives of VR resources
- 8. Conclusion, discussion, and Q&A



 Introduction to apps and software for implementing virtual fieldwork in classroom environment

Introduction on free Apps and how they can be used:

- Google cardboard
- Within
- YouVisit VR
- FreeVRPlayer

User Interface and Interactivity:

- Stereoscopic Display and its advantages;
- Pointer manipulation by eye movement;
- "Buttoned" and "Buttonless" user interface;
- "Long-press" and "short-press" actions;
- Navigation skills in VR environment.

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Discussion on turning VR materials into Geography learning and teaching activities

- 1. Discussion of the strategies on how to select suitable location for different parts of the curriculum;
- 2. Strategies for activity design;
- 3. Balance between VR and real-life learning experience;
- 4. How to maintain students motivation and interactivity;



Discussion on turning VR materials into Geography learning and teaching activities

5. Selected case studies of the 8 prepared lesson plans; <u>Focuses will include:</u>

- Difference of learning objectives for junior / senior secondary school students;
- Activities involved;
- Watching VR movie "in lesson" vs. "at home";
- Degree of inquiry-based learning;
- Ways to resolve individual difference;
- Formative and summative assessment methods;



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7. Introduction to alternatives of VR resources

- EduVenture-VR (Beta) and its resources bank (CUHK)
- Discovery VR (Discovery Channel)
- Mars Is A Real Place
- Sites in VR
- Google Expedition



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8. Conclusion, discussion, and Q&A

- Summarization of the course
- Discussion and Q/A
- Course Evaluation



