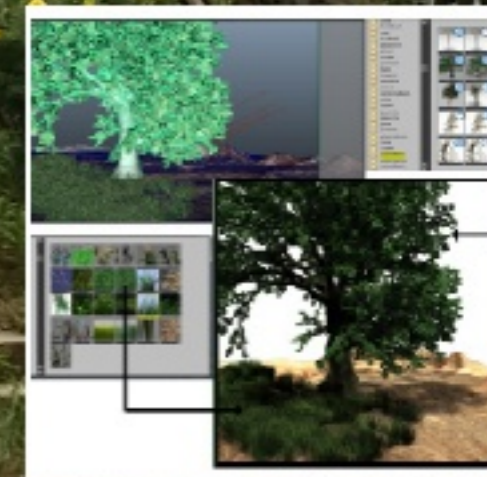


BORNEO VIRTUAL REALITY: A WALKTHROUGH



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PART I : RESEARCH OVERVIEW

| INTRODUCTION

The walkthrough is a simulation practice to experience through a Computer Generated Imagery *CGI* 's forest and searching for local content with information. It is a first of it's kind finding with purely local content.

The environment meeting up with big challenges from urbanisation and modernisation in Borneo, lot of habitats been destroyed. Development causing bad impact to the local culture content, as big as a longhouse also meeting up disastrous fate.

As a research centre encompasses vision and mission towards culture preservation by new, innovative, Immersive and creative media, CITC once again putting up efforts to regenerate our avenues and strength to reach out our horizon to materialise this research.





| OBJECTIVES OF THE RESEARCH

This research is to preserve the culture of Borneo through the context of digital documentation for digital Borneo or as synonyms we called it ***DB***.

| PROBLEM STATEMENT

A prototype of the virtual reality of Borneo walkthrough was made in order to preserve the of Borneo local content since the process of preserving is slower than destroying process.

However, the lack of life experience of the team members has been an obstacle for the whole virtual reality walkthrough to be succeeded. Therefore, the team needs to go to Borneo forest for field work studies and experience the real journey before the complete virtual reality could be produced.



| LITERATURE REVIEW

Human being's intelligence and the development of civilization is recorded through cultural heritage. Regretfully, some of this heritage are disrupted even came to extinction during handling down. According to Zgonjamin (2005, as cited by Zhou, 2009), the phenomenon that destroys one's own culture is the cultural pluralism. Once we destroy other nation's culture, we also destroy our own culture at the same time. He also added that there is no form of culture can survive independently. This is however, could be solved through the aid of the new media.



Moreover, a recent research found that young people use the new media as much and as often as possible (Ito, 2010) which seems to be a good reason to preserve culture for the young through this media. Furthermore, both the tangible and intangible essence of the society and cultural heritage can be captured and preserved through the usage of the new media (Zhou, 2009)



A close-up photograph of a traditional wooden staff or drum. The staff is made of light-colored wood and features several horizontal bands of woven yellow material. The top part of the staff has intricate carvings, including a circular pattern. A black rope is wrapped around the staff. The background is a plain, light-colored surface.

| RESEARCH METHODOLOGY

1

Field trip

A walkthrough to Borneo to have the simulation practice to experience through a Computer Generated Imagery CGI 's forest and searching for local content with information.

2

The Support in 3D modeling process

Three-dimensional models are one of the major important assets in setting up the whole virtual environment in this project. The main goal in building the 3D models is to ensure the quality of reconstructed models virtually as close as possible to the real world. Before the modeling process could be started it is crucial to review the real site environment in order to reveal certain characteristics and details which are only available at that specific location. Thus, at this stage, there are five main approaches to be conducted in this task.

The **5** approaches are meant to:

- i. **Observe** the real environment.
- ii. **Re-analyze** the structure and form through drawings and sketches.
- iii. **Capture** the texture images from real site.
- iv. **Refine** the textures through digital image processing.
- v. **Experiment** the methodology of 3D modeling and texturing.

OBSERVE THE REAL ENVIRONMENT

Figure 1:
Observe the real
environmental structure
in Iban long house



RE-ANALYZE THE STRUCTURE AND FORM THROUGH DRAWINGS AND SKETCHES



Figure 2:
Re-analyze the structure
and form through
drawings and sketches.

CAPTURE THE TEXTURE IMAGES FROM REAL SITE

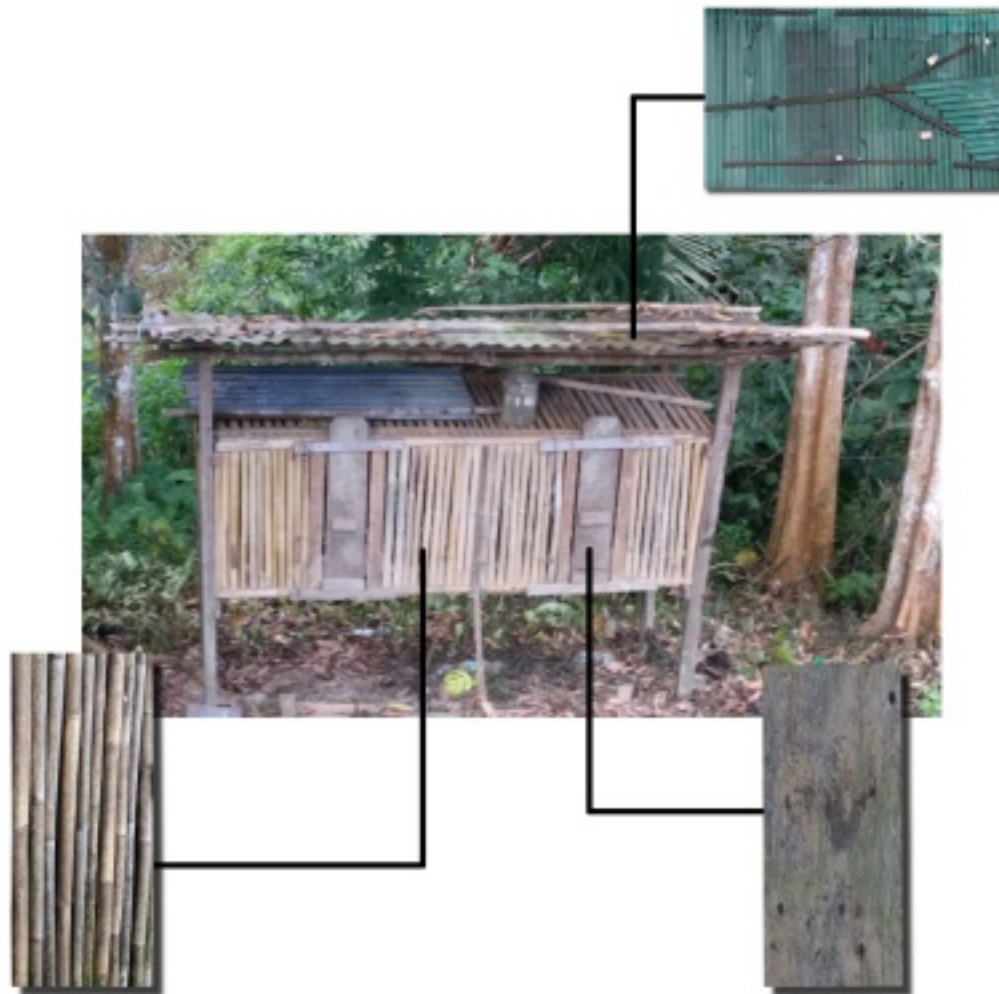


Figure 3:
Capture the texture
images from real site
environment.

REFINE THE TEXTURES THROUGH DIGITAL IMAGE PROCESSING



Figure 4:
The post-processed textures output
through digital image processing.

EXPERIMENT THE METHODOLOGY OF 3D MODELING AND TEXTURING

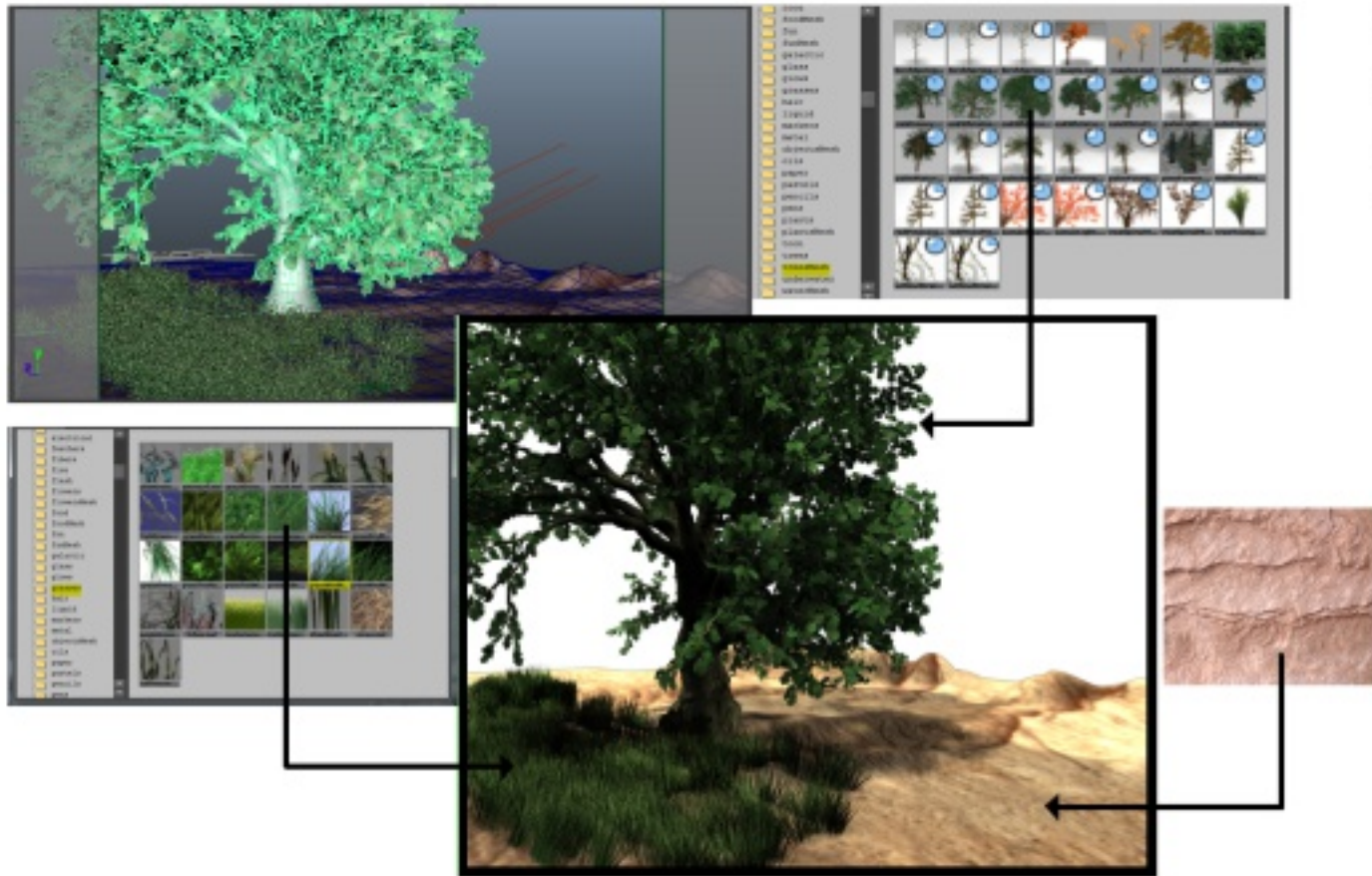


Figure 5:
Experimenting the
methodology of 3D
modeling and texturing.

Figure 3 shows the captured digital images of the texture from real chicken barn. These textures are meant to be used for the mapping of 3D models. Although the images have been captured in high-res quality but often some disturbing objects occluded the facades, e. g., leaves, tree branches or humans. Hence all textures have been post-processed using ordinary 2D graphics applications such as Adobe Photoshop in order to get rid of such elements in the textures. The post-processed textures output could be seen as *Figure 4*.

In modeling process, there is not restriction in using a certain modeling software, however, most of modeling task to be using Maya and 3D Studio Max. Due to the easy to use interface and the short required training time working with both software emerged as a very efficient procedure. At this stage, before any actual modeling task takes place, it is crucial to be certain on the most ideal methodology for 3D modeling and texturing in this project. Thus, experimenting the techniques in modeling and texturing must be done from time to time, as shows on *Figure 5*.

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- J. Döllner, H. Buchholz, F. Brodersen, T. Glander, S. Jütterschenke, and A. Klimetschek. SmartBuildings – A Concept for Ad-Hoc Creation and Refinement of 3D Building Models. In Proceedings of the 1st International Workshop on Next Generation 3D City Models, 2005.
- F. Steinicke, T. Ropinski, K. Hinrichs, and J. Mensmann. Urban City Planning in Semi-immersive Virtual Reality. In Proceedings of the International Conference on Computer Graphics Theory and Applications (GRAPP2006), pages 192–199. INSTICC Press, 2006.


PART II : DIGITAL CONTENT ARCHIVE

| INTRODUCTION

The Digital Content Archive solves the problem of not having a centralized repository to store digital content created by members of the project. In order to create new digital content, members often need refer to other contents but they are nowhere to be found. For example, when modeling an Iban longhouse in 3D, a reference to a photo of a longhouse is needed. There should be a platform for members to easily store, annotate and retrieve digital content where ever the members could be.

Digital content can be photos, videos, audio, drawing, illustration or animation. Each digital content type can be in various digital formats. For example, photos can be in JPG or BMP format and videos can be in AVI or MP4 format. There are existing available platforms where the digital content archiving objectives can be met. These platforms can be divided into 2 types: Content Management Systems (CMS) and Cloud Storage Systems. Example CMS'es include WordPress[1], Joomla[2] and Drupal[3]. These are highly customizable but require time to customize. Example Cloud Storage Systems include Microsoft OneDrive[4], Google Drive[5] and DropBox[6]. These can be used right away and do not require customization. Lastly, a new system can be developed instead of using any available platform. This option will require a lot of development effort.






| PURPOSE

For the purpose of this project, the digital content archive will be mainly to store photos, videos and audios collected during field trips. Digital drawings, illustrations and animations are not within the scope of this project. To facilitate retrieval/searching, content will need to be annotated with more meaningful information. For example, photos will need description of subject/object(s) in the photo. Keywords such as hill, tree, pepper tree, river, old man, boy, girl, food, etc, are to be added to the photo. Additionally, the camera view (e.g. longshot, medium shot, closeup, extreme closeup, macro, high angle, low angle) can be added. The geographical location of the photo should also be added. Last but not least, the creator/cameraman of the photo.

Thankfully, the annotation format of photos is quite established. There exist a standard specification called Exchangeable Image File Format (EXIF)[7] for storing metadata in image and audio files. An advantage of storing metadata in the image instead of in a database management system is that images are more portable from one platform to another. Most metadata are automatically captured by the camera, for example the manufacturer and model of the camera, date and time, geotag (sometimes turned off), etc.



| IMPLEMENTATION

As implementation, Microsoft OneDrive was chosen as the platform to store all the digital content of this project mainly due to the following reasons:

- i) large free storage capacity (30GB)
- ii) local to cloud (and vice versa) synchronization support
- ii) web-based photo album that supports EXIF data.

All members of the project are given access to the OneDrive account created. So far the account stores 518 photos and 5 videos. Only 27.1 GB of 30 GB is used.

The screen capture shown in Figure 1 (next page) shows the top tags of all the photos uploaded. Besides the tags added manually before the photo is uploaded, automatic tags were added by Microsoft OneDrive. Some of the tags added are for example “people”, “outdoor”, “food” and “animal”. These are very useful for searching purposes in the future. However, automatic tags are sometimes erroneous.

The screen capture in Figure 3 below shows the search results based on “longhouse” search keyword.

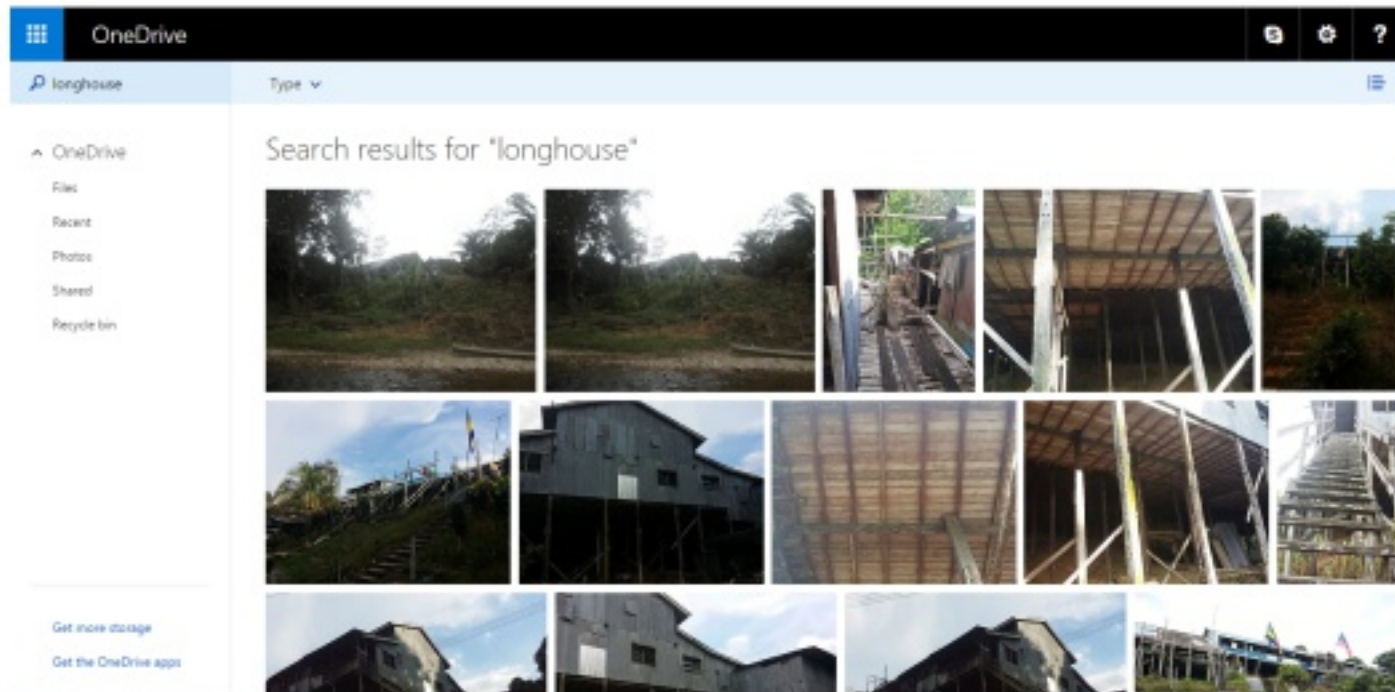


Figure 3:
Search results for
“longhouse”.

Microsoft OneDrive is used as a centralized platform for all members to easily upload and retrieve their content. Equally important are the annotated original content themselves. Backup copies are stored off cloud, on an external hard disk. These can be used to populate a different new platform should the current platform be unavailable.

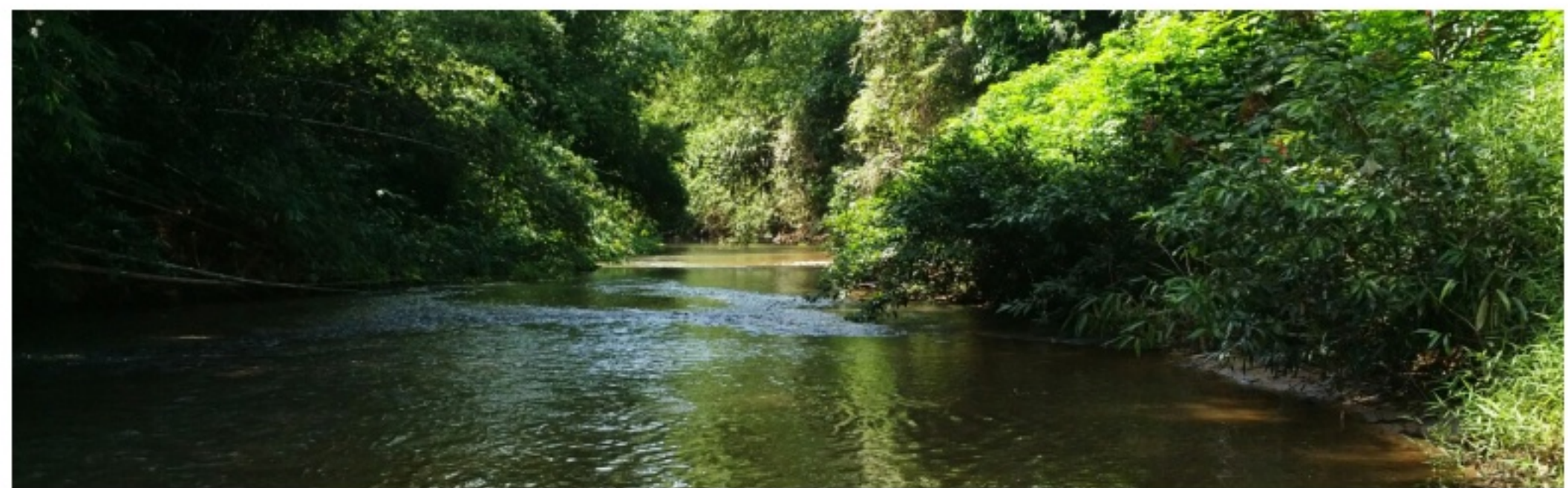
References

- [1] WordPress, retrieved on 12 Nov 2015 from <https://wordpress.com/>
- [2] Joomla, retrieved on 12 Nov 2015 from <https://www.joomla.org/>
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PART III : VISUAL SUPPORT

| INTRODUCTION

The concept of the visual turn, also referred to as the pictorial turn (Mitchell, 1995:11), points to the fundamental role of the visual in society and culture, and the need to attend to visual manifestations of the social and cultural in order to understand society in general (Mirzoeff, 1999; Mitchell, 1995). Understanding how the visual both produces and represents culture is the reason attending to the visual forms of representation and communication is important for creativity and education. The key argument is that images act as 'go-betweens in social transactions' that 'structure our encounters' (Mitchell, 2002:175), as cultures of everyday life are entwined with practices of representation.





| THE AIM

Aim of visual/images in this project is not only draws attention to visual objects and materials but also to practices of looking. It serves to foreground how discipline and control can be achieved through relations of looking, as well as how power operates to control what or who is seen/ made visible and what or who is not.

| THE APPROACH

In this research project, basically form three main points in which: First, this approach to the visual turn refuses to confine visibility to the modern era and in doing so it connects the contemporary with the past. This enables patterns and narratives of the visual to be seen over time and for connections to be made with respect to practices across different technologies. Second, it acknowledges that to live in any culture is to live in a visual culture. Third, this perspective on the visual turn moves away from the (easy) construction of binary models of history that centre on a turning point and 'declare a single great divide between the age of literacy (for instance) and the age of visibility' (Mitchell, 2003:173). When combined, these three points demand that attention be paid to the specificity of how visual and other symbolic forms are configured and elaborated in different historical, social and cultural contexts.





Figure 1 :

Capture the walk path in which lead to long house, to develop the step by step and included immersive technologies from the beginning until the end of project.



When provided visual support to visualize the outlook of long house, the visual culture of learning spaces is in part built into the material structure of a building and in part made through the interactions that occur within it (Seaborne, 1977; Grosvenor et al, 1999). In other words, the everyday behaviours of people both shape and are shaped by the cultures that are realised visually in the physicality of a building as well as in the patterned social interactions that form its social culture. Different images are allowed into some learning contexts and others not, and are mobilised for the purposes of teaching and learning in distinct ways. For example, figure 4(a),(b),(c) consist different angle and perspective of surrounding long house.



Figure 2:
The panorama view of long house provided the overall outlook of scenery and surroundings in term to help designer know better the details when developing virtual reality contents.



Figure 3:
Part of infrastructure image to include in the walkthrough.

References:

- [1] Mitchell, W.J.T. (1995). *Picture Theory: Essays on Verbal and Visual Representation*. Chicago: University of Chicago Press.
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- [5] Grosvenor, I., Lawn, M. and Rousmaniere, K. (eds.) (1999). *Silences and Images: The social history of the classroom*. New York: Peter Lang.

PART IV : BORNEO WALKTHROUGH DEVELOPMENT

| THE OBJECTIVE

The objective to this research development is to provide users a sense of reality being in Borneo with just walking through the development of VR creation.



| THE OVERVIEW

Understanding the key elements to Virtual Reality (VR), it should involve virtual world, sense of immersion, sensory feedback and interactivity (Sherman & Craig, 2003). This research field trip is an important experience to capture all the surrounding senses and spaces being there in reality. This is in order to achieve the best of VR elements at the end of the research development. This research development tasks on virtual Borneo walkthrough will use Unity Game Engine to compile then program the produced graphics and audio assets to create an interactive virtual world within Unity Engine. In order to achieve the high level of immersion, this research development will require me to research the best approach to transfer my reality experience into the virtual world. Furthermore, this development will require further research on advance technology use to enhance the sensory feedback through interactivity as to level up the sense of being immersed.

**PART V : NEW MEDIA REPRESENTATION
OF BORNEO THROUGH
WEB DESIGN**

| INTRODUCTION

New media is a term used to a new ways of representing the world, from printed-based media such as photography to a screen-based media such as computer games, Website or Internet. New media has the characteristics of digital, interactive, hypertextual, virtual, networked, and simulated. Other than that, new media, can be referred to a medium used for entertainments (computer games, special effects cinema), screen based interactive multimedia, World Wide Web, Virtual realities and other fields.[1]





In a current life of digital techno-culture, clearly new media has become a powerful approach in spreading the information as it consists of interaction design. According to Gillian Smith, the director of Interaction Design Institute Ivrea, interaction design through computers technologies, telecommunications, mobile phones and other interactive media is shaping our life in many ways such as for work, for play and for entertainment.[2]

One of the significant roles of new media in contribution towards culture and heritage as it is consequently encouraging a positive value towards society and social changes. For example is as how a Website could act as a powerful medium in preserving a culture. “The Hibulb Cultural Center & Natural History Preserve” Website in which creating a possibility to preserve, revive, restore, protect, interpret, collect and enhance the history cultural values and spiritual beliefs of the Tulalip Tribes. The idea is not to replace the actual value for specific cultural or traditional but it is mainly to focus in educating and encouraging people to learn more about them.

| THE DEVELOPMNET FLOW

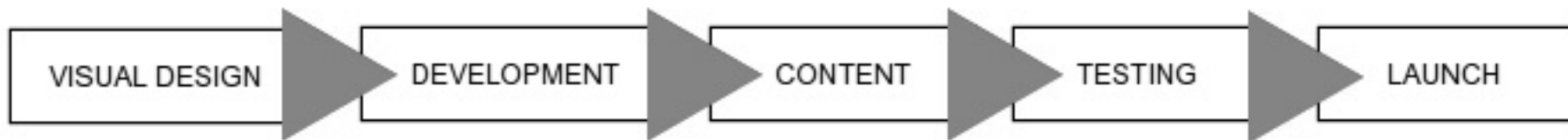


Figure 1.0: Website Development Life-Cycle

References:

- [1] New Media: a critical introduction, Martin Lister, Jon Dovey, Seth Giddings, Iain Grant and Kieran Kelly, 2009, Routledge 270 Madison Ave, New York, NY 10016 (pg, 12&13)
- [2] Designing Interactions, Bill Moggridge, 2007, The MIT Press Cambridge, Massachusetts London, England (pg, xi)
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