Panoramic Virtual Museum Website

By

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Dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Technology (Hons)
(Business Information System)

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CERTIFICATION OF APPROVAL

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Business Information System Programme
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Approved by,

_____
(Dr. Suziah Sulaiman)
Supervisor

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
May 2012

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

_____

HAFSAH U-SENG

ABSTRACT

Panoramic virtual museum website refers to the idea of displaying and promoting artifacts virtually with 360 degree view using the digital or electronic devices to wide public. Even though there are many panoramic virtual museums existed throughout the world, but the number appearance of this technique within Malaysia is considered few.

A panoramic virtual museum website is developed as an alternative way of museum visitation for visitors who find some difficulties due to the insufficient of accessibility and etc. It also produces a simple but complete self guided virtual tour through panoramic virtual reality technology for local museum, Pasir Salak Historical Complex. The website comes out with an immersive virtual environment displayed that makes visitors feel as if they are physically present in the museum. Audiences can manipulate the scene up to 360 degree rotation, move, resize, set an automatic rotation and turn it into full screen mode. This website also provides the tour that consist "hotspot" which enable to link from one section to another while providing the popup information and narrations for the objects shown.

The project has implemented with water fall methodology which identified as a suitable method in developing the panoramic virtual museum website. It consists of many series of the definite phases that run with an intended to start sequentially after another. This method provides an easily maintaining and iterating function when the requirements are changed.

Panoramic virtual museum website of this project has not been implemented yet by any museum websites in Malaysia before; furthermore, the study of general community's interest has shown good responses and direction for its development supports by good feedback from assistant curator of the respective museum (Pasir Salak Historical Complex), the website is worth being developed. With these, the panoramic virtual museum website not only standing as a medium of interaction between general public and museum but also able to enhance status of technological used by museum in Malaysia as well.

ACKNOWLEDGEMENT

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1

INTRODUCTION

1.1 Background of study

Museum is the place or institution which collects, organizes, displays, protects and preserves the national heritage, promotes the history and culture as well as delivers knowledge to public.[1]Through those definitions or roles of the museums, the technology and mass media have become the important tools that facilitate in their performance where they use the digitalization to implement for not only conservative cultural information but also make it more attractive with many interactive techniques while available to various points of access to the public.

The panoramic virtual museum website is one of the attractive ways that provides the information and images of the artifact shown in the museum. The visitors are able to gain knowledge, experience the museum tour with 360 degree and navigate its exhibits displayed from anywhere.

1.2 Problem Statement

Recently, many museums are opened for visitors everyday include weekend during day times and office hours but there are many people who unable to visit during those times provided. The distance and cost of the transportation are factors which people take into consideration when it comes to visit the museum as well. Apart from that, disabled people who cannot experience exhibits due to the physical barriers could have the difficulties regarding to the visitation, thus the accessibility and convenience of the museum are not that sufficient yet.

1.3 Significance of the study

The findings of this study will serve as a useful indicator in determining public interest needs and responses toward virtual tour website development for local museum. The main aspiration of the establishment will be to create an interactive panoramic virtual

museum website with 360 degree and allow the visitor to perform a self guided tour the museum. From that it also will be used as a learning tool and media to promote the local cultural heritage as well as to enhance the level of ICT used by museum in Malaysia.

1.4 Objectives

The main objectives of this project are:

- To identify the needs for development of panoramic virtual museum website.
- To evaluate the general community's interest toward panoramic virtual museum website.
- To develop panoramic virtual museum website which allow users to perform self guided tour the museum with an immersive virtual environments.

1.5 Scope of Study

The scope of my study will focus on the interest of general societies toward panoramic virtual museum website and the virtual tour with 360 degree of panoramic view which will be developed for the local museum in Malaysia (Pasir Salak Historical Complex). The significant of this self guided museum tour comes with respect to the location of the local museum as to create another alternative way to visit museum for the visitor who find the difficulties and inconvenient include day and time provided by museum, distance, transportation, physical barrier, accessibility and etc, while enhancing the status of Information Communication Technology used in digitizing its cultural heritages and object shown in facilitating museum performances.

CHAPTER 2

LITERATURE REVIEW

2.1Information and Communication Technology (ICT) used by Museum

The developments of Information and Communications Technology (ICT) nowadays become enormously advance and widely use by people and organizations. Nick Poole has given the definition of the ICT as the catching of all terms which describe computers and the different ways that they can be used to communicate and interact among people [2].

The method of providing museum with information technology (IT) solutions in presenting the objects, artifacts and cultural heritages in an interactive way was recognized during the *International Conferences on Hypermedia and Interactivity in Museums* (ICHM) since 1991[3], it encourages the museum in changing the way to disseminate information of the museum using new technology and applications multimedia. In the year 1997, the annual conference *Museum and the Web* has shown that a lot of museums become more interested in sharing their collection information to wide public or presenting on the World Wide Web [4].

2.1.1Internet Based Communication for Museum

Museums have emphasized on the education and access for the last long period ago with the goal that can make them to be more inclusive, relevant, valuable and lifelong education resource for the society [5]. As for today, when the internet has become a normal tool of communication which widely uses by public, the museum is facing with the new opportunities to increase the accessibility of the visitors for not only by physical entering but also digital entering.

According to Nick Poole and Gordon Mckenna, the website in some ways, we can think as the best of having an opening small television or radio station that never turns off and

requires an ongoing input of fresh, interesting content to ensure that people keep coming back [2].

Refer to MacDonald and Alsford(1997), they have stated that the museums cannot be remained farther from the technology trends in order not to lose the audiences from 21st century[6]. At present, people are using the computer and internet as a prominent part of their lives for education, work, recreation and entertainment; by using this power, the museum will be able to attract and reach to global audiences. Apart from that, people also able to use their own mobile phones and digital television on surfing the internet thus the more advance technology use, the more alternative ways that the visitors can access and view the museum website.

Example: *The Pitt Rivers Museum,* has implemented the virtual museum tour website that aims toward the researchers, members of the public, schools, university and museum staff. The Pitt Rivers Museum has almost 200,000 physical visitors a year from all around 129 countries while receiving a million virtual visitors through their website in the same period as the internet has enabled those visitors to get insight and see the displayed exhibits from their own places [7].

However, even there are many advantages of having a website which provides an accessibility to a wide visitors with information but there are some dangerous of miss used or conduct for those people do not take the advantage of ICT in a good way. Donovan (1997) warns that the museum should not think about to simply provide the accessibility to all visitors to the museum collection database or centric information database while encourage to provide context, storytelling and stimulate curiosity, exploration and serendipity, if they want to create compelling online experiences and be of interest to a broad range of users[8] as conclude that the online museum website should have provide a suitable depth of information or conceptual accessibility.

2.1.2 ICT for museum in Malaysia

Recent study regarding to the ICT used in museum institution in Malaysia have found that all the museums have implemented and installed adequate ICT services, applications and infrastructures. The Internet connection is available to all museums but some do not have their own Web sites and portals. The virtual reality is included under

the list of less ICT services and applications used by museum as it is being implemented only one place in Malaysia with serve an astronomy using half dome system. In summary of the study, adequate ICT infrastructures have been implemented by museums in Malaysia at the medium level [1]. Therefore, the development of the virtual museum is worth that to be utilized and encouraged in order to enhance the level of ICT use by the museums in the country.

2.2 Virtual Museum Tour

A virtual tour is another ICT used that can be implemented for the museum as it can attract more visitor with an interactive way. In relation to this kind of tour, a connection become the qualities needed that will allows the virtual museum to be fully displayed their cultural or traditional information. Based on this concept of connectedness that enable the museum to communicate or generate its information to audience, Ben Davis reaches out the conclusion as the virtual or digital museum become the visitor-centered rather than the curator-centered[9]. ***Panoramic virtual museum tour*** is fallen under the virtual categories which creates a 360 degree image of an exhibit with an aesthetically pleasing and uncluttered for a greater feeling of reality for the site visitors [10] this can attract a huge number of audiences, the more friendly or simple use to navigate the Website the higher the attractive level of the website will be.

2.2.1 Advantages

There are several advantages a virtual tour provides for museum include the followings:-

Access

- Providing an alternate access to for museums by showing the objects which is constructed under limited access physically to digital way.
- Enabling the audiences to explore with alternative formats of the artifacts descriptions, artifacts visualization, and screen readers.
- Providing closer, adjustable and intractable experiences of objects that are closed or sometimes overlooked by visitors [10].

Education

- Providing a tool for students or general audiences as an educational reinforcement and teaching supplement.

- Allowing a personally paced learning experience which may be inhibited in the museum.
- Assisting in the information showing which could be included with additional information or references that are not available at the exhibit.
- Allowing the user to focus on the items of their own interest as it can be personalized for the users' preferences or needs rather than going through a tour of the entire building.
- Allowing an interactive experience to further understand certain artifacts either prior to, during or after visiting the exhibit [10].

Artifact conservation

- Allowing access objects or artifacts in digital storage as it has limited space on museum site.
- Protecting the original unique artifacts and prolong its ages by reducing from handling or lighting [10].

Promotion

- Enabling the Website to become one of the media tools to promote museum as a tourist attraction place of the country where it is accessible to wide public all around the world [10].

2.3 Sample Museum website in Malaysia

As go through to the museum websites in Malaysia, all of them provide information regarding to the artifact shown in the museum with picture, its descriptions and other activities promoted. The visitor can access to the website and go through each collection by viewing the image shown [11], [12] while other different function displays in website included the map part of the museum itself where the visitor can press to the location map provided and the pop up window will display the artifacts shown of that location [13] refers to figure 2.1 below. However, there is no museum website which contains panoramic virtual feature yet there for, the completion of the project would be the first panoramic virtual museum website in Malaysia.

Figure 2.1: Example of Museum Websites in Malaysia

2.4 Others Sample Museum website

2.4.1Pitt River

This museum is holding one of the world's great collections with a half of million artifacts include prehistoric, archaeological and ethnographic objects from all parts of the world. The Pitt River museum is under university of oxford that also playing the leading role in contemporary research and museum curatorship.

The Virtual Museum of Pitt River allows visitors to discover the rooms and the Museum floor with 360-degree panoramas of the environments. It is one of the specialize museum that can tract such a huge number of the visitor. The museum has a rich database which allows visitors to make searches with many criteria and it can be taken as reference for the development of the Virtual Museum databases. Its navigation of the virtual museum is as ease of use and simple aesthetically pleasing and uncluttered.

However, the weakness of this Virtual Museum comes out in the fact that access to the museum’s catalogues made available online could be improved in its appearance and the inclusion of images of the objects listed [7].

Figure 2.2: Example of Panoramic Virtual Tour – Pitt Rivers Website

2.4.2 The old operating theatre, Museum and herb Garret

This is another example of the Virtual Website that allows visitor to gain the knowledge on the history of the old operating theatre, the herb and hospitalization in the past and comes out as its museum. A visit to the Museum provide the visitor to experience an individual profound insight into the history and stimulating interest in a whole range of issues about past and present health. The Museum also provides wide opportunities to the visitor in exploring subjects on the National Curriculum, Medicine as the combination of medical science and herbal healing and history about Victorian life.

Figure 2.3: Example of Panoramic Virtual Tour- The old operating theatre, Museum and herb Garret

2.4.3 The Canadian museum of Civilization Corporation

This corporation owned a portal which provides access to numerous permanent virtual exhibitions and a large database, available in English and French and tailored for scholars and researcher.

This museum has always been strong in the presentation of substantial amounts of in-depth knowledge and educational resources. In recent years their focus has changed more towards using the **Website** to promote visitation to the physical museums and to support corporate business processes via the introduction of online services[7].

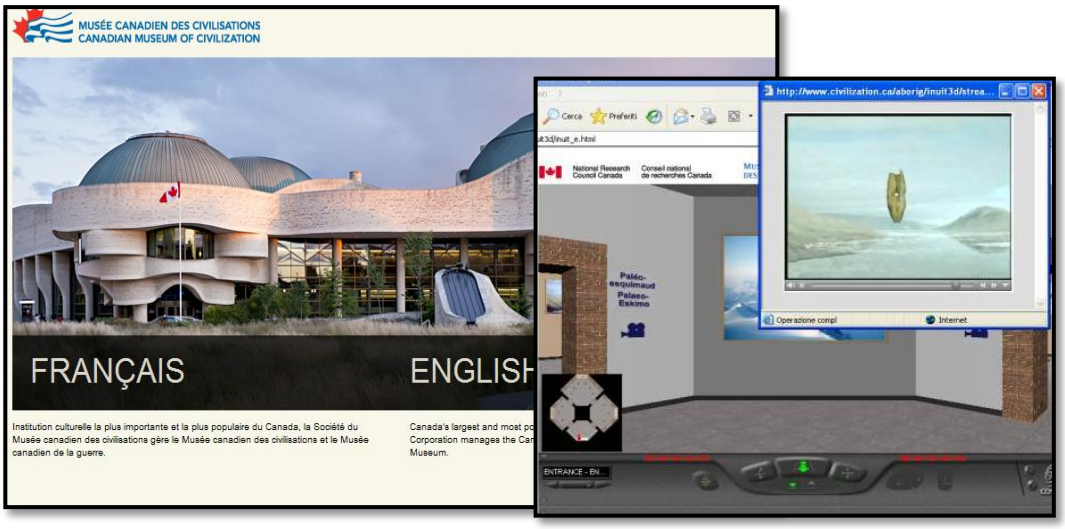

Figure 2.4: Example of Panoramic Virtual Tour-The Canadian Museum of Civilization Corporation

2.4.4The Marischal Virtual Museum

This museum is another example selected as a museum that performs such best practice from European Museum towards Multimedia system. The museum has an excellent track record of ensuring that its collection is used to inspire and educate a wide range of visitors through innovative exhibitions include virtual website and the realization of the Virtual Museum for this website has improved the services of the real museum [7].

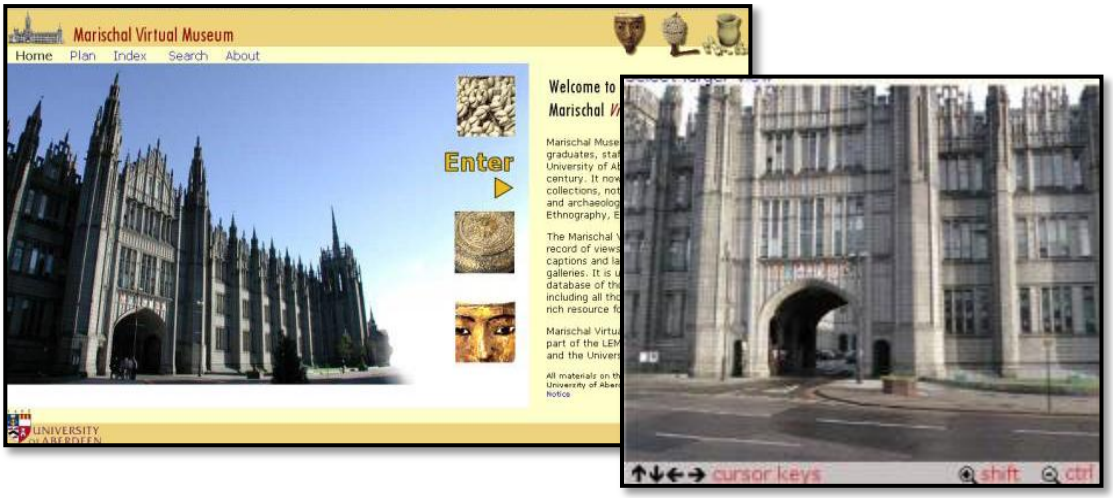

Figure 2.5: Example of Panoramic Virtual Tour-The Marischal Virtual Museum

2.5 Requirements for panoramic image

Creating the panoramic image is an important part in building panoramic virtual website. It requires a sequentially planned photography in capturing a full 360 degree x 180 degree view of the scene. It is also required to use camera in capturing row of images with tilting up and down as it calls pitch with its degrees from downward as negative and upward as positive using the tri pod for camera in standing to take picture. Each pictures required an overlap between adjacent images for about 30% based on the focal length of lens. The next step would be stitching the images together after import those pictures into the software or Photo stitching software, stitch it together and set the control point at overlap area to form a cylindrical panorama. Figure 2.4 is shown the transformation of it cylindrical [14].

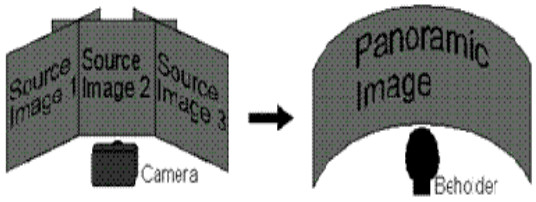

Figure 2.6Rendering Transformation after pictures are stitched

However, throughout the problem of brightness of each picture and overlapping area might not be exactly the same which required to edit its brightness, make a multi band blending or cross faded each other [15].

CHAPTER 3

METHODOLOGY

3.1 Project Methodology

The incremental of project development is an evolution of the waterfall model. It is chosen to be implemented in this project with the reason that this model refers to a series of the definite phases where each of them is running with an intended to start sequentially after another. Cycles are divided into smaller, more easily managed iterations. Each iteration pass through the Planning, Analysis, Design, implementation while maintain with the support phases as in figure shown 3.1. The model of water fall generates a quickly and early working during the system life cycle; it is flexible for the scope and the requirement when it is required to change. It is also easier when it comes to test during the small iteration and managing the risk where it can be identified and handle during its iteration before it goes to combine the whole development [16].

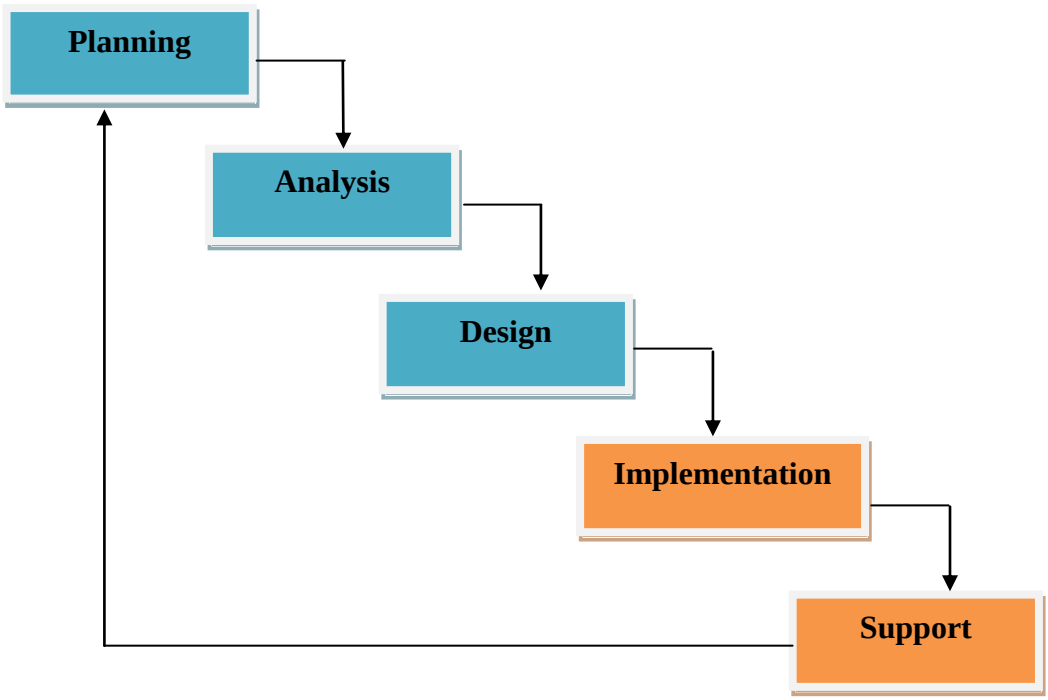

Figure 3.1 Panoramic Virtual Museum Website life cycle model

For this project, the author will be the planner, analyst, designer, implementer and the programmer. According to the time constraint for this final year project (FYP) the author chooses to use the waterfall methodology in order to represent the development phases. Through these, the author completed phase by phase until the end of the product is being developed.

3.2 Project Activities

Table 3.1: Project activities

Phases	Activities
1. Planning	Identify the website to be developed
	Create the project flow chart and Gantt chart
	Prepare related literature and research to support the project
	Search required tools and software while learn on how to implement it in the project
2. Analysis	Gathering the information from respective museum, research, conduct survey to determine general community's interest towards project and museum visited and interview (Pre-interview with assistant curator of Pasir Salak Historical Complex and Post- Interview with him, staff and users).
3. Design	Capturing, editing, stitching images into panoramic view and create panoramic tour.
	Embedded Panoramic tour into website designed
	Specify the information used into website
4. Implementation	These two phases have not been implemented as the website created is allowed to use the respective museum as a platform for education purposes only.
5. Support	

3.3 Required tools

Soft tools

- Panoramic Photo Stiching Software : To create a 360 degree in horizontal linesand 180 degree in vertical linespanoramas view of the museum and artifacts shown.
- Pano2VR : To convert panoramic image into flash movie while provide tool used for user to interact with the tour.
- Adobe Photoshop CS3 : To edit picture taken(brightness, color, reduce noise,etc) that can make images more precise before loading into Pano2VR.
- HTML, CSS,Java scripts, Dreamweaver : Internet programming languagesand software used in creating a Web site for the museum.
- Audio Converter: To convert the audio file of narration into MP3 file

Hardware

- Computer
- Camera(Cannon 100D, speed light)and Tripod
- Recorder(To record narration)

3.4 Gantt chart(FYPI)

Table3.2: Gantt chart (FYPI)

Task Name	2011														Output
	Sept	October				Nov					Dec				
	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	
	26	5	12	19	26	2	9	16	23	30	7	15	22	21	
Proposal Approval															
Do more research about Museum in Malaysia and Virtual website															
Literature Review															Literature review and Analysis
Preliminary report Submission(Extended proposal defense)															Preliminary report
Prepare for proposal defense															
Proposal Defense															
Requirement Gathering (Survey The museum & Interview Progress)															Information regarding to museum
Result Analysis and prepare the interim report															
Submit the draft interim report															Interim report
Submit the final Interim Report															Interim report

Process Suggested Milestone

Gantt chart (FYPII)

Table3.3: Gantt chart (FYPII)

Task Name	2012															Output
	May		June				July				August					
	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	
	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29	
Distribute the survey																Data Gathering
Capture images for project																Images Preparation
Develop prototype																Prototype Complete
Submission of Progress Report																Progress report submission
Prepare for Pre-SEDEX																Poster presentation
Pre-SEDEX																Poster presentation
SEDEX																Participated in SEDEX
Prepare Draft report																
Submission Draft report																Draft od dissertation
Prepare and review Dissertation (soft bound) and prepare technical paper																
Submission of Dissertation (soft bound)																Dissertation (softbound)
Prepare for Oral Presentation (Viva)																Viva slide
Oral Presentation (Viva)																Viva or Final Presentation
Submission of Project Dissertation (Hard Bound)																Dissertation
Submission of Technical Paper																Technical Report

Process ggested Milestone

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Results and Finding

4.1.1 Museum Visited

Picture 4.1: The Pasir Salak Historical Complex

The diagram above shows the entrance of The Pasir Salak Historical Complex which locates at kampong Pasir Salak in Kampung Gajah town, Perak Darul Ridzuan and situates by the Perak river behind, its location called Pasir Salak village and it is well known as historical village where consists of many importance of the remaining historical building, culture, artifacts and etc.

Through author's observation, this museum is suited for the being a platform for the development of the project where it consists of many different architectures outdoor include monuments, Malay old houses, watch tower, traditional harvest dance stage, time tunnel building and etc. For indoor, there are many different items of artifacts and dioramas that being included in the project.

Not only at the museum point that attract my attention and interest, along the journey to the Pasir Salak Historical Complex, author has been exposed to the beautiful of the town throughout the road, there are many traditional houses that still remain the old aura, fields where egret birds feed themselves and it become more surprisingly when author know the story of the village include many different humor story which made up the town name and also the Durian monument at cross road before crossing Perak river to small village road that lead to the museum, it is a symbol that capture the eye of visitors and make people easily remember the way to historical village; all of these are very interested to be included in the project.

However, along the journey to the museum for a visit and survey, author found some difficulties with regard to the public transportation to destination. On the first day of survey, author decided to go by general bus Ipoh-Lumut, depart from Universiti Teknologi PETRONAS at 8.30 am in the morning, the bus took author to Bota kanan where author need to take another bus to kampong Gajah or destination town, due to unavailable of the bus at that time as it only shows up twice a day at 11 am in the morning and 4pm in the afternoon therefore, author decided to take taxi which took a lot of time waiting for as it has no station for the taxi. While on the way back, there is no public transportation to leave from village to the town as the author would need to be waiting for the bus to get back, luckily, there was a nice lady who allowed me to ride with her motorcycle to the town. The bus to Bota kanan scheduled to arrive at 6 pm but author could not wait as it will late up for another round of the bus from Bota kanan to University, therefore, author decided to depart from that station by general car services to Bota Kanan then author continued taking another bus Lumut-Ipoh and arrive to University at 6.30 pm.

In conclusion for the visit, author found many interesting items that could be used in developing the project as well as the barriers along the journey which can be included as one of the factors to support the development of the project well. The barrier mentioned refers to the lack of public transportation and for the visitor who decides to come to Pasir Salak Historical Complex, it would be better for them to come by their own transportation.

4.1.2 Interviews

- *Pre-Interview with Assistant Curator of Pasir Salak Historical complex*

The interview was conducted for the purpose of gathering the information regarding to the present technology used and any other media that have been implemented by the selected museum, details information that could support the development of the project as well as the directions for the development of an online virtual museum website. It was an honored that the author had been given an opportunity conducting interview with Mr.Mohd Fauzi Mohamad Razali, Assistant Curator of Pasir Salak Historical complex. The interview session was conducted on October 31st 2011 formally while there is some information that Mr. Mohd Fauzi has given during normal conversation as well.

The initial information collected in this interview process involves broadly stated questions about the overall detail of the museum in the beginning of interview session while gathering more descriptive which help author to understand more on the actual or present technology used in the selected museum.

Mr.Mohd Fauzi began explaining the history of the complex, its establishment in 1990 that comprised two traditional Malay houses, two monuments and original mosque while it has been developed and constructed next phase in 1995 as we can see the remaining building up until now. He also mentioned that the museum is managed under Administrative board of Perak museum or Pentadbiran Lembaga Muzeum Negeri Perak, which is controlled under bigger management Pengurusan Pejabat Setiausaha Kerajaan Negeri Perak.

Pasir Salak Historical Complex display many different interesting artifacts include many ancients antiquities, diorama, daggers, architectures, etc. author did throw a question regarding to any technology used for the museum that make the items showed more attractive for visitor, Mr. Mohd Fauzi replied that currently, the museum has laser that detect the visitors when they pass one of the diorama showed in time tunnel or diorama exhibition hall which it will activate the movie sound play for that particular diorama. “We also has Kiosk that visitor can interact with which provide some information that cannot be gain from usual visit” he continued reply about the technology used in

museum; the museum also provide a place that allow visitor to view the video play that explain about history of daggers, the process to produce, etc. Previously, before visit the museum, author had visited the museum website, it is actually under the page of all museum in Perak where it requires user or online visitor to click into Pasir Salak Historical Complex page, that led to the next question asking an assistant curator regarding to it, Mr. Mohd Fauzi said "Well, our website was develop on our own in 2003and then in the year 2008 it is managed and controlled by Administrative Board of Perak Museum (Pentadbiran Lembaga Museum Perak) at Ipoh, which we hire one of the vendor company to develop our website with service charge RM1200 for an update per year", he also mentioned about the problem faces regarding to the website that there is no updated of information in the website and sometimes, there is an error on the link with in website itself. However, as an observation at current time, the website mentioned has been closed and page would not be found anymore due to some problems. Mr. Fauzi also provided me the report regarding to the number of visitor from previous years includes year 1990-2011(table 4.1, Appendix A). The number of visitors is quite big, and it could be increased more through the uses of website.

After a while of interview session, the topic become narrower to the website that author tends to develop, therefore, it was an opportunity to ask the assistant curator about his perspective in developing the website. He mentioned that some of places and items or artifacts shown could not be displayed into an online world due to some circumstances, to protect from the copyright issue that outsider could make a fraud claims and avoiding an unexpected political issue that may be raised by some unknown parties. "It would be better if the museum website contain the rating counter that counts the number of visitor who views the website and also the comment box" said by Mr. Mohd Fauzi at the end of conversation.

*Previous Number of visitor*s

Table 4.1: Number of visitors

Year	Number of visitors
1990-1999	527,265
2000-2009	431,782
2010-2011(Jan - Sept)	55,740

- *Post-Interview with Assistant Curator of Pasir Salak Historical complex and staff*

After the project is completed, Author decided to bring the work to display to Mr. Mohd Fauzi and staff at Pasir Salak Historical Complex. The interview was actually conducted on Tuesday 17th of July 2012, Mr. Mohd Fauzi provided a meeting room for the project demonstration and invited staff and trainees to the meeting room as well. Author started to explain the objective of the project at the beginning and gave prior notice towards the feedback needed after demonstration for attendees. The demonstration start in five minutes after introduction, all attendees were really concentrated with website displayed, they were interested with the panoramic virtuality technique as they are able to interact with using toolbar provided. Author explained the pages and sections in the websites and guided them on how to navigate the website. During the demonstration, many questions had been asked regarding to the software used, time for the development etc, which author explained respectively. Mr. Mohd Fauzi gave a good feed back towards the project as he said that this project is very interesting as so far as he know, there is no museum website in Malaysia that has implemented this features before; however, there were type of virtuality that display for exhibition by Museum Negara but it is performed or displayed to general public during special events only not on the website.

Other staff was asking to try in navigating the website and they seems really interested with website and tour features while spent more time navigating it, exchanging among themselves in performing the tour through the website. Author also asked Mr.Mohd Fauzi about the suitable of information and pictures created in website as the museum securities and prohibited details required to be concerned, the result was none as all

information and images displayed are all appropriate. He also mentioned that there might be the possibilities that this website could be published but it requires a lot of paper work, documentation as well as the hierarchical approval from the Museum administrative boards if they need to purpose this website.

After the testing and navigating by staff was done, they all gave good responses and feedback towards the project as it is something new which they have never used it before, "it is very interesting and engaging, the pictures are beautiful" said by one of the trainee who was currently training over there; "Is it possible if we can make it as a video demonstrating the journey to museum as well as the comment box" asked by Mr. Mohd Fauzi at the last of our session, so answered by author "That is a good idea, however, due to the time constraint this feature can be added more in the future for further development as well as the comment part of the website which allow visitor to state opinion regarding to the museum and website too".

The interview was done with one and a half hours, the session was ended by special thanks from author to Mr.Mohd Fauzi who always provide a great supports along museum visitation and project development as well as other staff for any conveniences during museum visitation.

- *Post-Interview with users(Testing)*

According to the responses of users which consist with 10 persons, two from staff of Pasir Salak Historical Complex, four are students from UiTM University who is currently doing an internship at the museum and four students from Universiti Teknologi PETRONAS. Their responses are all the same as they were really surprised and interested with panoramic virtual museum website, and tend to spend more time navigating it while playing with popup button as they found that it provide information and narration. "It's good, I would prefer to listen more than read" said by one of the respondent. Other feedback said that "The pictures are so nice, and I have never seen this type of museum website before", followed by other person who said "it's technique seems like Google earth but Google street does not have narration and popup like this". These all are good feedback that author has received while no one particularly given any negative response.

4.1.3 Questionnaire

The questionnaire is designed to gauge the interests of general societies toward virtual online museum/ panoramic virtual tour of Museum website as well as their responses on visiting through this type of museum website while its result will become one of the factors that will support the development of Virtual Museum Online for this project.

The survey questionnaire had been conducted from 20 of May until 15 of June 2012, the questionnaire was distributed in an online form created using Google account while having facebook, e-mail and instant messenger as media delivered the questions to respondents. It also was distributed by hand at Pasir Salak Historical Complex, Universiti Teknologi PETRONAS and Shopping Market.

The questionnaire consist of eleven questions that combine some of rating questions which will be rated of the given statement by using Likert-style rating scale ranging from 1(Strongly uninterested, never) to 5 (Strongly interested, Always) see question 4 and 11. This type of response scale gives a wider range of possible scores, and increases the available statistical analyses for this survey [17]. As to ensure that the respondents read each statement carefully before ticking out the box given, both negative and positive statements are included in the form.

The first three personal questions require gender, age and occupation of respondents as its varieties of result will support one of the project aims that there is no limitation in accessing the Virtual Online Museum website and also creating an initial step for respondents to evaluate their own personal information before going to the evaluation of their personal attitude towards next questions. Followed by the question number four, the frequency of internet used was, this will help to see the possibility that respondents could be able to attach and being attracted by website. The fifth question asks the respondent regarding to their experience visiting the actual museum and to bring them to the idea or story of the questionnaire followed by question asking their experience in visiting any museum website as well as any virtual museum websites or panoramic virtual tour of museum website in sixth and seventh respectively. Not all of general communities would have any idea or information regarding to the virtuality, virtual museum websites or panoramic virtual tour of museum website; therefore, the

respondents were asked with question on how do they feel or having any idea about it, whether interested, nuisance, never face it or never heard about it before, Its result will assist in determining the level of how well the present communities perceive or familiar with it. The ninth required respondent to give their most preferred choice when it comes to visit the museum, this will help in perceiving their attitude and preference regarding to visit the museum along with the next question that require respondent to give reasons or factors affect in accessing or visiting museum through online and end with last question asking the respondent's attitude towards the virtual museum website or panoramic virtual tour of museum website to response on interest scale [refer questionnaire at Appendix A].

Question 1

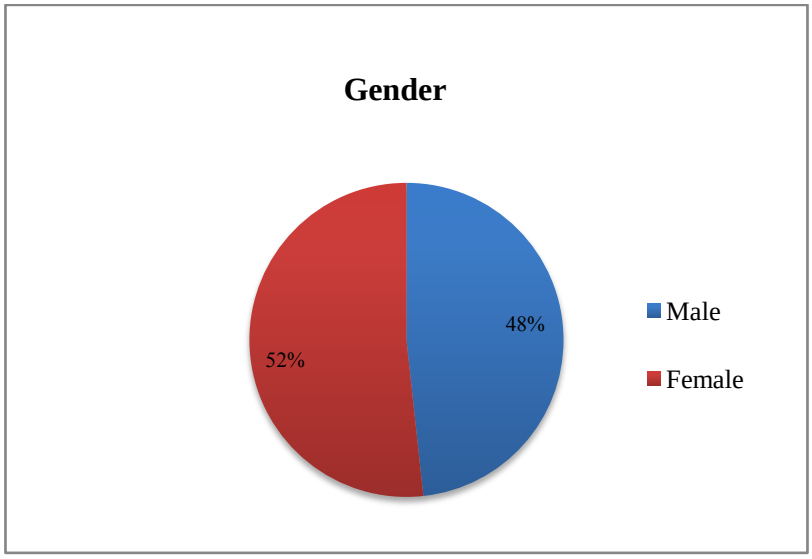

Figure 4.2: The gender percentage among respondents

As the survey question is randomly distributed, author managed to get 145 respondents with 70 males and 75 from females which calculated as 48% and 52% for male and female of the overall respondents.

Question 2

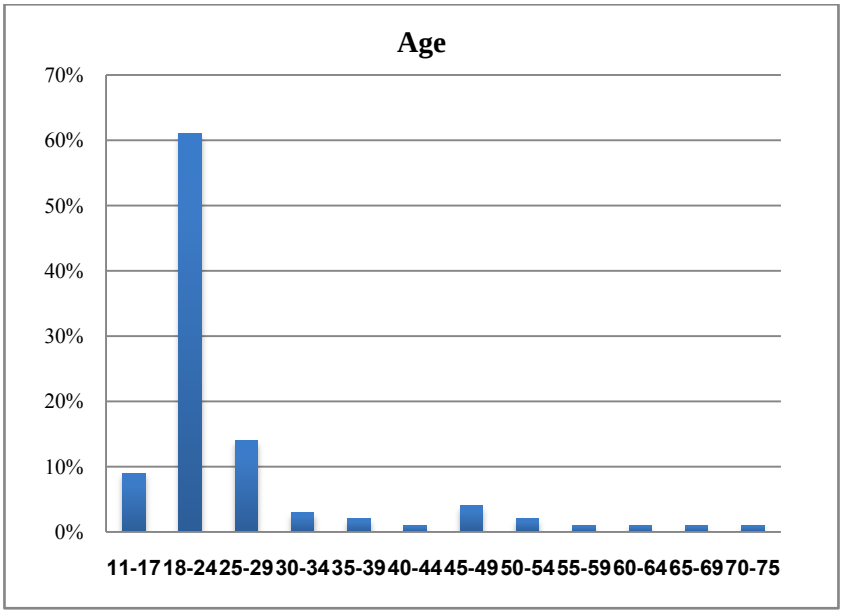

Figure 4.3: The age range percentage among respondents

As for today, Internet and any other communication or connection have no boundaries, everyone is able to access and implement regardless of age and others, therefore the second question requires respondents to fill in their age and for the result, there are 14 respondents with age range 11-17 years old calculated as 9%, 88 respondents with age range of 18-24 years old calculated as 61% and it is the highest number of respondents, 20 respondents from 25-29 years old age range as 14%, 5 respondents from age range of 30-34 years old as 3%, 3 respondents from 35-39 years old age range as 2%, 1 respondent from 40-44 years old age range as 1%, 6 respondents from age range of 45-49 years old calculated as 4%, 3 respondents from age range of 50-54 years old as 2%, 1 respondent as 1% from each of age range of 55-59, 60-64, 65-69 and 70-75 years old.

Question 3

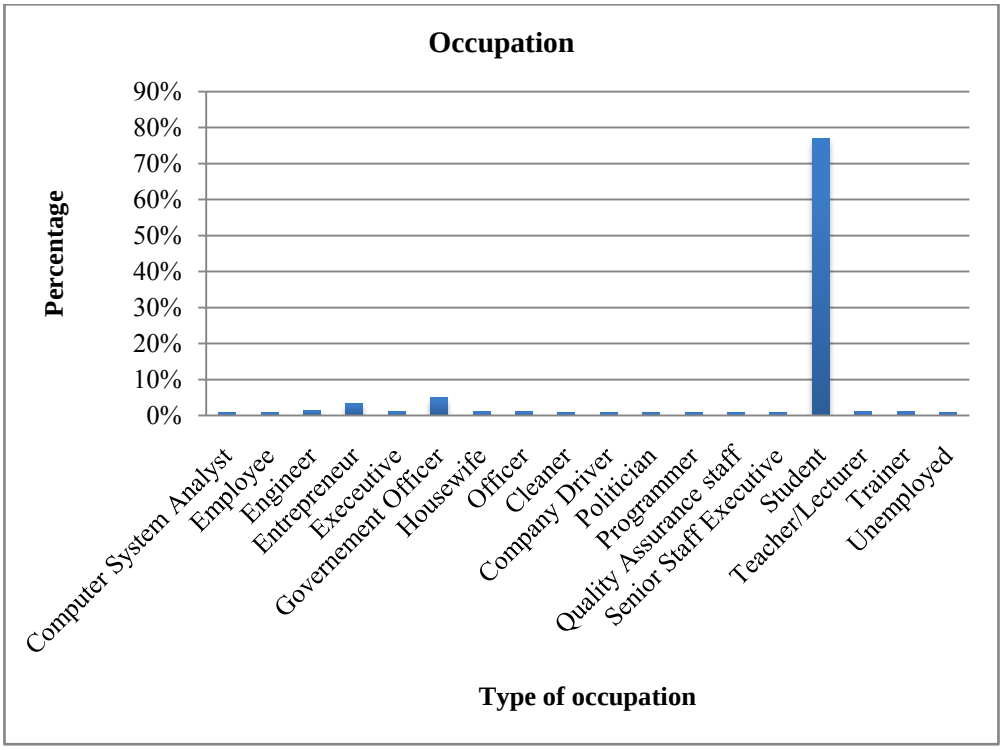

Figure 4.4: Type of occupation among respondents

Question3 require respondent's occupation and its result as the graph above which consists of various type of occupations. The highest number of respondent is 112 of being student calculated as 77% of the overall respondents. There are 7 respondents of government officer calculated as 5% as second highest number of respondent followed by 5 entrepreneurs as 3% of all respondents while there are 2 respondents from each of engineer, Housewife, Teacher or Lecturer, Trainer calculated as 1% for each of these occupations. 1 respondent from each of the following occupation include Computer System Analyst, Cleaner, Company driver, Politician, Programmer and Quality assurance staff, and unemployed which calculated as 1% for each. However, there are some respondents who did not give a clear occupation type, this referred to 2 respondents who stated their occupation as Executive, 2 respondents stated the word Officer and 1 respondent that responded as employee and 1 for senior staff executive which calculated for each as 1% of the overall respondents. The varieties of occupation of respondents display the various types of respondent of the communities; therefore, the

result would not be focused on one of occupation and would give different perspectives towards virtual online museum/ panoramic virtual tour of Museum website.

Question 4

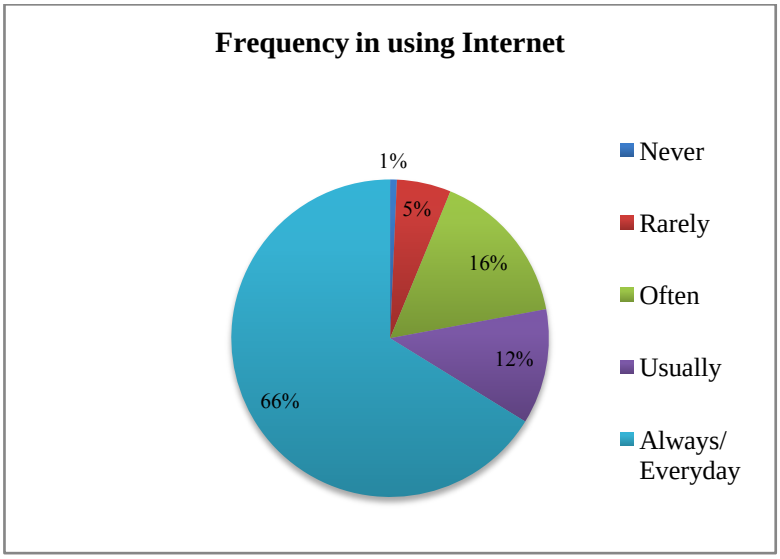

Figure 4.5: The frequency in using the internet by respondents

The frequency of using the internet can show on how often the respondent is attached with internet or use it; It intends to make sure that they use internet which relates to the objective for this survey as to seek the result from community's attitude to support the development of virtual online museum/ panoramic virtual tour of museum website and to ensure the internet used before going further to the next question that specifically asks about visiting website. There are 96 respondents calculated as 66% of the overall respondents responded for Always or Everyday that they use internet, 23 respondents as 16% responded for Often choice, 17 respondents as 12% responded for Usually use internet choice, 8 respondents as 5% answered for rarely and 1 respondent for never used the internet. If evaluate as the experience in using the internet, 99% of respondents have used the internet and 1% who has never used the internet.

Question 5

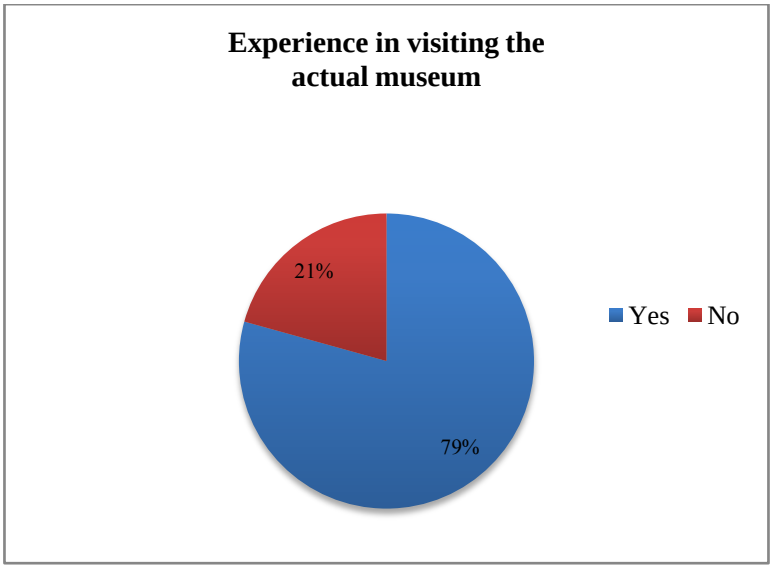

Figure 4.6: Experience of respondents in visiting the actual museum

The above diagram show the result of question 5 where respondents were asked on their experience in visiting the real actual museum at its places. 115 respondents responded as Yes calculated as 79% while 30 respondents have never been to any actual museum calculated as 21% of the overall respondents. This will help in determining as a factor of interest towards online museum whether their experiences support or create such preference and how will they react with the online museum website especially with virtual museum one.

Question 6

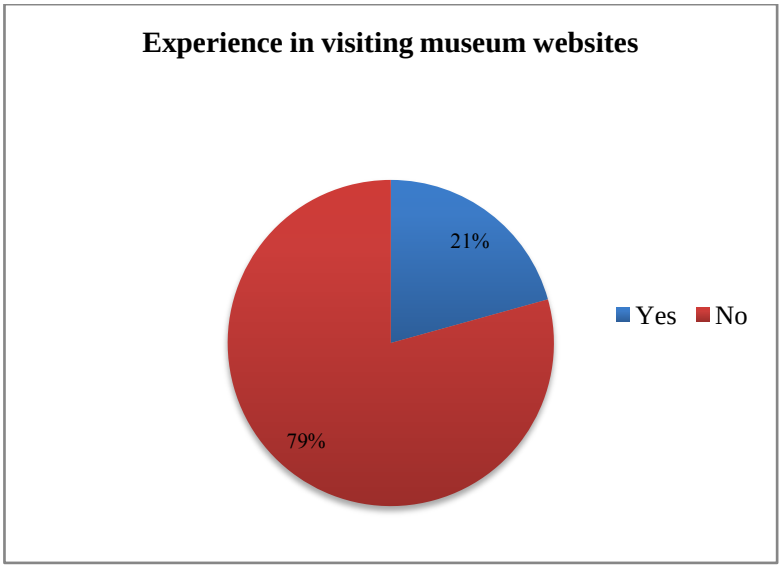

Figure 4.7: Experience of respondents in visiting museum website

The above diagram show the result of question 6 where respondents were asked on their experience in visiting any museum website. 30 respondents responded as Yes which calculated as 21% of overall respondents while 115 respondents or 79% have never visit museum website before.

Question 7

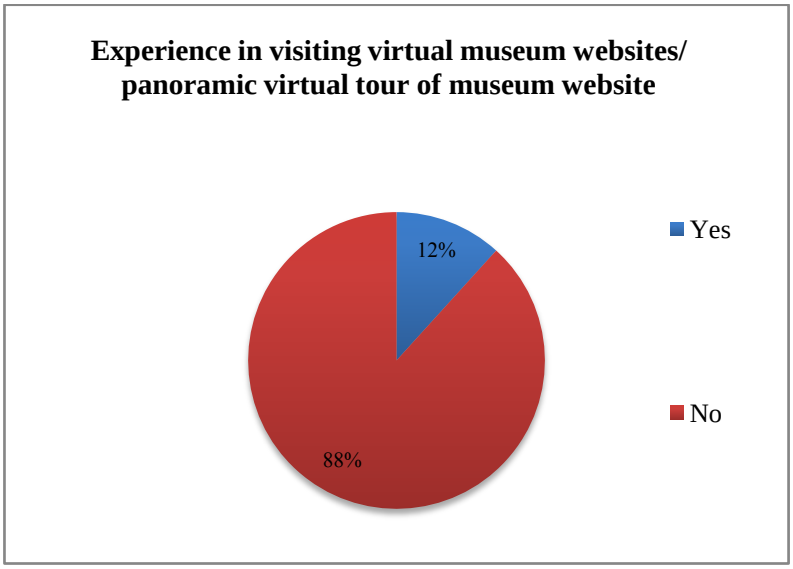

Figure 4.8: Experience of respondents in visiting virtual museum websites/ panoramic virtual tour of museum website

Question 7, the respondents were asked regarding to their experience in visiting any virtual museum websites or panoramic virtual tour of museum website. 88% of respondent or 128 respondents have never visited this type of museum website before, while only 12% of all respondents or 17 respondents responded as Yes. The lower the number of respondent towards visiting mentioned website may caused by the lack of information, interest and etc. however, based on the previous research and exploration, there are quite few number of museum website that implement this kind of techniques which directly become one of the factors that most of them have not exposed to it.

Question 8

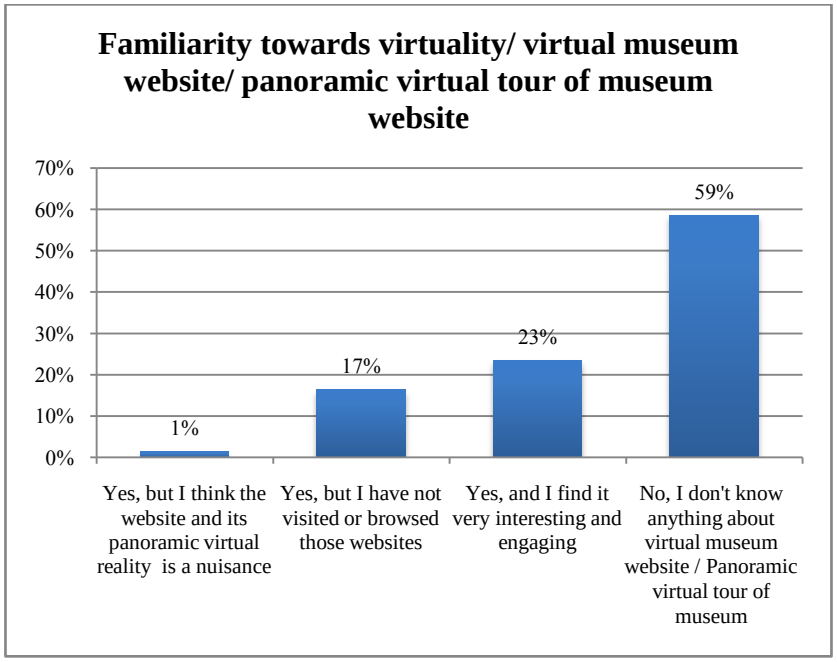

Figure 4.9: Familiarity towards virtuality/ virtual museum website/ panoramic virtual tour of museum website

Based on diagram above, respondents were asked regarding to their familiarity toward virtual museum websites or panoramic virtual tour of museum website and for the result, there are 85 respondents calculated as 59% who have no idea about it showing that they are not aware of this type of technique or its availability; perhaps they have not been exposed to this kind of technology and website before. 34 respondents as 23% responded as yes with positive respond as they found it interesting and engaging, 24

respondents or 17% of all responded as yes but they have not been exposed or browsed to those websites yet while only 2 respondents or 1% of all found it as nuisance.

Question 9

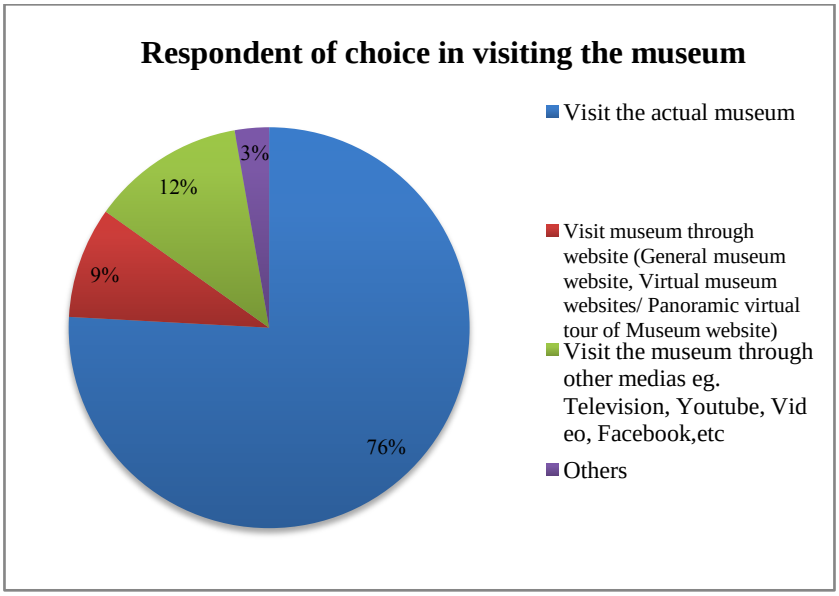

Figure 4.10: Respondent of choice in visiting the museum

Question 9 asked respondents on which would be the most preferred of choices when it comes to visit the museum, as expected, 76% or most of them with 110 respondents prefer to visit the actual museum, as the actual museum would give such a real situation where people can see, touch and feel while 18 respondents or 12% of all prefer to view the museum through other media such as Television, Youtube, Video, facebook,etc, as these types of media presently come out with many different interesting technique to display to audience which capture their attentions well. However, there are 13 respondents calculated as 9% who prefer to visit museum through website which also refer to general, virtual and panoramic virtual tour website who found it interesting or they may have other reasons for not being able to visit the museum through other media or even the actual one. 4 respondents calculated as 3% of all responded as other which one of them stated that he does not like to visit the museum, the rest answered out of scope as visiting with family which the last three result would likely to be fault because it may be refer to visit the actual museum with family, visiting through cyber or even watching any media about museum with family.

Question 10

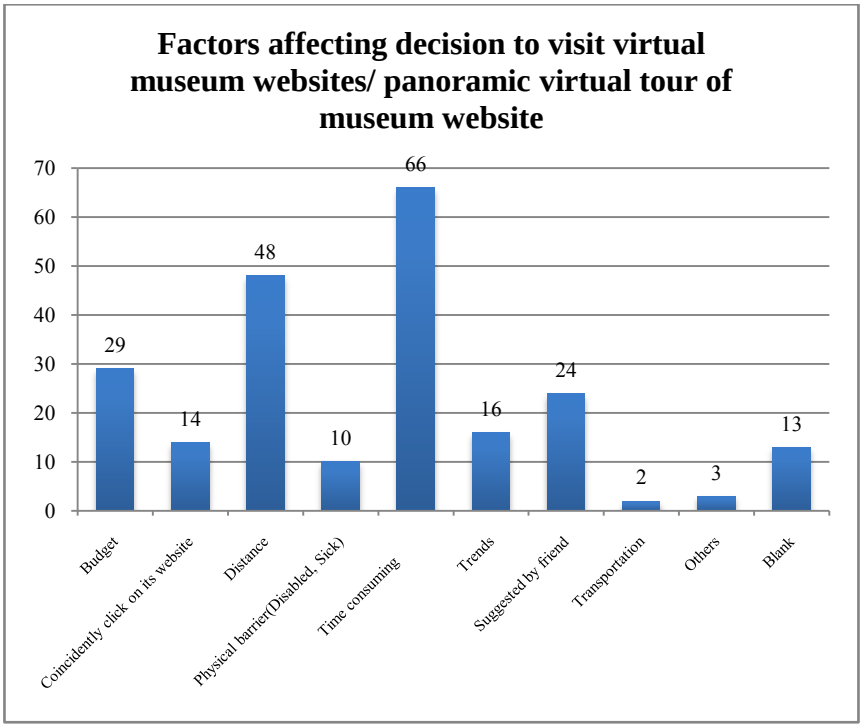

Figure 4.11: Factors affecting decision to visit virtual museum websites/ panoramic virtual tour of museum website

For this question, respondents were asked to select the choices that would be reason for them to visit the virtual museum website or panoramic virtual tour museum website, the question also allowed respondents to select more than one choice which would possibly be the factors affect their decisions. The highest choice goes to Time consuming where it is selected by 66 respondents, followed by Distance which is selected by 48 respondents, 29 times selected by 29 respondents for Budget factor, 24 responses to Suggested by friend box, 16 responses to Trends box which respondents would believe in an effective of technology trends that could change the way people practice and attract them to the use of it, 14 responses to Coincidently click on website mentioned box, 10 responses to the physical barrier as a factor that lead them to visit museum through website, 2 responses said that they are affected by transportation, 3 that mentioned the factor that could lead them to those website caused by an academic requirement, survey requirement and one of unclear answer as “It is not real and authentic” while 13 of

respondents leaved this questions blank as the question allowed them to leave if it is not applicable for them.

Question 11

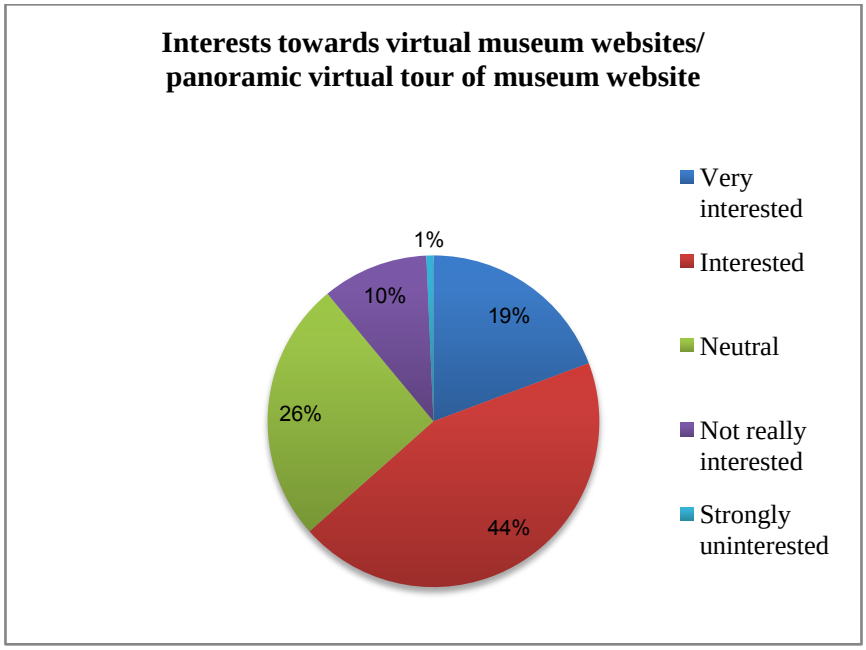

Figure 4.12: Interests towards virtual museum websites/ panoramic virtual tour of museum website

The above diagram display the portion of all responses by respondents to the question that required them to answer based on the scale provided about their interest toward virtual museum websites or panoramic virtual tour of museum website. This question will implement the Likert Scale that help in measuring the respondent's attitude toward the website mentioned (refer to table 4.1), there are five scales and for the first one or strongly uninterested, only 1 % or 1 person responded to this scale thus total score is (1x1)=1; For second scale which refer to not really interested scale, there are 15 responses calculated as 10% of all responses with total score(2x15)=30; The third scale which is neutral, there are 37 responses calculated as 26% of all responses and it is also the second most selected scale with total score of (3x37)=111; the fourth scale refers to interested choice, it is the highest or most selected choice by respondents with 64 responses calculated as 44% of all responses with total score (4x64)=256; and for the last scale strongly interested, there are 28 responses calculated as 19% of all responses

with total score (5x28)=140. This result seems positively incline to interested or fourth scale where it is measured by Mean value, M=(overall total for each scale/ overall responses)=> (1+30+111+256+140)/145=3.71 and its percentage is (3.71x100/5) = 74.20%.This calculation shows a positive lean up value towards interested scale.

Table 4.2 Mean measure of respondent's interest toward virtual museum websites/ panoramic virtual tour of museum website

	Score					M(Mean Response /Item)	%
	Strongly unintere sted	Not really interest ed	Neutral	Interested	Strongly interested		
Item	1	2	3	4	5		
Interests to Ward virtual museum web sites/panoram ic virtual tour of museum web site	1	15	37	64	28	3.71	74.20%

4.2 Design and Development

The development of project consists of many stages include:

4.2.1 Capturing images

Photographing the image using Cannon 100D Camera with 360 degree circulate the environment of the item needed with many shots continually. Each of pictures is compulsory to be overlapped for 50-70% of the previous image. Some shots require using tripod to reduce the error or unlined of images.

4.2.2 Editing the images

Some of the images need to be adjusted to increase the brightness, contrast and vanishing for an effective stitching process. This step, the images have been edited using Adobe Photoshop (CS3).

4.2.3 Stitching images

All of imaged taken is stitching together to make such a panoramic pictures using Photo Stitching Software.

4.2.4 Convert and Create panoramic image into flash

By using Pano2VR software, the images are uploaded to create an interactive virtual museum tour which consists of toolbar for visitor to enhance their view, the hotspot that link one scene to another and popup that provide information regarding to objects as well as the narrations.

4.2.5 Website

The website is developed using html language while embedded the panoramic virtual museum flash.

(The prototype can be refer to Appendix C)

Challenges

The main challenges occurred were related with the images capturing, stitching and panoramic tour development as all are related to each other, One scene of panoramic image was required to be taken for more than fifty images in order to get the most connected picture while for the stitching process, it was required to select from the first step for more than twenty-five images based on each scene; Once the pictures taken are not in line with each other due to the differences of its brightness and angles(unavoidable), the stitching process will not be able to generate the neat and nice pictures therefore, Adobe photoshop CS3 was used to support and solve this problem.

4.3 Discussion

Finding presented above from Survey, interview and questionnaire has highlighted many different factors that can be used to support the development of an online virtual museum. A public transportation that turns the journey to become more difficulties for those who does not have their own car or any other vehicles would found some boundaries in visiting the museum, this may not be referred to only the museum mentioned but also other museums that could possibly locate in the same type of area, the places that public transportation could not reach. From this, it tends to reduce the feeling to visit the actual museum, and if the museum has another choices that allow visitor to experience a different type of visitation, that would be the technology implementation.

Refer to the development of ICT in many different sectors; the museum sector in Malaysia is moving in at a slow phase as it left behind for almost 30 years from UK and US who managed to attract significant number of international and local visitors every year [18]; the use of such interesting features in presenting the museums artifacts and architectures shown can make the museum become more attractive. As goes for the website where public can easily access and would likely to be impressed if the website can display and demonstrate in smart way like panoramic virtual tour. Refer to the Pasir Salak Historical Complex, the museum is currently lacking the website which particularly needs it as a weapon to promote and attract more visitors.

To date, not many people who have been exposed to the virtual kind of technology as well as the panoramic virtual museum website, however, as the modern era has begun, people tend to live with technology trends and accept any new technology techniques that create such an attractive and convenient to their lives; as for the result, many of them are interested with panoramic virtual museum website even they have no idea about the virtuality and never visited this type of museum website before, while people who have experienced or used this type of technique before tend to give such a good response towards it; according to another result generated after attaching with prototype or website, the respondents provided with positive feedbacks toward the panoramic virtual museum website and tend to spend more times in navigating the website, some also responded that the features provided by this project has a few similarity as Google Street as it uses panoramic tour technique but distinct in representing the information, the feedback was "it's technique seems like Google street but it does not have narration and popup like this".

the panoramic virtual museum website is becoming one of the choices among the ways of museum visitation, however, community still prefer more to visit the museum physically as they are able to feel, touch and see the exhibits well; panoramic virtual museum website is not aiming to tract the general public for not to visit the actual museum one but being an alternative that create such a convenient for people and also support the attractiveness of the museum.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Nowadays, museum is moving forward alongside with the new technologies and systems; an improving communication channel like internet allows this institution creates alternative ways in presenting their artifacts and cultural heritages. A panoramic virtual museum website becomes a medium of interaction between museum and modern communities who keep follow the pace of new attractive developments. This type of website also acts with no aim of replacing the actual museum but positioning as a complementary while enhancing the function of current technology used for local museum.

5.2 Recommendations

This project has explained the attitude and the need for the development of panoramic virtual museum from the curator and general public perspectives. The findings of this study have a number of important implications for future practices. However, the survey questions might have some weaknesses where the choices given in the survey did not varies much as most of respondents like to select answer from the provided list (choices) rather than adding new answer on their own. The finding from the present research should be treated with a degree of caution for future references as it could be varies at all times, thus the result must therefore be viewed as indicative only rather than conclusive while further study can be conducted more in the future. For the prototype, it could be enhanced from the current stage that able to view 360 degree horizontally to 360 degree of all angles, it may. This type of website also would be developed to include with complex databases and map for a plan section as well as to make it compatible with mobile application and touch screen technology in the future.

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APPENDIX A: MONTHLY LISTS OF TOURIST NUMBER (PASIR SALAK HISTORICAL COMPLEX)

Bulan / Tahun	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Januari		1845	2612	5491	2132	4792	2558	2069	1759	3454
Febuari		3920	5058	2718	2014	1118	5238	4908	3045	4870
Mac		2278	1005	3491	5632	5801	4150	5480	3738	2280
April		3085	4330	3206	5754	4449	4433	5819	5096	3817
Mei	580	2789	4690	4615	3543	6288	5276	7464	5630	8813
Jun	1955	3255	4708	5162	5384	5522	7670	7656	2800	6392
Julai	1674	3450	2786	4086	3680	4169	4349	3331	3150	4747
Ogos	3630	4570	5048	5628	5076	6176	6587	5293	4623	6647
September	2764	2304	2959	2317	3304	4627	3398	4751	7009	9388
Oktober	2786	2869	4234	4217	6010	7832	3226	4507	3691	9079
November	4277	4265	6079	6099	7339	6373	6427	9813	7695	9300
Disember	1913	3536	2249	1340	3883	4099	8557	10596	5401	4415
Jumlah	**19579**	**38166**	**45758**	**48370**	**53751**	**61246**	**61869**	**71687**	**53637**	**73202**

527265

Laporan Jumlah Pelawat Berkunjung Ke Kompleks Sejarah Pasir Salak

website

Bulan / Tahun	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Januari	5168	6937	2440	2046	2397	1587	2199	1847	1603	4057
	48	44	12	14	94	24	20	9	7	65
Febuari	7346	3268	4061	3184	1521	2541	1420	2355	2233	1980
	191	53	11	26	24	42	48	18	23	6
Mac	5236	4879	2349	2391	1898	2285	1992	2816	2306	3521
	351	136	53	8	151	63	33	27	60	4
April	6212	4633	2783	2113	1852	1758	2122	1685	1407	2148
	251	61	17	4	2	4	13	4	6	3
Mei	7073	7724	3918	2955	3432	2628	2702	2802	3734	3207
	540	308	14	7	17	21	8	92	92	10
Jun	6437	5538	3556	4209	3315	3288	2527	3323	3535	4219
	346	76	190	9	13	207	48	30	6	16
Julai	5523	4886	2889	2334	3531	1961	2483	2066	2075	3480
	23	155	26	91	6	16	67	6	5	7
Ogos	6308	4065	4095	5777	4203	2861	3075	4230	3917	1809
	23	49	78	36	16	11	65	9	2	2
September	9405	8555	6086	3402	2455	1721	2105	1737	607	1790
	97	51	21	21	140	25	25	4	5	3
Oktober	8923	6223	5008	4806	2058	750	1533	2512	4445	2873
	43	4	4	60	18	12	8	4	19	7
November	8013	4194	2182	1845	1953	2925	2381	3743	4571	3384
	82	5	15	2	10	49	12	10	11	7
Disember	3387	4635	5020	3220	3044	4377	4016	5079	6870	5839
	17	6	24	37	8	95	26	33	17	34
Jumlah	**81043**	**66485**	**44852**	**38597**	**32158**	**29251**	**28928**	**34441**	**37556**	**38471**

431782

Daftar Bulanan Pelancong Kompleks Sejarah Pasir Salak.

	Bulan	Jan	Feb	Mac	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	
2008	Pelancong Tempatan	1603	2233	2306	1407	3734	3535	2075	3917	607	4445	4571	6870	37303
	Pelancong Luar	7	23	60	6	92	6	5	2	5	19	11	17	253
		1610	2256	2366	1413	3826	3541	2080	3919	612	4464	4582	6887	37556

Daftar Tahunan 2008

1 Australia	3	6 Indonesia	9	11 Switzerland	2
2 Brunei	1	7 Ireland	2	12 Thailand	4
3 Finland	3	8 Japan	1	13 United Kingdom	16
4 Germany	3	9 Russia	1	14 United States	6
5 Holland	10	10 Singapore	135	15 Others	57

Daftar Bulanan Pelancong Kompleks Sejarah Pasir Salak.

	Bulan	Jan	Feb	Mac	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	
2009	Pelancong Tempatan	4057	1980	3521	2148	3207	4219	3480	1809	1790	2873	3384	5839	38307
	Pelancong Luar	65	6	4	3	10	16	7	2	3	7	7	34	164
		4122	1986	3525	2151	3217	4235	3487	1811	1793	2880	3391	5873	38471

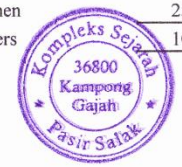
Daftar Tahunan 2009

Pelawat Tempatan

1	Perlis	378	6	Negeri Sembilan	946	11	Pahang	682
2	Kedah	1787	7	Melaka	613	12	Sabah	111
3	Pulau Pinang	1353	8	Johor	1009	13	Sarawak	94
4	Perak	22465	9	Kelantan	352	14	Kuala Lumpur	3289
5	Selangor	4411	10	Terengganu	507	15	Putrajaya	305
						16	Labuan	5

Pelawat Luar Negara

1	Australia	11	8	Japan	4	15	Turkmenistan	1
2	China	10	9	Philippines	2	16	Ukraine	2
3	England	21	10	Russia	2	17	United Kingdom	5
4	France	3	11	Singapore	37	18	Vietnam	4
5	Germany	6	12	South Korea	2	19	Yemen	25
6	Holland	3	13	Taiwan	4	20	Others	10
7	Indonesia	8	14	Thailand	4			



Daftar Bulanan Pelancong Kompleks Sejarah Pasir Salak.

	Bulan	Jan	Feb	Mac	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	
2010	Pelancong Tempatan	1770	3255	2971	1808	2565	4451	1987	1049	1971	3164	3970	5858	34819
	Pelancong Luar	42	23	12	20	54	86	20	72	4	4	11	48	396
		1812	3278	2983	1828	2619	4537	2007	1121	1975	3168	3981	5906	35215

Daftar Tahunan 2010

Pelawat Tempatan

1 Perlis	105	6 Negeri Sembilan	538	11 Pahang	504
2 Kedah	1743	7 Melaka	358	12 Sabah	360
3 Pulau Pinang	893	8 Johor	1274	13 Sarawak	76
4 Perak	20211	9 Kelantan	440	14 Kuala Lumpur	3619
5 Selangor	4784	10 Terengganu	303	15 Putrajaya	220
				16 Labuan	7

Pelawat Luar Negara

1 Australia	4	6 Holland	2	11 New Zealand	34	16 Thailand	23
2 Bangladesh	37	7 Hong kong	3	12 Russia	6	17 United Kingdom	21
3 Brunei	17	8 Indonesia	62	13 Scotland	4	18 United States	17
4 England	17	9 Italy	4	14 Singapore	112	19 Yemen	1
5 France	12	10 Netherland	6	15 Sri Langka	2	20 Others	13

Daftar Bulanan Pelancong Kompleks Sejarah Pasir Salak.

	Bulan	Jan	Feb	Mac	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	
2011	Pelancong Tempatan	1665	3266	2456	1803	2405	4052	1980	493	2000				20120
	Pelancong Luar	23	23	9	5	33	20	7	1	14				135
		1688	3289	2465	1808	2438	4072	1987	494	2014	0	0	0	20255

Daftar Tahunan 2011

Pelawat Tempatan

1 Perlis	147	6 Negeri Sembilan	317	11 Pahang	296		
2 Kedah	802	7 Melaka	268	12 Sabah	60		
3 Pulau Pinang	528	8 Johor	445	13 Sarawak	39		
4 Perak	10484	9 Kelantan	235	14 Kuala Lumpur	1961		
5 Selangor	2405	10 Terengganu	166	15 Putrajaya	160		
				16 Labuan	4		

Pelawat Luar Negara

1 Afghanistan		42 Dominica		83 Kyrgyzstan		124 Russia	
2 Algeria		43 Dominican Republic		84 Laos		125 Rwanda	
3 Angola		44 Ecuador		85 Latvia		126 Saudi Arabia	
4 Antigua & Barbuda		45 Egypt	2	86 Lebanon		127 Senegal	
5 Argentina		46 El Salvador		87 Lesotho		128 Sierra Leone	
6 Armenia		47 Equatorial Guinea		88 Liberia		129 Singapore	36
7 Australia	10	48 Eritrea		89 Libya		130 Somalia	
8 Austria		49 Estonia		90 Lithuania		131 South Africa	
9 Azerbaijan		50 Ethiopia		91 Madagascar		132 South Korea	4
10 Bahamas		51 Finland		92 Malawi		133 Spain	
11 Bahrain		52 France		93 Malaysia		134 Sri Langka	
12 Bangladesh		53 French Guiana		94 Maldives		135 St. Kitts & Nevis	
13 Barbados		54 Gambia		95 Mali		136 St. Lucia	
14 Belarus		55 Georgia		96 Malta		137 St. Vicent & The Grenadines	
15 Belgium		56 Germany		97 Mauritania		138 Sudan	
16 Belizze		57 Ghana		98 Mexico		139 Suriname	
17 Benin		58 Greece		99 Moldova		140 Swaziland	
18 Bhutan		59 Grenada		100 Monaco		141 Sweden	
19 Bolivia		60 Guatamala		101 Mongolia		142 Switzerland	
20 Botswana		61 Guinea		102 Morocco	4	143 Syria	
21 Brazil		62 Guinea Bissau		103 Mozambique		144 Taiwan	
22 Brunei	8	63 Guyana		104 Myanmar		145 Tajikistan	
23 Bulgaria		64 Haiti		105 Namibia		146 Tanzania	
24 Burkina Faso		65 Holland	4	106 Nepal		147 Thailand	2
25 Burundi		66 Honduraas		107 New Zealand		148 Togo	
26 Cabinda		67 Hong kong		108 Nicaragua		149 Trinidad & Tobago	
27 Cambodia		68 Hungary		109 Niger		150 Tunisia	

28 Cameron		69 Iceland		110 Nigeria		151 Turkey	1
29 Canada		70 India	2	111 North Korea		152 Turkmenistan	
30 Central African Republic		71 Indonesia	27	112 Norway		153 Uganda	
31 Chaad		72 Iran		113 Oman		154 Ukraine	
32 Chile		73 Iraq		114 Pakistan		155 United Arab Emirates	
33 China		74 Ireland		115 Panama		156 United Kingdom	10
34 Colombia		75 Israel		116 Paraguay		157 United States	
35 Congo		76 Italy		117 Peru		158 Uruguay	
36 Costa Rica		77 Jamaica		118 Philippines		159 Uzbekistan	
37 Cote D'Ivoire		78 Japan	1	119 Poland		160 Venezuela	
38 Cuba		79 Jordan		120 Portugal		161 Vietnam	4
39 Cyprus		80 Kazakhstan		121 Pueerto Rico		162 Yemen	5
40 Denmark		81 Kenya		122 Qatar		163 Zambia	
41 Djiboti		82 Kuwait		123 Romania		164 Zimbabwe	
						165 Others	9

APPENDIX B: QUESTIONNAIRE

Questionnaire (English Version)

Survey Questions

This questionnaire is designed to gauge the interests of general societies toward virtual online museum/ panoramic virtual tour of Museum website as well as their responses on visiting through this type of museum website. Please take a few minutes to answer the survey questions and thank you very much for your contribution and support.

1. Please select your gender
   ☐ Male
   ☐ Female

2. Age : …….years

3. Occupation
   ☐ Student ☐ Nurse
   ☐ Teacher/Lecturer ☐ Doctor
   ☐ Entrepreneur ☐ Gardener
   ☐ Housewife
   ☐ Government Officer
   ☐ Other (Please state) : …….

4. How frequently do you use the internet?
   ☐ Never ☐ Rarely ☐ Often ☐ Usually ☐ Always/Everyday

5. Have you ever visited the actual museum?
   ☐ Yes ☐ No

6. Have you ever visited museum websites?
   ☐ Yes ☐ No

7. Have you ever visited Virtual museum websites/ Panoramic virtual tour of Museum website?
   ☐ Yes ☐ No

8. Do you have any idea about virtuality/ virtual museum website/ Panoramic virtual tour of Museum website?

☐ Yes, and I find it very interesting and engaging
☐ Yes, but I think the website and its panoramic virtual reality is a nuisance
☐ Yes, but I have not visited or browsed those websites yet
☐No, I don't know anything about virtual museum website / Panoramic virtual tour of museum Website

9. Which choice do you prefer most when it comes to visit the museum?
   ☐ Visit the actual museum
   ☐ Visit museum through website (General museum website/Virtual museum websites/
   Panoramic virtual tour of Museum website)
   ☐ Visit the museum through other medias eg. Television, Youtube, Video
   ☐ Others (Please state)……. ……

10. If you choose to visit the museum through website, what would be the reasons?(You may answer more than one and You may leave this question if it is not applicable)
   ☐ Time consuming ☐ Trends ☐ Budget ☐ Physical barrier (Disabled, Sick)
   ☐ Distance ☐ Coincidently click on its website ☐ Transportation
   ☐ Suggested by friends ☐ Others (Please state)…….

11. Describe your interest scale in Virtual museum website / Panoramic virtual tour of Museum website?
   ☐ Very interested ☐ Interested ☐ Neutral ☐ Not really interested
   ☐ Strongly uninterested

Questionnaire (Bahasa Melayu Version)

Kaji Selidik

Kaji selidik ini bertujuan untuk menilaikan jumlah bilangan di kalangan masyarakat umum yang berminat terhadap penggunaan virtual online muzium/melayari web muzium yang mengunakan teknik panoramic serta sambutan terhadap laman web sebegini.Diharap anda dapat luangkan sedikit masa untuk mengisi kajiselidik ini. Kerjasama anda amatlah dihargai.Terimakasih

1. Jantina
   ☐ Lelaki
   ☐ Perampuan

2. Umur : …….tahun

3. Pekerjaan
   ☐ Pelajar ☐ Jururawat
   ☐ Guru/ Pensyarah ☐ Doktor
   ☐ Usahawan ☐ Pekebun
   ☐ Suri rumah
   ☐ Pegawai kerajaan
   ☐ Lain - lain (Sila nyatakan) :
   …….

4. Berapa kerapkah anda menggunakan internet?
   ☐ Tidakpernah ☐ Jarang ☐ Seringkali ☐ Biasa ☐ Sentiasa/Setiaphari

5. Pernahkah anda berkunjung kemuzium?
   ☐ Ya ☐ Tidak

6. Pernahkah anda melayari laman web muzium?
   ☐ Ya ☐ Tidak

7. Pernahkah anda melayarilaman web muzium secaramaya / web muzium yang mengunakan teknik panoramic?
   ☐ Ya ☐ Tidak

8. Tahukah anda mengenai mayateknik/ web maya muzium (web virtual museum) / web muzium yang mengunakan teknik panoramic?
   ☐ Ya, ia amat menarik
   ☐ Ya, tetapi pada pendapat saya ia menyusahkan
   ☐ Ya, tetapi saya belum pernah melayari laman web tersebut

☐ Tidak, saya tidak tahu mayateknik/ web maya muzium(web virtual museum) / web muzium yang mengunakan teknik panoramic

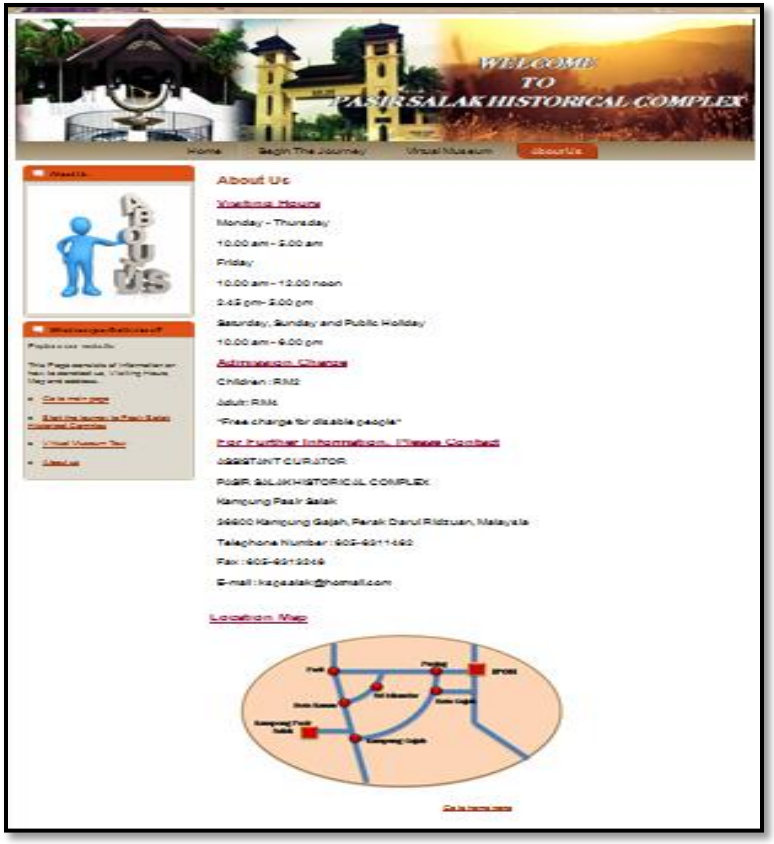
9. Cara manakah yang anda akan pilih untukmelawatmuzium?
   ☐ Pergi melawat sendiri kemuziumtersebut
   ☐ Melayari laman web (termasuk web muzium/web mayamuzium,web virtual muzium/web muzium yang mengunakan teknik panoramik)
   ☐ Melayari sumber media yang lain seperti Televisyen, Youtube, Video
   ☐ Lain-lain (Silanyatakan)…….
10. Jelaskan sebab-sebab mengapa anda memilih untuk mengunjungi muzium dengan cara melayari laman web?
    ☐ Menjimatkan masa ☐ Gaya hidup masa kini ☐ Bajet ☐ Masalah fizikal (Cacat, Sakit)
    ☐Jarak/ Jauh ☐ Tidak sengaja melayari laman web tersebut ☐ Kenderaan
    ☐Dikenalkan oleh rakan-rakan ☐ Lain-lain (Sila nyatakan)……..……
11. Nyatakan Sejauh mana minat anda terhadap laman web virtual muziam / web muziam yang mengunakan panoramic teknik?
    ☐Sangat berminat ☐ Berminat ☐ Neutral ☐ Tidak berminat
    ☐ Langsungtidakberminat

APPENDIX C: PROTOTYPE

Figure C.1: Main Page

Figure C.2: Start journey

Figure C.3:Virtual Museum Page with subpages (Architecture, Diorama and Dagger gallery section) and Popup with narration boxes



FigureCB.4:About us Page

Toolbar description:

When visitor click on those show case from main Virtual Tour, it will link to another window display flash in html where the visitor able to rotate the view 360 degree and support by tool devices below the flash window.

 : Buttons that enable visitor to rotate the view to right and left

 : Buttons that enable visitor to rotate the view up and down

 : Buttons that enable visitor to zoom in and zoom out

 : Button that enable an automatically or continually rotate the view 360 degree

 : Button that enable visitor to view in full screen mode

 : Sign that refer to link which enable visitor to continue the tour to the other sections of museum

 : Button that display on the object which allow visitor to click on While provides a pop up information

APPENDIX D: POSTER PRESENTATION

Figure D.1: Poster Presentation

Panoramic Virtual Museum Website

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ABSTRACT

Panoramic virtual museum website refers to the idea of displaying and promoting artifacts virtually with 360 degree view using the digital or electronic devices to wide public. Even though there are many panoramic virtual museums existed throughout the world, but the number appearance of this technique within Malaysia is considered few. Furthermore, many people have not been exposed to the panoramic virtual of museum website while the museum's accessibilities itself are still insufficient due to many factors which provide difficulties toward museum visitation for visitors. A panoramic virtual museum website is developed as an alternative way with a simple but complete self guided virtual tour and enable visitors to manipulate the scene up to 360 degree rotation, move, resize, set an automatic rotation and turn it into full screen mode. This website also provides the tour that consist "hotspot" which enable to link from one section to another while providing the popup information and narrations for the objects shown. The website been developed using waterfall model methodology which consists of many series of definite phases that run with an intended to start sequentially after another and Pasir Salak Historical Complex has been chosen as a platform for project development.

Keywords: Museum; Panoramic; Virtual Website; Museum Website; Pasir Salak Historical Complex;

I. INTRODUCTION

Museum is the place or institution which collects, organizes, displays, protects and preserves the national heritages, promotes the history and culture as well as delivers knowledge to public.[1] Through those definitions or roles of the museums, the technology and mass media have become the important tools that facilitate in their performance where they use the digitalization to implement for not only conservative cultural information but also make it more attractive with many interactive techniques including panoramic virtual website while available to various points of access to the public. Recently, many museums are opened for visitors everyday include weekend during day times and office hours but there are many people who unable to visit during those times provided.

The distance and cost of the transportation are factors which people take into consideration when it comes to visit the museum as well. Apart from that, disabled people who cannot experience exhibits due to the physical barriers could have the difficulties regarding to the visitation, thus the accessibility and convenience of the museum are not that sufficient yet.

The findings of this study will serve as a useful indicator in determining public interest, needs and responses toward the virtual tour website development for local museum. The main aspiration of the establishment will be to create an alternative way of museum visitation for visitors who unable to visit the physical museum due to the insufficient of accessibilities and availabilities with an interactive panoramic virtual museum website and allow the visitor to perform a self guided tour the museum up to 360 degree using Pasir Salak Historical Complex as a platform for the project.

II. LITERATURE REVIEW

A. Information and Communication Technology (ICT) used by Museum

The developments of Information and Communications Technology (ICT) nowadays become enormously advance and widely use by people and organizations. Nick Poole has given the definition of the ICT as the catching of all terms which describe computers and the different ways that they can be used to communicate and interact among people [2].

The method of providing museum with information technology (IT) solutions in presenting the objects, artifacts and cultural heritages in an interactive way was recognized during the *International Conferences on Hypermedia and Interactivity in Museums* (ICHM) since 1991[3], it encourages the museum in changing the way to disseminate information of the museum using new technology and applications multimedia. While in the year 1997 based on the annual conference *Museum and the Web* has shown that a lot of museums become more interested in sharing their collection information to wide public or presenting on the World Wide Web [4].

1) Internet Based Communication for Museum

Museums have emphasized on the education and access for the last long period ago with the goal that can make them to be more inclusive, relevant, valuable and lifelong education resource for the society [5]. As for today, when the internet has become a normal tool of communication which widely uses by public, the museum is facing with the new opportunities to

increase the accessibility of the visitors for not only by physical entering but also digital entering.

According to Nick Poole and Gordon Mckenna, the website in some ways, we can think as the best of having an opening small television or radio station that never turns off and requires an ongoing input of fresh, interesting content to ensure that people keep coming back [2].

Refer to MacDonald and Alsford(1997), they have stated that the museums cannot be remained farther from the technology trends in order not to lose the audiences from 21st century[6]. At present, people are using the computer and internet as a prominent part of their lives for education, work, recreation and entertainment; by using this power, the museum will be able to attract and reach to global audiences [7]. Apart from that, people also able to use their own mobile phones and digital television on surfing the internet thus the more advance technology use, the more alternative ways that the visitors can access and view the museum website.

However, even there are many advantages of having a website which provides an accessibility to a wide visitors with information but there are some dangerous of miss used or conduct for those people who do not take the advantage of ICT in a good way. Donovan (1997) warns that the museum should not think about to simply provide the accessibility to all visitors to the museum collection database or centric information database while encourage to provide context, storytelling and stimulate curiosity, exploration and serendipity, if they want to create compelling online experiences and be of interest to a broad range of users [8] as conclude that the online museum website should have provide a suitable depth of information or conceptual accessibility.

2) Information and Communication Technology (ICT) for museum in Malaysia

Recent study regarding to the ICT used in museum institution in Malaysia have found that all the museums have implemented and installed adequate ICT services, applications and infrastructures. The Internet connection is available to all museums but some do not have their own Web sites and portals. The virtual reality is included under the list of less ICT services and applications used by museum as it is being implemented only one place in Malaysia with serve an astronomy using half dome system. In summary of the study, adequate ICT infrastructures have been implemented by museums in Malaysia at the medium level [1]. Therefore, the development of the virtual museum is worth that to be utilized and encouraged in order to enhance the level of ICT use by the museums in the country.

B. Virtual Museum Tour

Based on this concept of connectedness that enable the museum to communicate or generate its information to audience, Ben Davis reaches out the conclusion as the virtual or digital museum become the visitor-centered rather than the curator-centered[9]. Panoramic virtual museum tourist fallen under the virtual categories which creates a 360 degree image of an exhibit with an aesthetically pleasing and uncluttered for a greater feeling of reality for the site visitors [10] this can attract a huge number of audiences, the more friendly or simple use to navigate the Website the higher the attractive level of the website will be.

There are several advantages a virtual tour provides for museum include the followings:-

1) Access: Providing an alternate access to for museums by showing the objects which is constructed under limited access physically to digital way. Audiences able explore with alternative formats of the artifacts descriptions, artifacts visualization, and screen readers with closer look, adjustable and intractable experiences of objects that are closed or sometimes overlooked by visitors.

2) Education: Providing a tool for students or general audiences as an educational reinforcement and teaching supplement while allowing an interactive experience to further understand certain artifacts either prior to, during or after visiting the exhibit.

3) Artifact conservation: Allowing access objects or artifacts in digital storage as it has limited space on museum site as well as protecting the original unique artifacts and prolongs its ages by reducing from handling, lighting and etc.

4) Promotion: Enabling the Website to become one of the media tools to promote museum as a tourist attraction place of the country where it is accessible to wide public all around the world [10].

C. Sample Museum Website

As go through to the museum websites in Malaysia, all of them provide information regarding to the artifact shown in the museum with picture, its descriptions and other activities promoted. The visitor can access to the website and go through each collection by viewing the image shown for instance the website of Museum Negara[11] and previous Pasair Salak Historical Website[12], while other different function displays of Cheng Ho Cultural Museum website[12] included the map part of the museum itself where the visitor can press to the location map provided and the pop up window will display the artifacts shown of that location [13]. However, there is no museum website which contains panoramic virtual feature yet there for, the completion of the project would be the first panoramic virtual museum website in Malaysia.

Pitt River Museum, The Canadian Museum of Civilization Corporation and The Marischal Virtual Museum website are chosen as the sample of best practices museum websites of European Museums [7]. The main similar criteria is about the navigation of the virtual museums are produced as ease of use and simple aesthetically pleasing and uncluttered, rich and complex databases that enable visitor to search a particular object of regarding to their interest while educate a wide range of visitors through information and its displayed. Virtual Museums for these websites also have improved the services of the real museums as well.

D. Requirements for panoramic image

Creating the panoramic image is an important part in building panoramic virtual website. It requires a sequentially planned photography in capturing a full 360 degree x 180 degree view of the scene. It is also required to use camera in capturing row of images with tilting up and down as it calls pitch with its degrees from downward as negative and upward as positive using the tri pod for camera in standing to take picture. Each pictures required an overlap between adjacent images for about 30% based on the focal length of lens. The next step would be stitching the images together after import those pictures into the software or Photo stitching software, stitch it together and set the control point at overlap area to form a cylindrical panorama. Figure 2.4 is shown the transformation of it cylindrical [14].

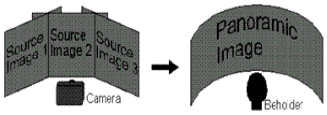

Figure1: Rendering Transformation after pictures are stitched

However, throughout the problem of brightness of each picture and overlapping area might not be exactly the same which required to edit its brightness, make a multi band blending or cross faded each other [15].

III. METHODOLOGY

The incremental of project development is an evolution of the waterfall model. The model refers to a series of the definite phases where each of them is running with an intended to start sequentially after another. Cycles are divided into smaller, more easily managed iterations. Each iteration pass through the Planning, Analysis, Design, implementation while maintain with the support. The model of water fall generates a quickly and early working during the system life cycle; it is flexible for the scope and the requirement when it is required to change. It is also easier when it comes to test during the small iteration and managing the risk where it can be identified and handle during its iteration before it combine the whole development [16].

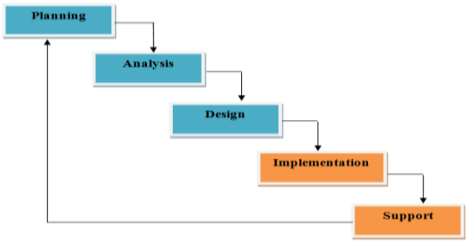

Figure 2: Water Fall model

The first phase is planning which is an important since it defines all information that is required to ensure the development of the project successful. The steps that been carried out during this phase includes define the website to be developed, the tools that required for the development of the virtual website, implement the Gantt chart to plan the project scheduling and time allocation, prepare related literature review and research to support the development of the website.
During analysis phase, the author analyzed all the information collected during planning phase and start gathering the information from respective museum, research, conduct survey to determine general community's interest towards project and museum visited. The interviews were conducted in this phase include pre-interview with assistant curator of Pasir Salak Historical Complex to gather the information regarding the general information required for website contents, the present ICT used by museum, problem faced and etc. Post- Interview also conducted to evaluate the responses of assistant curator, staff and users toward the website developed.
For designing phase, first is to capture images using panoramic technique processes which require capturing 360 degree circulation of each scene, the image need to be furnished or edit its brightness and color then it been proceeded to stitching process. The tour designed is created after panoramic images are prepared and come out with flash tour; the following step would the embedded the tour to website that contain all information needed. The completed panoramic virtual museum website was not proceed with the last two phases implementation and support phase as the contents of the Website and its details been allowed to use the respective museum as a platform for education purposes only despite from being tested to evaluate the responses from assistant curator, staff and users.

Figure 3: Main page of Website and its virtual tour pages

IV. RESULTS & DISCUSSION

A) Results & Findings

1) Museum Visited

The Pasir Salak Historical Complex locates at kampong Pasir Salak in Kampung Gajah town, Perak Darul Ridzuan. Through author's observation, this museum is suited being as a platform for the development of the project where it consists of many different architectures outdoor include monuments, Malay old houses, watch tower, traditional harvest dance stage, time tunnel building and etc. For indoor, there are many different items of artifacts and dioramas that being included in the project. Not only at the museum point that attract author attention and interest, but also the environment along the journey to the Pasir Salak Historical Complex surrounds by beautiful and full with an old aura of traditional culture like traditional houses. However, the museum accessibility still insufficient due to the lack of public transportation and its availability. The more convenient for the visitor for being here is to visit the museum by private car.

2) Interviews

There are two interviews that have been conducted include pre-interview with an assistant curator of Pasir Salak Historical Complex for the purpose of gathering the information regarding to the present technology used and any other media implements by the selected museum, details information that could support the development of the project as well as the directions for the development of project website. Another is post-interview that was conducted to evaluate the respondent's feedback towards the completed panoramic virtual website, this interview involved with assistant curator of respective museum, staff and normal users who were randomly selected. The results of the interviews are concluded as the followings:-

a) Pre-interview: Pasir Salak Historical Complex is a museum that has a huge number of visitors each year (table 1). At present, the technology used in supporting the museum exhibitions include Video demonstration, Kiosk and Sound display using sensor detector while the website which was previously implemented has no longer existed. Therefore,

the museum is having a suitable condition and needs for the website development. In future, the number of visitors could also be increased through the uses of this interactive website as well.

Table 1: Previous number of visitors

Year	Number of visitors
1990-1999	527,265
2000-2009	431,782
2010-2011(Jan -Sept)	55,740

b) Post-interview: The completed panoramic virtual website was brought to test and get the responses from particular respondents mentioned. The positive reactions have shown as assistant curator was attracted with this website and provided good feedback. For users, which consist with 10 persons, two from staff of Pasir Salak Historical Complex, four are students from UiTM University and four students from Universiti Teknologi PETRONAS have provided good responses and spent more times navigating the website. Majority of them responded that they have never experienced with this type of museum website before while one respondent mentioned about the similarity of this Panoramic virtual museum website with Google street as it enable user to navigate the scene provided with 360 degree but distinctly different at the pop up narration section which provides by this website but have not yet consisted in Google street.

3) Questionnaire

The questionnaire is designed to gauge the interests of general societies toward virtual online museum/ panoramic virtual tour of Museum website as well as their responses on visiting through this type of museum website while its result will become one of the factors that will support the development of Virtual Museum Online. The survey questionnaire had been conducted from 20 of May until 15 of June 2012, the questionnaire was distributed in an online form created using Google account while having facebook, E-mail and instant messenger as media delivered the questions to respondents. It also was distributed by hand at Pasir Salak Historical Complex, Universiti Teknologi PETRONAS and Shopping Market. There were 145 respondents with the age range from 11-75 years old; the majority of respondents were students. And for the result, the responses with 88% have never experienced with panoramic virtual museum website despite from 12% who experienced with it before. Towards the familiarity and knowledge regarding to panoramic virtual museum, 59% of all responses said that they have no idea of what the panoramic virtuality is, 23% responded as they know and found it interesting and engaging, 17% responded as they know but have not been exposed or browsed to those websites yet while only 1% of all found it as nuisance. Thus these can be evaluated as not many people are exposed to the virtual kind of technology as well as the panoramic virtual museum website.

Many people are interested with panoramic virtual museum website despites never visited this type of museum before as 44% responded that they are interested and 19% with really interested toward panoramic virtual museum website; from both of these responses (interested and really interested scale), 48.9% of them are respondents who have no idea regarding to panoramic virtual website. Further mean measures calculation of the respondent's attitudes is provided to display a positive direction and support for the development of the website. The question consists of five scales, for the first one or strongly uninterested, only 1 % or 1person responded to this scale thus total score is (1x1)=1; For second scale which refer to not really interested scale, there are 15 responses calculated as 10% of all responses with total score(2x15)=30; The third scale which is neutral, there are 37 responses calculated as 26% of all responses and it is also the second most selected scale with total score of (3x37)=111; the fourth scale refers to interested choice, it is the highest or most selected choice by respondents with 64 responses calculated as 44% of all responses with total score (4x64)=256; and for the last scale strongly interested, there are 28 responses calculated as 19% of all responses with total score (5x28)=140. This result seems positively incline to interested or fourth scale where it is measured by Mean value, M=(overall total for each scale/ overall responses)=> (1+30+111+256+140)/145=3.71 and its percentage is (3.71x100/5) = 74.20%. This calculation shows a positive lean up value towards interested scale.

Table 2: Mean measure of respondent's interest toward virtual museum websites/ panoramic virtual tour of museum website

Item	Score					Mean	%
	Strongly uninterested	Not really interested	Neutral	Interested	Strongly interested		
	1	2	3	4	5		
Interests to Ward virtual museum web sites/panoramic virtual tour of museum web site	1	15	37	64	28	3.71	74.20 %

B) Design & Development

The development of project consists of many stages include:

1) Capturing images

Photographing the image using Cannon 100D Camera with 360 degree circulate the environment of the item needed with many shots continually. Each of picture is compulsory to be overlapped for 50-70% of the previous image. Some shots require using tripod to reduce the error or unlined of images.

2) Editing the images

Some of the images need to be adjusted to increase the brightness, contrast and vanishing for an effective stitching process. This step, the images have been edited using Adobe Photoshop (CS3).

3) Stitching images

All of images taken are stitched together to make such a panoramic pictures using Photo Stitching Software.

4) Convert and Create panoramic image into flash

By using Pano2VR software, the images are uploaded to create an interactive virtual museum tour which consists of toolbar for visitor to enhance their views, the hotspot that link one scene to another and popup that provide information regarding to objects as well as the narrations.

5) Website

The website is developed using html language while embedded the panoramic virtual museum flash.

(The prototype can be refer to Appendix C)

The main challenges occurred were related with the images capturing, stitching and panoramic tour development as all are related to each other, One scene of panoramic image was required to be taken for more than fifty images in order to get the most connected picture. For the stitching process, it was required to select from the first step for more than twenty-five images based on each scene; Once the pictures taken are not in line with each other due to the differences of its brightness and angles(unavoidable), the stitching process will not be able to generate the neat and nice pictures. Therefore, Adobe Photoshop CS3 was used to support and solve this problem.

C) Discussion

Finding presented above from Survey, interview and questionnaire has highlighted many different factors that can be used to support the development of an online virtual museum. A public transportation turns the journey to become more difficulties for those who do not have their own car or any other vehicles would found some boundaries in visiting the museum, this may not be referred to only the museum mentioned but also other museums that could possibly locate in the same type of area, the places that public transportation could not reach. From this, it tends to reduce the sensation to visit the actual museum, and if the museum has another choices that allow visitor to experience a different type of visitation, that would be the technology implementation.

Refer to the development of ICT in many different sectors; the museum sector in Malaysia is moving in at a slow phase as it left behind for almost 30 years from UK and US who managed to attract significant number of international and local visitors every year [18]; the use of such interesting features in presenting the museums artifacts and architectures shown can make the museum become more attractive. As goes for the website where public can easily access and would likely to be impressed if the website can display and demonstrate in smart way like panoramic virtual tour. Refer to the Pasir Salak Historical Complex, the museum is currently lacking the website which particularly needs it as a weapon to promote and attract more visitors.

To date, not many people who have been exposed to the virtual kind of technology as well as the panoramic virtual museum website, however, as the modern era has begun, people tend to live with technology trends and accept any new technology techniques that create such an attractive and convenient to their lives; as for the result, many of them are interested with panoramic virtual museum website even they have no idea about the virtuality and never visited this type of museum website before, while people who have experienced or used this type of technique before tend to give such a good response towards it; according to another result generated after attaching with prototype or website, the respondents provided with positive feedbacks toward the panoramic virtual museum website and tend to spend more times in navigating the website, some also responded that the features provided by this project has a few similarity as Google street as it uses panoramic tour technique but distinct in representing the information, the feedback was "it's technique seems like Google street but Google street does not have narration and popup like this".

The panoramic virtual museum website is becoming one of the choices among the ways of museum visitation, however, community still prefer more to visit the museum physically as they are able to feel, touch and see the exhibits well; panoramic virtual museum website is not aiming to tract the general public for not to visit the actual museum one but being an alternative that create such a convenient for people and also support the attractiveness of the museum.

V. CONCLUSION & RECOMMENDATION

Nowadays, museum is moving forward alongside with the new technologies and systems; an improving communication channel like internet allows this institution creates alternative ways in presenting their artifacts and cultural heritages. A panoramic virtual museum website becomes a medium of interaction between museum and modern communities who keep follow the pace of new attractive developments. This type of website also acts with no aim of replacing the actual museum but positioning as a complementary while enhancing the function of current technology used for local museum.

This project has explained the attitude and the need for the development of panoramic virtual museum from the curator and general public perspectives. The findings of this study have a number of important implications for future practices. However, the survey questions might have some weaknesses where the choices given in the survey did not varies much as most of respondents like to select answer from the provided list (choices) rather than adding new answer on their own. The finding from the present research should be treated with a degree of caution for future references as it could be varies at all times, thus the result must therefore be viewed as indicative only rather than conclusive while further study can be conducted more in the future. For the prototype, it could be enhanced from the current stage that able to view 360 degree horizontally to 360 degree of all angles. This type of website also would be developed to include with complex databases and map for a plan section as well as to make it compatible with mobile application and touch screen technology in the future.

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