

Multimedia Display in a Natural Habitat Environment to Enhance Visitors' Gallery Experience

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ABSTRACT

Technological advancements in exhibition spaces are changing gallery displays. Contents are becoming a mixture of analogue and digital. This poses a new challenge in physical layouts, content platforms, exhibition furniture and visitors' experience. The Environmental Interpretive Centre (EIC) focuses on mangrove conservation along the Sepang River and promotes eco-tourism. It is managed by the Malaysian Nature Society (MNS) and Sepang Goldcoast (SGC), and visited by local and international nature lovers. Apart from outdoor activities such as river cruise, mangrove guided tour and bird-watching, there is an indoor showcase such as poster display, replica of mangrove trees and inhabitants. Current issue is that visitors especially school children find the artifact on display less informative and attractive. They prefer digital display and interactive showcases. The objective of this research is to find out whether digital technology can enhance visitors' experience. Mangrove content is created into creative video by students of Visual Research & Communication from the Faculty of Creative Multimedia. These digital videos are showcased on a looping mode and can be selected individually for viewing pleasure. Other multimedia art forms such as photographs are displayed together with the existing analogues. A descriptive research is carried out to study visitors' perception of the digital enhancement via observational method. Their views on the multiple platforms are also recorded. Findings will benefit the nature society, multimedia artists and environmental designers in knowing which display tools are received well by visitors. In the future, interactivity can be designed to further enhance galleries for natural environment.

KEYWORDS: Multimedia Gallery, Digital Display, Visitor Experience, Natural Environment

INTRODUCTION

Exhibition spaces such as galleries and museums consists of indoor and outdoor display areas. Owners of the spaces utilize these spaces to exhibit, display and showcase their content, artworks, designs, artefacts and products in multiple display platforms. It usually consists of the conventional analogue showcases, digital or multimedia installations, virtual environment, or a mix of these types of environment to suit different display functions and to attract visitor's attention. Different content and environment have their own objectives and targeted audiences which influences the gallery setting as a whole. Factors such as types of content, presentation tools and techniques often influence designers and artists' preferences for designing and creating their content, mode of display and installation settings in the exhibition spaces, be it indoor or outdoor spaces. Artists' intended message to be conveyed to various visitors from all age groups (toddlers, children, young adults, adults, and elderly) also has a significant influence to the decision of designing these spaces.

In this study of visitor perception of a natural environment exhibition space, an indoor gallery space which houses analogue artifacts, replicas, posters and information on the mangrove area spreads out onto an outdoor deck area for bird watching and other inhabitant's observation. There is a track that leads into the natural mangrove area along the river. Local and international visitors are able to gain knowledge and different experiences from both indoor and outdoor spaces. They can visit the interior gallery before proceeding to the outdoor area for hands on experience, or vice versa. Either way visitors are able to understand more about the mangrove area. The indoor gallery is located at the Environmental Interpretive Centre (EIC), at the Tapak lama Balai Polis in Sepang, Selangor. The authentic area offers a diverse range of activities such as mangrove river tracking, bird watching, flora and fauna discoveries and many more. Thus, the content of the gallery focuses on the natural habitat of surrounding mangrove area, its inhabitants and explores the sanctuary of the many species of flora and fauna.

Currently indoor showcases displayed are a variety of printed material such as posters, pictures, illustrations, brochures and a spread of miniature replica of the mangrove trees and creatures such as crabs, birds, monkeys, shells and many others. The abundance of information targets visitors such as school children, nature

societies, NGOs, nature enthusiasts and many others. For many years the EIC is a place for visitors to learn more about mangrove area and its preservation efforts as well as the important function of the mangrove eco-system.

Information displayed at the indoor gallery is viewed in a normal viewing mode which is in a loop, array and subsequent order which invites visitors to view the artifact and read the information on display. The direction of the visitor path throughout the indoor gallery will eventually lead them to the outdoor verandah that overlooks the outdoor mangrove area. There is a seating area for groups of visitors to observe the mangrove area, for photography and video taking, as well as an outdoor briefing session to the visitors. There is no display tools here other than furniture for sitting, obviously a space designed for hours of nature observation either during the night or day. There is a pathway that leads into the mangrove area from the balcony. From the preliminary study of the space, it is gathered from staff that operate the center that many visitors request for interactive, digital display and installation especially for children. Visitors that come here usually are on an educational purpose and often seeks further information on the mangrove area. Multimedia platform is also part of their suggestions as printed material and display may not necessarily hold long span of attention ability especially for primary school children.

For visitors who go for tracking and experience the hands on by venturing along the trees that leads to the river will often come back into the indoor gallery area to reflect and digest/discuss their recent experience. The need for a quick recap on what they have discovered is fulfilled via the gallery analogue display. In reference to other multimedia galleries, it will be of an advantage should the display be enhanced with video and interactive installation such as games platform, interactive website, portals and sensorial display to assist further on their interest. These multimedia platforms will benefit them in completing their visit to the center as well as fulfilling and satisfying their quest for knowledge.

Taking the current issue of introducing multimedia platforms as an additional display mode, new digital display such as photographs and video presentation is installed at the indoor gallery. Visitors are observed for their behavior and perception of the multimedia installation. They are also interviewed for their feedbacks on how these additional items are able to enhance their experience, do they add to their knowledge, do they feel excited, comfortable, satisfied and able to comprehend what is being displayed. Observational data is collected and descriptive analysis is conducted.

LITERATURE REVIEW

Galleries

A gallery has always been considered a place to acquire, conserve, research, communicate and exhibit for the purpose of study, education and enjoyment [1]. Their role has always been important in the social society in areas of traditions, culture, art and craft, education, industrial growth and technological advancement. These institutions are non-profit making, permanent institutions in the service of society and as material evidence of man and his environment. They are important to the society as historical preservers, aesthetic collectors and educational innovators. There are two types of gallery, the physical gallery and the virtual gallery. A physical gallery relates to material things and physical environment; and perceptible especially through the senses and subject to the laws of nature. While it is concrete, real, solid, tangible and visible, a virtual gallery exists or results in essence or effect though not in actual fact, form, or name. It is created, simulated, or carried on by means of a computer or computer network. It involves artificial intelligence, cyberspace, simulated 3-D environment, and Virtual Reality [2]. In his book 'The Language of Space', Lawson (2001), mentioned that spaces form important constituent parts of what is known as 'settings', which are influenced by behaviors and constraints. He continued to stress that a setting really consists of the space, surrounding, contents, people and its activities [3]

Visitor Experience

Visitor experience / human behavior is based on four categories; sensual thread, emotional thread, compositional thread and spatio-temporal thread. Sensual thread is concerned with sensory engagement with certain situation where the interaction between a person and environment becomes participation and communication. Emotional thread lies on the fact that emotions are qualities of particular experiences. Compositional thread is concerned with relationships between parts of the whole experience while Spatio-Temporal thread relies in each part of experience [4]. There is a significant relationship between physical environment and human behavior, thus any architectural design may affect human behavior in its environment. These potentially interactive and participatory nature of new media projects allow people to navigate, assemble or contribute to an artwork in a way that is more than interactive; experiencing it runs counter with the basic rules of museum: 'Please do not touch the art'. Human behavior that not only actively engage and interact need a certain level of familiarity with the interfaces and navigation paradigms because museum audience consists of all age group and different kinds of visitor groups and expert level [5]

Multimedia Display

This is a continuously evolving field. Characterizing multimedia display includes process-oriented, time-based, dynamic and real-time; participatory, collaborative and performative; modular, variable, generative and customizable [5]. Any form of art is a primarily visual medium that is used to express ideas about the world around us and our experiences. The intended messages are contained within its content while aesthetics portray artistic expression, experience and innovation [6]. Media is classified into traditional; drawing, painting, printmaking, sculpture and craft-making while non-traditional media is represented in the emerging of knowledge and technology such as mixed media, video and film, digital imaging and performance. Some media are based on technology which includes photography, film and video while digital media involves computer-based storage of still or moving images as digital information, with or without sound. While technology supports the production of content, the presentation of new media art also involves creation of platforms of exchange, between artwork and audience, or the public space of gallery and public space of a network [5]. The new media art is made using electronic media technology and displays any or all of the three behaviors of interactivity, connectivity and computability, in any combination [7].

METHODOLOGY

Research Design

This is a qualitative based research which includes preliminary case study of the site, interview sessions with staff and observational study on visitors' behavior and perceptions.

The Research Design is as follows:

- i. To start off the research, a literature review is carried out on background studies and related research methods of similar process. Background research includes study on the site (mangrove area), study on gallery space, its settings, functions, method of display, types of content, technology involved and most importantly on visitors' perception and their interaction with the content on display, the space, as well as with other visitors. Gallery design is studied on the many types of layout design available, furniture settings, paths/tracks design and other spatial layout elements. Types of display content and presentation tools are also studied which include analogue, digital, multimedia and virtual platforms. Different types of display have different functions and objectives to consider for different types of audience. How the message is to be delivered is also important in any gallery display.
- ii. Research questions and objectives are derived and a research design is implemented.

Research Question:

How do types of multimedia display influence visitor perception in a gallery for natural habitat environment?

Research Objective:

To study visitor perception of multimedia display in a gallery for natural habitat environment.

- iii. An exhibition space is chosen to carry out the study. The indoor space must cater for natural habitat environment that situates educational display for visitors. It must be on site to gauge visitors' understanding of the information that they get from being outdoor to indoor display. The additional digital display acts as enhancement.
- iv. Preliminary research is done which consists of site study and gallery layout study. Interviews were carried out with staff to know more of the center, the gallery, its function and objectives, its aspirations as well as the issues and problems faced by the center in accommodating an indoor gallery and outdoor natural environment.
- v. From the background research and interview conducted, content is gathered on the mangrove area to be developed into photograph forms of mangrove trees and inhabitants. Creative videos are then created about mangrove trees, preservation of mangrove areas, its function and importance for the eco-system as well as related issues. The series of videos are developed into documentaries, stories, insights and 2D animation to suit the different level of visitors from children to adults.
- vi. Discussions were held on the new gallery layout, types of display equipment and furniture as well as visitor path that goes through the gallery and eventually comes out to the verandah and the outdoor tracking area. Once the content is ready, it is installed and projected onto screens and also on monitors for individual screenings. Chairs for seating area is arranged at the projection area while the existing analogue display such as posters, replicas and artifacts are maintained.
- vii. Visitors that visit the gallery are observed for their behavior going through the gallery, their interaction with the display, content and other visitors. Data collected is tabulated and descriptive analysis is

carried out. The implementation of a structured observation exercise (data collected can be organized into clear categories) is to gather accurate information of recorded behavioral patterns in a contrived setting (a specific setting situation is created by observer), using a non-disguised observation method (where visitors know that they are being observed), via human observers who will study the gallery visits over a period of time through direct observations (looking at the actual behavior at real time).



Figure 1: Research Design

Observation Schedule

Below are the observational items that were adhered to:

- i. Specifies categories of behavior that are to be observed.
- ii. Setting: specific spaces of exhibition area with multimedia display to be observed.
- iii. Group of visitors to be observed using convenient non-probability sampling.
- iv. Time Sampling (date and day of observation), over a determined period of time.
- v. Human observation system used.
- vi. Interpretation of observer during the data analysis.

Reliability of observation: the agreement of more than one observer at the same time of the same sampling towards the set of behavior collected and in terms of their coding of the behavior pattern. Degree of consistency of observation over a period of time due to capacity of people to behave in different ways on different occasions and in different context. Validity can be checked through the strict administration of the observation schedule [8].

RESULTS AND DISCUSSION

Images from Observation

Images below show that visitors are viewing the multimedia display together with the analogue display and individual video screening area. Different behaviour patterns are observed from these studies. Further images show the outdoor area includes verandah and track that leads to the mangrove area along the river.



Figure 2: Seating Area to watch the video presentation



Figure 3: Another setting of video presentation



Figure 4: Individual Screens for video watching



Figure 5: Outdoor verandah area for nature observation



Figure 6: Track leading out into the mangrove trees along the river



Figure 7: Mangrove area right behind of the indoor gallery

Findings

The table below shows findings from the observation conducted. Visitors are from higher education institutes and adults with a basic background of the content and multimedia installation. Period of time for each group is over one session of approximately four hours to six hours, depending on the size of group and whether they explored indoor/outdoor/both spaces.

Table 1: Findings

Exhibition Space Setting	Percentage	Behavior Observed
Printed Materials Display Area (Conventional Method)	13%	Walk without noticing
	24%	Walk briefly
	38%	Walk and stopped by to view the display
	17%	Walk then sit down/stand to enjoy longer
	0%	Interacted with display
	8%	Asked staff for further explanation
Video Projection Area (Multimedia Platform)	6%	Walk unnoticed
	19%	Walk briefly
	15%	Walk and stopped by to view the display
	52%	Walk then sit down/stand to enjoy longer
	0%	Interacted with display
	8%	Asked staff for further explanation
Interaction with Video on TV Screen (Multimedia & Interactive)	8%	Walk unnoticed
	13%	Walk briefly
	12%	Walk and stopped by to view the display
	32%	Walk then sit down/stand to enjoy longer
	21%	Interacted with display
	14%	Asked staff for explanation

Table 2: Interpretation

<p>Printed Materials Display Area (conventional method):</p> <p>The printed material section where posters of visuals, images, text and other information are displayed either in black and white/monochrome or in colour. The images are of different sizes and the overall size of posters differ. The figurines or replica/sculpture accompanied by text are placed according to themes such as birds, wildlife, insects, shells, flora and others. A large percentage of visitors stopped by to view: read the display and walk briefly while reading. A smaller amount stopped to enjoy longer, due to their interest in the specific area while some walked without noticing the display. A very small amount asked staff for further explanation.</p> <p>Interpretation: Visitors will stop due to interest while some stopped longer to know more. Only a few asked assistance. Interviewed visitors mentioned that they are generally comfortable with the display though less satisfied with the information. They did not enquire more due to comprehensive level of display.</p>
<p>Video Projection Area:</p> <p>The video projection section has seating areas that portray a more comfortable environment. The content is also relevant to the mangrove center, more interesting as there are images, animation, text and sound. The story of the site is being told in an interesting looping of video. A bigger percentage shows that visitors stopped more to view when seating is provided as they felt that the environment allows them to do so. Fewer percentage walked by not noticing even though there is sound emitted</p> <p>Interpretation: The seating provided signaled a welcoming and comfortable environment where visitors know that they are required to sit and enjoy the screening. They managed to view all of the videos as they could get comprehensive information at one seating. They only require assistance when they wanted to know more of the videos.</p>
<p>Interaction with Video on TV Screen:</p> <p>The interaction area allows visitors to choose the video that they want to view, either due to interest, or to add to knowledge after visiting other displays, indoor as well as outdoors. The interaction allows them to discuss more freely, they spend more time at the display area either to view friends/other visitors interacting or interact among themselves.</p> <p>Interpretation: They share their knowledge more freely as they do not feel restricted or being watched over. The availability of tools and technology allow them to plan their preference of content and to select content of interest. Visitors are more confident to interact and asked more questions as they feel more comfortable and wanted more satisfaction of knowledge acquiring.</p>

Table 4.3: Findings from Interviews

Printed Materials Display Area (Conventional Method)	
Space	<p>I like the gallery, very spacious and open concept, the replica have turn the space into a mangrove area.</p> <p>Quite hot and humid especially in the afternoon and after lunch, otherwise quite breezy and comfortable.</p> <p>The indoor area that leads to outdoor is really interesting, especially when we can go out into the mangrove area.</p> <p>Maybe they should paint the gallery a lighter color, looks a bit dim inside.</p> <p>The concept suits the nature environment, the verandah is a splendid idea because we can spend time looking at the animals such as monkeys, birds, insects and others.</p> <p>Sometimes there is a smell coming from the mangrove area, maybe they should close the indoor gallery and put air conditioning.</p>
Furniture	<p>The open concept makes the gallery spacious as the exhibition cabinet and tables are arranged against the wall.</p> <p>I find it simple enough to go around the gallery, clear direction to go to the outdoor area.</p> <p>There are seating areas so I presume we are allowed to spend time looking around.</p> <p>I wish the furniture can be more modern.</p>
Content	<p>Nice pictures but some are faded, not sure if children will find it interesting.</p> <p>I learn about new things, the scientific names and types of birds, shells and trees, but there are some things that it would like to know more but the information is too little.</p> <p>Some information is too high up, quite difficult to read.</p> <p>The artifacts are OK.</p> <p>The replica is getting outdated, hope can be replaced.</p>
Tools & Technology	<p>The pictures and information is very basic, no technology I presume.</p> <p>Ordinary like any gallery.</p>
Visitor Interaction	<p>We came in a big group but the space is big enough for comfortable viewing.</p> <p>I can ask any time for assistance if I have any questions.</p> <p>Quite noisy but it is OK since display is of visuals.</p> <p>I feel free to touch and read the information as the staffs are friendly. They encourage us to ask questions.</p> <p>We do not interact with the pictures physically, just for viewing.</p> <p>We can see the outdoor mangrove area from inside and it feels very environmental friendly.</p>

Video Projection Area (Multimedia Platform)	
Space	<p>The space to watch the video is good, there are chairs for us, and so we feel relaxed while watching.</p> <p>Quite bright in the afternoon, it disturbs the projection.</p> <p>Some people walk in front of the screen, thus we find it uncomfortable, and perhaps there should be a mini theatre or a closed room.</p> <p>We can enjoy watching the video while standing and walking too. If we want to watch again we are free to do so.</p>
Furniture	<p>The chairs are comfortable for us to sit down, but some may sit down because of feeling tired and this prevents other people watching from near.</p> <p>Maybe the video area should be in a corner because it is too open.</p>
Content	<p>I love the videos!</p> <p>I learn so much from just watching the video, very informative and some are funny.</p> <p>I like the information shared, makes me feel more responsible towards nature.</p> <p>I think this is the best part, I do not really have time to read all the information on the posters.</p> <p>Can I skip the video if I do not like it?</p> <p>I cannot hear well for some video while some is OK.</p>
Tools & Technology	<p>The screen is large so makes it easy to watch even though we sit at the back.</p> <p>I think the sound system should be added more.</p> <p>Staff is very attentive, once video has ended they quickly replay.</p> <p>I wish I can select the videos that I want to watch.</p>
Visitor Interaction	<p>I can view well and talk/discuss with my friends, the environment is comfortable.</p> <p>If I stand I can see well because the chairs are too near each other, and many people in front of me.</p> <p>Because there is sound and visual I feel I can interact with the video better than just pictures.</p>

Interaction with Video on TV Screen (Multimedia & Interactive)	
Space	The space provided for watching video on the TV screen is quite private with only a few chairs, so I feel comfortable and not shy to repeat certain video. I like the private seating area because I can concentrate better, watch better and hear better. From far we can see the TV screen and video playing so we know we can find some information here. I cannot watch for a longer time since many are waiting and some linger around since the place is an open concept. Maybe it will be better if the video station is in a private room.
Furniture	Good TV area, few chairs and monitor screens. Maybe can add few more chairs and screens if there is a large crowd. The screen is a bit high maybe can bring them down to eye level. Chairs are normal chairs, I have seen some gallery chairs are cozy and like sofa setting, maybe can change to a home cinema setting because this feels like in a classroom. Please put more chairs and more monitors.
Content	These videos are the same video that is on the big screen but what I like is that I can choose to watch which one I like. Watching in private gives me more time and space to understand better the content because I can change the volume, brightness and replay or forward. The information is so good and I understand the message in addition to the outdoor mangrove area.
Tools & Technology	Having my own device to control gives me satisfaction as I can view how I like. I think they should have a portal/website or game about mangrove area since there is monitor screen and PC. This technology attracts kids and school children better than the pictures and text information. If they provide speakers or ear phones it will be better because some videos are too soft.
Visitor Interaction	I like watching and being able to choose the content or changing the volume. My group of friends takes turn watching and we are free to discuss with each other while watching the video. Staffs are helpful when we cannot play the video. Even though we are at the corner, we can still see and hear and smell the surrounding. Good, I can concentrate well in private.

Conclusions

Findings from the result of data collection, preliminary and on site observation and interview sessions show that the introduction of multimedia display, content and tools in a physical gallery space is well received by the visitors. In addition to the conventional mode of visuals and text as well as replica of the mangrove area, visitors feel that they obtained more information as interactivity level is heightened. They also could comprehend better, able to move around comfortably and satisfied with their gallery experience of a nature environment concept. The center has also hands-on outdoor area which adds on to their understanding of the content and experience when they are able to have a non-linear interactive display. The multimedia components such as images, text, animation, video and sound attracted them and the seating area provided a comfortable environment. They are able to interact with the display, the multimedia content and within themselves because the layout is an open concept with visuals and information at the walls while multimedia display area has chairs to denote that the area is for sitting while viewing.

The limitations of this study are that only a basic level of multimedia installations is being tested as well as an average number of visitors are observed. This study also does not compare between age groups, intentions or over a longer period of time. The findings of this study can lead to a better exhibition environment design for an indoor/outdoor nature reserve as their experience are enhanced via multimedia platforms. Content can be in various forms to include better interactivity especially for school children and young adults. Some suggestions include games and sensorial displays. New tools and technology can also be introduced such as head gear set, Kinect games, VR stations and many others. Visitors mention that their understanding of mangrove area is enhanced more with multimedia display as they are more interesting and satisfying. Further recommendations for this research would be on various multimedia display and installation, to be introduced at the indoor and outdoor spaces as well as to compare between children and adults on their visitor experience and perceptions.

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