

## *Guest Editorial*

### **Applications of Online Exhibitions**

Prior to the introduction of computer and communication technologies, museums and exhibitions were synonymous with physical spaces in which artefacts were displayed at a safe distance to their visitors. Traditional museums used to display their cultural artefacts in such a way that they form a story line of an exhibition on a topic. People visit museums to enjoy, explore and understand cultural heritage. Nowadays museums are digitising their collections in order to preserve original documents or cultural objects and make them accessible to public over networks. Online exhibitions are one of the best solutions to all the problems faced by the physical exhibitions in terms of free information access, public awareness and visits to the museums. In this context, today's online exhibitions are complementary to yesterday's physical exhibitions in entertaining and educating, if not a small part of people only can visit and enjoy the real museum.

Online exhibition is an event which can be viewed right on computers or mobile phones using internet or GPRS anywhere, any place and any time. It is the best way of disseminating information in digital form including exhibiting products, artefacts, and educating visitors on any topic. This information will be delivered over the internet and accessed by the users through their home PC and internet connection 365 days round the clock. It also helps in doing e-commerce over internet. For example, Smithsonian Institution ([www.folklife.si.edu/index.html](http://www.folklife.si.edu/index.html)) and Library of Congress ([www.loc.gov/exhibits/kislak/kislak-exhibit.html](http://www.loc.gov/exhibits/kislak/kislak-exhibit.html)) developed many online exhibitions on Cultural Heritage which are worth seeing examples.

Online exhibitions provide many benefits including:

- (i) Enhanced learning by providing more detailed information on cultural and heritage issues of a country, providing subject information to meet different categories and levels of users and also connecting with other sites for additional information;
- (ii) Exhibition material can be used for teaching and learning;
- (iii) Visitors to the exhibits are not limited to a geographical location;
- (iv) Serve as a free information resource for teachers and school kids for their instruction; and
- (v) Able to expand the content and context to provide various levels of information that are often hard to present in a traditional exhibitions.

As learning networks, web-based exhibitions can be linked through their parent organisations to encourage international collaboration in learning or research projects. Such online communities can be facilitated via real meetings, chat rooms or listservs, within which the process of creating a product cooperatively is positive. In fact, once the exhibition is put online, it becomes immediately available to every student, not only in India, but also all over the world. Teachers will also find it easy to download the digital materials and customise it to meet their curriculum needs. Students can also use the online information for their school projects. This provides a different kind of learning experience, as students gather information, organise it, create meaning, reach insight, and present their findings online to global audience.

Online exhibition is synonymously used to virtual exhibition but both differ on their emphasis: virtual exhibitions emphasise the 'virtual' environment (a computer-generated simulated environment), and online exhibitions emphasise the electronic information delivery methods (via telephone lines to personal computers or via cables to terminals). All virtual exhibitions are online exhibitions but not vice versa. Normally, all virtual exhibitions provide a simulated real environment using virtual reality tools which is a bit more difficult, expensive and time consuming to develop than a simple online exhibition. Thus, virtual exhibitions and online exhibitions are used interchangeably to define the same entity in this issue.

Hypertext and virtual reality (VR) are two excellent tools for creating educational contexts for our cultural heritage. Both tools provide interactive environments for learning by experience, which can be adapted

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for different types of users. The technology used including Web3D-based VRML and X3D for building 3D artifacts and delivering through the web.

The VR technologies have been employed in the area of cultural heritage for various purposes. These are known for their realism and interactivity. Moreover, the design of a VR application for cultural heritage requires several different professional skills. Some museums are developing virtual exhibitions using 3D design tools. For example, researchers of the National Research Council of Canada have collaborated with the Canadian Museum of Civilisation to build a number of interesting 3D representations, focused both on reconstruction of real environments and modelling of virtual spaces for hosting cultural heritage exhibitions.

The Flash technology created a major revolution in online exhibitions to create high quality online displays with smaller file size basically meant for web-based exhibits. After the introduction of multimedia, many of these cultural heritage institutions started developing exhibitions with both video on demand and streaming. The Holocaust Memorial Museum (USA) developed during the same period with different interactive solutions for their users, choosing the Flash Communications Server for webcasting.

Augmented reality (AR) is another tool for developing virtual exhibitions. The AR extends VR systems with the support for blending real and virtual elements into seamless composite scenes. By combining VR with video processing and computer vision techniques, AR systems offer a natural view of real scenes enriched with virtual objects. The VR and AR are promising technologies that have wider impact on cultural heritage domain. For example ARCHEOGUIDE ([archeoguide.intranet.gr/project.htm](http://archeoguide.intranet.gr/project.htm)), is a system providing new ways of information access at cultural heritage sites in a convincing, user-friendly way with the use of advanced IT tools including augmented reality, 3D-visualisation, mobile computing, and multi-modal interaction. The visitors are provided with a see-through head-mounted display (HMD), earphone, and mobile computing equipment. A tracking system will find out the location of the visitor within the site. Based on the visitor's profile and his/her position, audio-visual information will be presented to guide and allow him/her to increase more insight into relevant aspects of the site.

Some important online exhibitions developing tools are:

- Multi MIMSY 2000 (<http://www.willo.com/mimsy/>)
- Museum3 software (<http://museum3.org/>)
- Open Exhibits (<http://openexhibits.org/>)
- Re:discovery software (<http://www.rediscov.com/>)
- CONTENTdm® (<http://www.contentdm.org/>)
- PastPerfect & Virtual Exhibit 5.0 (<http://www.museumsoftware.com/ve5.html>)
- KE EMU software (<http://www.kesoftware.com/>)
- House of Image software (<http://www.hoimages.co.uk/>)
- Omeka (<http://omeka.org/about/>)
- VEX-CMS: A Tool to Design Virtual Exhibitions and Walkthroughs  
([http://hclab.uniud.it/publications/2010-04/Vexcms\\_Smartgraphics2010.pdf](http://hclab.uniud.it/publications/2010-04/Vexcms_Smartgraphics2010.pdf))

According to experts and published research results, a good online exhibition should have good content, a narrative theme, intuitive navigation, and inviting graphics. The online exhibition has recently emerged as a highly successful motive favoured system and is a vital component of any successful exhibition. The elements of any good online exhibitions design includes:

- (i) Simple, easy to use and attractive user interface;
- (ii) Overall structures and design may be organised by conceptual topic by chronology, by physical piece, and by pigeon hole;
- (iii) The exhibit should be functional, ease to use and aesthetically nice looking;
- (iv) Magnification tool should be provided for the visitors to magnify most of the images;
- (v) Search engine should be provided with the exhibition if it contains more than 50 pages;

- (vi) Three types of Navigation patterns may be provided in an online exhibition; and
- (vii) User control may be provided in online exhibitions so that users can easily navigate between different topics of the homepage.

Visitors to virtual museums often operate in a social practice context, whereby the focus is less on the presentation of the exhibit, but more on the social construction of the visitor and the interactions with the exhibits and fellow visitors. Visitors in a virtual museum look at both the exhibits as well as other visitors, and they themselves are being observed by other virtual visitors. However, there may be a limit to how much interaction is possible between virtual museum visitors, since virtual existences are both ambiguous and ambivalent.

As on today there are about 98 exhibitions in the list of National Gallery of Modern Art, New Delhi but the number of online exhibitions are very few and those available also not well developed to attract the online visitors. Similar is the case in other national institutions like National Gallery of Modern Art, New Delhi; National Rail Museum, New Delhi; National Museum, New Delhi, etc. All of them are primarily focusing on physical exhibitions which are too much expensive, time consuming and not reusable. Slowly some of the NGOs like Indian National Trust for Art and Cultural Heritage ([www.intach.org/home.htm](http://www.intach.org/home.htm)) are coming forward to arrange online exhibitions – e.g. an exhibition on children's paintings.

Online exhibitions are playing a profound impact on all participating archives/museums and many other institutions who would like to provide public access to their collections via electronic means. Online exhibitions made an impact on institutions by providing an opportunity to extend and transform the educational mission of archives/museums and to support, enhance the teaching and learning in universities. From the universities perspective, online exhibitions enjoyed high visibility on campus and exemplified how technology can enhance teaching and learning. Many art history faculty members are facing challenges of teaching with digital images so faculties in need of related training program that will have lasting effect is required.

This issue covers seven papers written by experts dealing with various applications of online exhibitions. The papers came from Europe, USA, UK, Singapore, and Malaysia but none from India. Some of the major applications of online exhibitions covered are:

- Online exhibitions in education
- Online exhibitions for history and cultural heritage teaching
- Online exhibitions for outreaching the museums artifacts to global audience
- Online exhibitions for promoting access to archival information sources
- Online exhibitions for tourism
- Online exhibitions for conducting research
- Online exhibitions in medical sciences
- Online exhibitions for building sciences exhibitions
- Online exhibitions for collaborative work and leaning
- Online exhibitions for teaching and learning

The process of designing systems or products largely depends on a number of decisions such as “who do I design for?”, “what should my product do?”, “what are the user requirements?” etc. The developing teams usually take their decisions based on experience and/or heuristics and this is particularly the case, in the development of online products and especially online exhibitions. Antoniou, Lepouras & Vassilakis provided a generic methodology in their paper for the design of online exhibitions, using top-down processes that are useful to all types of museums and will be helpful to the designers during the early decision stages.

Flash, unlike other multimedia authoring tools is a vector-based authoring program. It works with vector data instead of bitmaps or raster graphics like GIF and JPEG. Vector-based contents and applications download faster over all types of connections, and programs like Flash provide engaging and interactive contents with a multi-sensory experience that includes interactive streaming video, animation, audio, and

vector and bitmap graphics. Jordi Domènech has constructed a virtual exhibition on Genetics both in html and flash interfaces and then evaluated by the users. The current developed version based on the JOOMLA1.5! content management system (CMS) includes eight virtual exhibition halls, interactive resources like news and multimedia. The navigation is improved by the use of metatags and other automated tools of Joomla1.5 ! Web 2.0 tools are used to increase participation by the users, as well as Wikipedia and Facebook resources that are being set. It was found that the virtual exhibition has received 101,977 visitors from several countries in one year of its hosting.

Salar, Özçinar, Çolak & Coşkun discussed the applications of online exhibitions in education. Online or virtual exhibitions are no more new tools to libraries, museums, art galleries and particularly to education institutions. The National Library of Medicine, United States Holocaust Memorial Museum, Smithsonian Information, national archives of several counties started exhibiting their information resources through these tools. The education resources provide instructional templates that present and use of exhibition materials to engage students' interest in historical and scientific perspectives. Educators are welcome to review and use the module or lesson plans in whole or in part, as appropriate for their students' interests, levels and academic goals.

Virtual Exhibitions are both single- or multi-user realistic 3D representations of artefact collections, in which visitors navigate, observe the exhibits, learn related information about them presented in various media, and in some cases interact with them. On the other hand, studies have shown that visitors have various goals concerning to their experience within an exhibition space, they follow different navigation strategies in browsing the exhibits, and they may be interested only in parts of the collection. These differentiations among online users raise a need for adaptation and personalisation of the 3D environment and its content. Bonis, *et al.* presented a general framework in their paper for designing and implementing multi-user virtual exhibitions that adapt to the visitors' preferences and goals and foster the emergence of communities of common interests.

Alexander presented a case study and discussed about several open source exhibition building tools in his paper. It explores the ways faculties and graduate students at University of Virginia are meeting their needs as well as an earlier development effort of the Virtual Exhibition Tool (VET). He also discussed about the Omeka, an open source tool for building online exhibitions. This paper also explores the current solutions used at UVa and outlined the lessons learned from them and from the earlier development effort on the VET.

Phan Koo & Ramaiah's paper discussed about building up of an online exhibition based on the Singapore Press Holdings (SPH) photographs covering the pre-independence period, i.e., 1950-65. From the user point of view, they would like to have detailed information about the Singapore including its past history to the present. It was also found that internet is a very convenient medium to the teacher and public to deliver heritage and cultural information.

Maria Beatriz Carmo & Ana Paula Cláudio's paper discussed about the creation of 3D virtual exhibitions and as a way to promote museums and cultural places to the worldwide visitors over the web through their educative and recreational activities performed onsite. A wide range of applications are presented here to exemplify the different requirements and techniques that can be considered in this domain. Techniques to create 3D models are reviewed in this paper as they are the base to generate a virtual environment and special attention is given to applications devoted to the development of 3D virtual museum exhibitions.

In future, many institutions began to take advantage by using VR and 3D technologies because of the power of PCs to implement real-time modelling and simulation. This is useful for creating engaging onsite exhibits and for reaching across the Internet with immersive, educational simulation programs. 3D scenes in an interactive exhibition will help the visitors to navigate through exhibition halls and interactively examine those 3D models of objects. The 3D exhibitions will also have multi-lingual content delivery (English and Chinese) and is easily accessible to disabled people too. The government should realise the importance of these tools in museums and other cultural and heritage institutions and start introducing latest technologies to collect, organise, preserve, manage and disseminate cultural heritage information. This will not only help in educating and developing awareness among younger generations but also attract many foreign tourists to the country. We look forward to see such scenario in India very soon.

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He was a Commonwealth Scholar for doing PhD in UK in the field of Information Science in England during 1989-1993. Soon after obtaining his PhD, he came back to India and setup a multimedia lab and worked several years in designing multimedia applications, presentation and training materials. His formal education includes Masters degrees in Chemistry and Library and Information Science. He is Fellow of Society of Information Science, and member of many international professional bodies/societies such as the CILIP, ASIST, ACM, IFLA, ALISE, etc. He has published about 100 papers and four books. His research interests include: Multimedia & hypertext technologies, human-computer interaction, user interfaces, designing e-books, e-publishing, e-learning, archival informatics and bibliometrics.