

Creating Virtual Exhibitions for Educational and Cultural Development

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The paper presents different tools and mechanisms to implement a virtual exhibition in different cultural areas, such as museums and libraries. Quality characteristics of virtual exhibitions are identified and described. The possibility to create native mobile applications for virtual exhibitions presentation is analyzed. The functional flow of creating a virtual exhibition is presented and discussed. The Seals - History Treasure exhibition is presented and significant historical documents are revealed.

Keywords: *Virtual, Digital, Exhibition, Mobile, Cultural, Educational*

1 Introduction – Digital versus Virtual

It must be realized a difference between the digital and virtual concepts. If we talk about digital libraries, then we have in attention electronic libraries, meaning collections of books, journals, thesis, and so on, which are stored in electronic format. If we consider the concept of virtual library, then we have in attention a collection of links that does not reflect physical books, journals, thesis, and so on.

In [1] is described the crossover between virtual and physical interactions in smart virtual exhibitions. This approach seems particularly attractive, because it put the focus on the physical heritage and, at the same time, digital capabilities specifically created to fit the personalized user vision and experience.

In [2] is presented the theory of virtualization in rapport to exhibition, especially the relation between spatial practice and digital mediation. There are presented concrete examples of virtual exhibitions, which put the theory into practice, by combining exhibition design with digital objects, from multimedia content to virtual objects, using a curatorial narrative in order to offer experience and immersion to visitors.

It must be appreciated the Google involvement in the cultural heritage area, by mentioning the Google Art Project [3] and The Digital Dead Sea Scrolls [4]. Google Art Project is a collaborative project between Google and a lot of art partners from across

the world, such as museums, libraries, galleries, and different cultural institutes. The Digital Dead Sea Scrolls is another project where Google contribution was extraordinary, because users can examine and explore the most ancient manuscripts from Second Temple times at a level of detail never before possible [4].

2 Quality characteristics of Virtual Exhibitions

The Digital Exhibitions Working Group [5] defined the digital exhibition as an ensemble of interlinks that has the objective to disseminate digital multimedia content, in order to deliver innovative presentations of a concept, and allowing in a great measure the user interaction.

A virtual exhibition has the following quality characteristics:

- *localization*, meaning to put the user/visitor in the context and making him familiar with the cultural elements presented;
- *relevance*, in order to attract many visitors to access it and to be attracted about it;
- *interaction*, meaning to give users the possibility to interact with the application rendering the virtual exhibition, for example to make zoom on a picture or to select something in order to get a detailed description;
- *maintainability*, meaning the possibility to being updated every time when new

elements appears and must be added to the gallery or when the creators want to enrich the descriptions or correct them;

- *accessibility*, meaning to reach audiences that the physical exhibition never could attend.

A virtual exhibition has many of key purposes:

- to engage the members of the group in an in-depth, collaborative inquiry;
- to provide an opportunity to explore multiple perspectives of a theme;
- to inform colleagues and staff of the purpose and general guidelines for the exhibition;
- collaborate with others to establish participation (for example, mentors, academics)
- schedule a time frame for the inquiry process, including a date for the staging of the exhibition, and book any facilities required;
- establish the resources needed, such as internet connection, audio-visual equipment, technology materials and consider budgetary limitations if necessary.

Nowadays, virtual exhibitions are not considered as passing fads, but a representative extension to physical exhibitions. The capacity to engage in multiple forms of multimedia content, such as image, audio, video, text, augmented reality and virtual reality components on a single page, having the ability to reverse, visit again, translate and read text written for different users, collective helps to establish a deeper sense of understanding, awareness, and learning of contents than physical exhibits [6].

3 Creating Virtual Exhibitions for Web and Mobile Devices

As presented in [7], the evolution of new information technology solutions gives new opportunities to promote and valorize the

cultural heritage elements. The potential offered by mobile technologies and the number increase of mobile devices that can process multimedia content, both offline and online, facilitates the feasibility of implementing virtual exhibitions. In the near future, mobile devices, such as smartphones and tablets, will become the best interface for accessing cultural heritage, although studies on the type of audience that access cultural content through mobile devices are still lacking.

Nowadays, the evolution of mobile technologies and the increase of mobile devices and applications have made possible the collaboration between informatics and geography fields, especially when dealing with mobile applications including maps and GPS localization. It's the time to combine informatics and history fields, by creating attractive mobile applications containing virtual exhibitions and cultural heritage elements.

At the moment, almost all the people have a smartphone or a tablet, and it is very important to valorize the historical documents and artefacts that can be found in national museums and libraries, because people has no time to visit these institutions and prefer to access their material online (virtual museums, virtual libraries, e-books, etc.).

A very good example of mobile application implementing a virtual exhibition is represented by the <http://statuiedaci.ro> project, which shows significant statues of Dacians and different places around the world where they are present. The mobile application was implemented for Android and also for iOS platforms and can be free downloaded from Google Play and Apple Store.

Figure 1 describes the functional flow of creating a virtual exhibition, even is the result will be a mobile application or a website or movie.

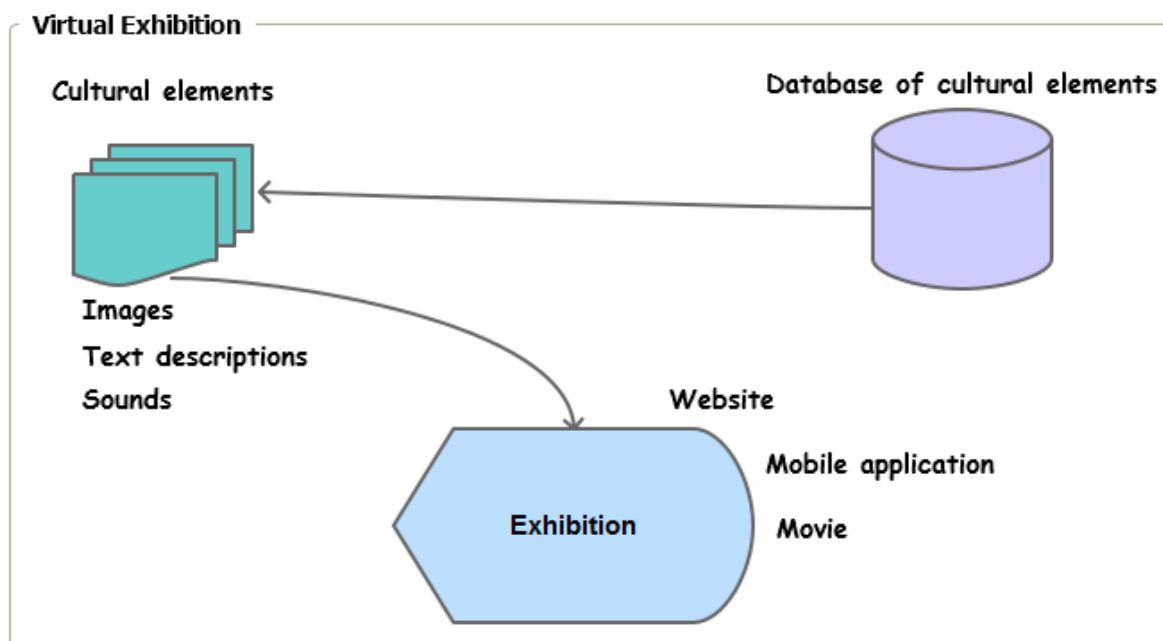


Fig. 1. Functional flow of virtual exhibition

In the flow presented in Figure 1, all the cultural elements that will be components of the virtual exhibition are extracted from a database. These cultural elements are represented by images of historical documents, seals, sculptures, paintings, and so on, or by sounds or text descriptions of these images. By using a specific tool or a programming language, the cultural elements are assembled together in a virtual exhibition, represented by a website, a mobile application or even a movie.

There are many tools available on the web in order to create digital exhibitions with good quality content and very attractive for the visitors. Some of these tools were created with the support of research projects funding, others were created by different IT&C companies. Through the most interesting tools, the following can be mentioned:

- *MOVIO*, an open source content management system designed for creating online virtual exhibitions.
- *Prezi Digital Storytelling*, an online tool to create attractive virtual presentations.
- *Omeka*, an open source web publishing platform which enables you to create interpretive exhibitions [5].

By using such tools or by implementing native mobile applications for Android or iOS platforms, there can be created very

attractive virtual exhibitions, such as presented in Figures 2 and 3.



Fig. 2. Mobile view of *Seals - History Treasure* exhibition

In Figure 3 is presented an historical document with seal from Romania, which

can be carefully studied in order to discover all the security elements used in that period of time to secure a document.



Fig. 3. Historical document from *Seals - History Treasure* exhibition

Another pertinent issue in the implementation process of a virtual exhibition for web or mobile platforms is the necessity to create a set of representations for one same physical artifact. As an example, a picture can be captured at different resolutions and dimensions. It can be used as a thumbnail, at a medium resolution for web browsing, but also at very high resolution for zooming and for detailed analysis.

By using a carefully user-centered design, the virtual exhibitions that are using hyper-links support both linear and non-linear discovery and learning paths, which can create educational opportunities that are difficult to reproduce in physical exhibitions. The end users can evolve from a diversity of different user groups, such as students, teachers, academics and researchers, to the general public and professional users, such as

librarians, archivists or information professionals [6].

4 Virtual Exhibition to Promote Rare Historical Manuscripts and Seals

Historians have always been tempted to investigate the Middle Ages, with a view to understanding the value of the testimonies and even the spirit of the epoch. Seals, as medieval artifacts, are regarded as authoritative means of document validation, as well as markers of identity, loci, art, spiritual and ritual deeds. This approach of the medieval seals confers them an important role in the historical research, since they reflect organization principles of medieval societies and cultures, defining the adequacy of the paradigmatic cultural patterns.

The exhibition entitled *Seals - History Treasures* presents various types of historical documents, written on parchment or on paper, in black, red or green ink, decorated with polychrome frontispieces, gilded with gold, ratified by signatures and seals, the most spectacular ones being in red wax, hanging on braided silk thread or in metal capsules, dating back to 1340 - 1700 AD. The exhibition displays magnificent seals which belonged to different monarchs in Europe or to Romanian rulers, bishops and patriarchs of the Church, expressing authority and furnishing a picture of the medieval life and identity.

The collection of historical documents with seals of the Romanian Academy Library is of particular interest, as they provide economic, political, social and cultural information, which can be perceived by inspecting all their constituent elements, specific to chancellery acts of the time: language, spelling, diplomatic form, autograph subscriptions, seals, parchment, paper, format, size, folding, inks, script, notes on the verso.

The participation of the Romanian Academy Library in the Athena Plus project enables a large number of European researchers to become aware and utilize this impressive collection, which is mainly unknown.

Historical documents are convincing evidence of the Romanian countries'

development in the European sociopolitical structures, in close connection with major events and transformations in the history of the continent. Moreover, they define the specificity and peculiarities of the Romanian history inward Europe's becoming.

Generally, the virtual exhibition is defined as an online dynamic web-based and hyper-textual collection dedicated to a specific theme or topic, concept or idea and most virtual exhibitions are attributed to museums or libraries in order to make visible their collections to the visitors [6].

As an example could be mentioned a physical exhibition organized at the Romanian Academy Library, *Seals – History*

Treasures, which is constructed with multiple objectives in mind: archival, preservation, discovery, higher educational value. In the near future it will become a virtual exhibition, which will provide to the general public the access to the particularly valuable historical documents collection, in order to increase cultural heritage access and diffusion.

Figure 4 presents historical documents that were included in the *Seals - History Treasure* exhibition catalogue. They are important cultural components of the exhibition and they can be physically found only at the Romanian Academy Library.



Fig. 4. Documents from *Seals - History Treasure* exhibition

In Figure 5 are shown other important components of *Seals - History Treasure* exhibition. In [8] are presented some of Europe's biggest cultural treasures collected from most important Europe's libraries, such

as stunning images, extraordinary manuscripts and books. The Europeana portal gives the people the possibility to explore the digital resources of Europe's

galleries, museums, libraries, archives and audiovisual collections.



Fig. 5. Components of *Seals - History Treasure* exhibition

In order to build a virtual exhibition is necessary to follow few steps and the most important is choosing a theme. It's not enough to simply have a lots of artwork you'd like to exhibit; in order to tie each piece together, we need to define the exact content and its relational fields. In order to mount an exhibition, which is considered a creative process that involves a group of people in a long-term adventure, a theme or topic must be chosen, a connecting thread must be defined, text descriptions must be written, cultural components borrowed and restored if necessary, decisions taken about how is best to display them and their arrangement in the galleries planned. The stakeholders involved in building a virtual exhibition are:

- *curator*, who is knowledgeable of the information objections and primarily responsible for artifact selection (the

exhibition curator is the person who defines the theme of the exhibition and chooses the works to include in it);

- *photographer*, who is in charge with digital acquisition in order to create the digital objects to be stored in the digital repository;
- *cataloguer*, who is in charge with metadata management in order to describe, catalogue and group together the individual objects (first of all is highly recommended the use of standards in order to support the interoperability. When this is not possible for any reasons, the metadata information exchange across systems becomes more costly due to the need for validation, optimization and mapping. In terms of metadata definition and storage, the XML format file has turned out to be the preferred means to manage

information inside virtual exhibitions) [9];

- *designer*, who is in charge with model refinement in order to create and describe the cultural elements interpretations and refinements.

The physical artifacts are scanned and transformed into objects which are packaged together and hyperlinked to allow non-linearity or multiple-linearity by exhibition visitors. Virtual exhibitions are considered dynamic, because they often change in terms of design, activity or content, including encouraging visitors to contribute towards it, thereby contributing to its dynamism [6].

Also, it is necessary to keep all the information in the structure required by the virtual exhibition model and all modifications, in order to support future changes of components. The tools used for this feature will be based on a mechanism of conversion, which will transform any exhibition model into a generic description, by enabling a uniform treatment of any scene.

The potential advantage of this feature is that the mechanism for placing components onto the scene is independent from the type of the component and can be easily extended in order to support new object types. The virtual exhibition architecture will be based on a modular design, so that the supported characteristics can easily be extended, a necessary feature since the creation of a virtual exhibition may require a wide range of characteristics and elements to expose [10].

In order to achieve modularity in the application features, the functionalities of the application are split into multiple edit modes. Also, one of the essential characteristics of a virtual exhibition, and possibly its greatest strength, is accessibility. It can reach audiences that the physical counterpart never could and through user-friendly interfaces to encourage users to visit and access the site, and ultimately become customers of the organization.

5 Conclusions

The virtual exhibitions have some advantages, such as it is relatively easy to add new components or change the existing ones in the form of adding new elements, updating and reusing the existing ones, or adding new educational components, and through digitization and rendering, also to have the special advantage to create and use electronic duplicate of the physical fragile records, or expensive artifacts which might be damaged in physical consultation [6].

The kind of virtual exhibitions, implemented as mobile applications, having the objective to present rare collections from different cultural areas, such as museums and libraries, will have a significant evolution in the next years, taking into consideration their impact in educational and cultural fields [12].

One of the main problems of museums and libraries at this moment is the low digitization process of all the collections, in order to express the intention of opening the treasure of the cultural resources for all the visitors [13]. In addition, new business models for the interactions between various actors such the owners of cultural goods, physical and virtual visitors, creative companies, service providers an telecom operators, public authorities should be implemented so that the movement could be sustainable [15], [16].

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