# User Defined Exhibitions – Exploring Possibilities to Involve Visitors in the Design of Museum Exhibitions

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**Figure 1:** A researcher and a curator are conducting semi-structured interviews.


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## Abstract
When connecting the physical experience of museums and exhibitions with relevant digital information, creating engaging exhibitions is a challenge shared by both curators and interaction designers. There is a wealth of artifacts scattered across museums, their archives, and remote locations. Additionally, online repositories hold a multitude of digital cultural heritage content about these artifacts. The challenge of creating an exhibition lies in selecting related artifacts, combining them with available or proprietary information, and arranging them in a way that serves an intended story line. Common practice dictates the creation to be limited to a set of curators working together. We propose a visitor-centered design approach including a physical interaction space where visitors can browse archived objects and put together their own exhibitions with regards to a unique or given story line. We conducted an initial field study and report findings regarding the likes and dislikes of visitors.

## Author Keywords
User Defined Exhibitions, Interactive Surfaces, Interaction in Museums

## ACM Classification Keywords
H.5.m [Information interfaces and presentation (e.g., HCI)]: Miscellaneous.

## Introduction

Many museums keep physical archives of artifacts and documents as well as digital repositories filled with directly related and meta information. Naturally, the number of objects filed away or being in remote locations surmounts the physical exhibition space. Many objects cannot be presented to the user and, thus, remain concealed. Hence, one of the challenges curators are facing is the selection and composition of artifacts and their combination with information into a congruent story line. Common practice dictates the creation to be limited to a set of curators working together. Thereby, special interests of visitors may often be neglected.

The growing availability of digital copies and related information of cultural heritage, such as Europeana[1], opens up possibilities to use new technologies to include digital content in museums. Showrooms can present a larger diversity of objects and virtual artifacts can include pieces from other museums. In contrast to physical exhibits, digital objects can be (re-)arranged without much effort. This allows the creation of a more dynamic design of showrooms. By ad-hoc arrangement of cultural heritage artifacts, visitors take on an active role and contribute to the exhibition design.

The contribution of our initial work is twofold: First, we present the concept of *Parallel Exhibitions* inviting visitors to become co-curators for the virtual part of a physical exhibition. Second, we report insights from a preliminary field study in a museum using a first prototype of this system.

[1] http://www.europeana.eu/

## Related Work

Engaging the user in the museum visit is an ongoing research topic [3]. Driven by the fast development of information technology, new concepts for personalization and interactive exhibitions are developed. An early approach in personalization in the museum context is presented by Rocchi et al. [4]. To inspire young visitors they designed an application for Personal Digital Assistants (PDAs), which were used as a personal guide during the visit. On the PDA the visitor could watch personal presentations about more general content presented on large screens in the showroom.

According to Dalsgaard et al. interactive technology cannot be successfully implemented in museums without the participation of visitors [1]. This forces museums to rethink their role and the way of presenting and communicating with the audience. The challenge that arises is how to include modern technology connecting exhibitions with social media and to provide a more fascinating museums experience.

In the terminology of Taxén museums can profit from the expert knowledge of being a visitor [5]. An example of using this knowledge is presented by Weilenmann et al. [6]. They analyzed pictures on Instagram[2] that were taken in the Gothenburg Natural History Museum. Thereby, they showed that visitors told stories by using pictures of exhibits. In many cases, these users did not follow the categorization of objects presented in the museum. They arranged new groups of exhibits, which they saw as more inspiring and, thus, they became co-curators. Weilenmann et al. also observed a communication between the story telling visitor and the online community. By commenting photos on twitter visitors got influenced by others in the

[2] http://instagram.com/

selection of uploaded pictures and told stories. Their study indicated an interest of visitors to be included in the design of the showroom.

## Parallel Exhibitions

We propose a visitor-centered design approach for exhibitions where visitors actively participate in the selection and composition of exhibits. Therefore, we created a first prototype, called *Parallel Exhibitions*, which empowers visitors to select digital representations of artifacts from a large online repository, arrange and project them into a physical space. These projected exhibits can be combined with physical artifacts in one collaborative space where compositions can be put together and commented on by visitors in real-time. By using this approach, we identify objects that are of particular interest for the visitors or a combination of objects that visitors would like to see next to each other. Hence, *Parallel Exhibitions* invites visitors to actively engage with museum content, collaboratively compose exhibits, and thereby provide valuable feedback to museum curators about popularity of objects and possibly new exhibition ideas.

**Figure 2:** Visitors interacting with the system.

**Figure 3:** The *Parallel Exhibition* user interface presented on the interactive surface.

## User Study

We conducted a field study [2] to get first insights into how visitors interact with *Parallel Exhibitions*. The study took place at the Allard Pierson Museum in Amsterdam[3] and took roughly five hours in the evening. In total, 35 visitors of the museum interacted with the system. We observed subjects while interacting with our system and later on approached them to conduct semi-structured interviews (cf., Figure 1). We also asked staff of the museum to use the system and to take a look at visitors' arrangements.

[3] http://allardpiersonmuseum.nl/

*Prototype*

We developed a first proof-of-concept prototype for the user study. It consists of a projector in combination with a Microsoft PixelSense[4] interactive table to augment a physical exhibition place with interactive projections. The interactive table allows groups of users to simultaneously interact in a comfortable way. Furthermore, it draws visitors' attention to the system.

The software is built using HTML5 and JavaScript. The user interface of the software shows two sections: On the right, all available virtual exhibits are listed in a grid menu. The presentation stage is located on the left, where users can arrange and comment digital artifacts (cf., Figure 3). Via drag and drop, users are able to select objects from the menu and place them on the stage. This stage is projected onto a projection screen (cf., Figure 2). To connect the virtual exhibition with the real world, we placed three plinths in front of the projection screen and indicated them on the user interface. These physical structures were then virtually represented on the stage to indicate the geometry of the room. The virtual exhibits were selected for an ongoing Egyptian exhibition.They showed ancient statues, tools, parts of mummies, and Egypt drawings.

## Findings

Overall the users' feedback was very positive. Most of them liked the idea of adding content as well as exploring digital artifacts. We elaborated the following findings from observations and the semi-structured interviews.

*Creating (digital) Exhibitions*

It seemed that users did not want to modify arrangements that had been started by other users. Instead, they tended

[4] http://www.microsoft.com/en-us/pixelsense/default.aspx

to remove foreign objects and started from scratch with a clear stage. This also affected predefined digital exhibitions arranged by curators. Thus, using physical objects within the digital exhibition could prevent users from deleting objects and provided a fixed exhibition context.

*Background Information*
Multiple users mentioned that they would have liked to obtain background information about the objects presented. Visitors seemed to be highly inspired by the stories behind the objects. This became even more obvious when a curator was around when users were interacting with the prototype and was able to provide his unique knowledge. In these situations, visitors were more motivated to arrange exhibits.

*Adding Text to Exhibitions*
Only a small number of visitors commented on the images by adding text. Visitors stated that predefined text would provide valuable information and could be automatically added without the need to enter text. Additionally, most users did not provide unique exhibition titles for the presented objects supporting the finding that text input was not desirable.

*Physical and Virtual*
Users tended to focus mostly on the interactive table and not on the widely visible projection. They would like to have rather physical objects than virtual objects. We already addressed this by allowing users to place objects on the physical plinths. Probably, this could be enhanced by using 3D projections looking more physical.

*Taking exhibitions home*
Some visitors expressed the desire to take home their creations. Two different approaches were differentiated: physical print outs (e.g., post cards) and digital copies (e.g., posting to social media such as facebook). Physical print outs seem to be more popular than digital copies because visitors did not need to login to social media or e-mail clients. One visitor even took pictures of the objects she had arranged whereas the curators were rather interested in streaming the arrangements live to the museums homepage.

*Gamification*
While interacting with the system users were looking for game elements. In the follow-up interviews, they asked how they could "gain points". Furthermore, curators saw *gamification* as a way to increase the interest of visitors in the system.

## Conclusion and Future Work

In this paper, we presented the concept of *Parallel Exhibitions*, a working prototype, and the findings of a field study conducted within a museum. We elaborated five findings from the field study that could be used to improve the prototype.

In the future, we plan to create incentives to interact with the system. Gamification is one of the obvious solutions , where visitors gain points by performing different tasks to contribute to the exhibition. These points can be used to nominate the "best visitor of the day" which is shown on the social media sites of the museum or to offer discount for the next museum's ticket.

Furthermore, we want to create the possibility to take the created exhibition home by connecting our system to social media. In addition, a small printer that prints postcards will be added to allow physical take-aways as an incentive.

On the technological side we want to rethink the use of different devices. In contrast to interactive surfaces, tablet computers are lightweight and multiple devices are easy to place within the museum. Another possibility is the integration of users' proprietary devices. This could ease up the integration with social media because most users are strongly connected with their own devices.

After adding these features to the prototype, we plan to conduct a long term user study by deploying our system in a museum. We will investigate in which way visitors' contributions and engagements affect the museum experience. As visitors become co-curators, engagement and interest levels in museum content possibly change. By quantitatively analyzing the usage data of such interactive exhibit creation tools, we can derive popularity of objects and thus provide recommendations for future exhibitions in the physical space. Participatory systems, such as *Parallel Exhibitions*, contribute to both the user experience as well as the curators' ability to monitor visitors' interest levels.

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