

In the Shadow of the Pyramids

Digital Exhibition Objects

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Abstract: Celebrating the hundred-year anniversary of the Austrian excavations in Giza, the Kunsthistorisches Museum Wien curated a special exhibition about this event, providing insights into the civilization of Ancient Egypt and documenting Austria's seminal role in researching the Old Kingdom. From the early phases of planning for the exhibition, digital presentations were meant to be an integrated part of the display concept and had the goals to create a contextual framework for the exhibited objects, to sketch the development of the necropolis of Giza at three different time frames – its development in the Old Kingdom, the time of discovery and the present day situation. Additionally our goal was to give an impression of the everyday work of the excavators at that time and compare traditional and modern documentation technologies.

Beside of digitizing of the original documentation from that excavation (sketchbooks, photographic images) various 3D reconstructions were created – several phases of the development of the cemetery of Giza and a prototype of a Mastaba tomb. Complementing the historical documentation, plans, maps, photographs, aerial images and terrestrial laser scans were used to achieve the reconstruction. Fruitful discussions with the egyptological curators of the exhibition were aiding the reconstruction process.

This work will present the underlying ideas and concepts from the planning to the realization of the digital presentations of the exhibition mentioned above. As the digital artefacts should be integrated into the permanent collection about Ancient Egypt, it was necessary to consider different display contexts.

On the technical side, state of the art interactive presentation methods allowed to perceive information at different levels, depending on personal interest and on background knowledge.

Keywords: Digital Exhibition, Archaeological Reconstruction, Egypt, Interactive Presentation.

Introduction

The recent hundred-year anniversary of the Austrian excavation at Giza was the motivation for curating a special exhibition honouring the work of the Austrian team. The Austrian excavations in Giza took place between the years 1912 to 1929 and were directed by Hermann Junker.



Fig. 1 – Austrian Expedition in Giza (Slide 166: © Junker Archive, Institute for Egyptology, Vienna University)

The exhibition was situated in the special exhibition area of the Kunsthistorisches Museum Wien (KHM) that contains one of the most important Egyptian collections worldwide. The egyptological curators of the special exhibition were Regina Hölzl, director of the Egyptian collection and Peter Jánosi, from the Institute for Egyptology, Vienna University.

Exhibition Concept

As several international teams have excavated the cemeteries of Giza – one of the intentions of the exhibition was to join the dislocated objects and provide an explanation of their spatial and temporal context. For the temporal context of Giza three different time frames were chosen (the present time, hundred years ago and the old kingdom period). Since the excavations were undertaken at the cemeteries in Giza, a prototypical Mastaba tomb was used to provide the detailed location context of the exhibition objects. A separate area of the exhibition showed the documentation of the expedition (photographs, diary and sketchbooks) and illustrated the everyday life of the expedition. A comparison of excavation tools from hundred years ago (leveling instrument and theodolite) with contemporary methods (3D laser scanner) should illustrate the technical context of surveying. A separate section of the exhibition was explaining the burial cult at the time of the Old Kingdom.



Fig. 2 – Kunsthistorisches Museum Wien (© http://commons.wikimedia.org/wiki/File:Maria-Theresien-Platz_in_Wien.jpg)



Fig. 3 – Floor Plan of the Exhibition Layout (© Gerhard Veigel)

The exhibition was structured into three main sections. The central room contained an overview of Giza, the kings attributed to the pyramids and important persons buried in the cemeteries around the pyramids. The chamber on the left side was dedicated to the documentation of the expedition and the excavation instruments. The two chambers on the right side were used to display objects from the tombs of the excavated cemeteries. The digital displays situated along the main visibility axis were intended to attract visitors into the thematic sections.

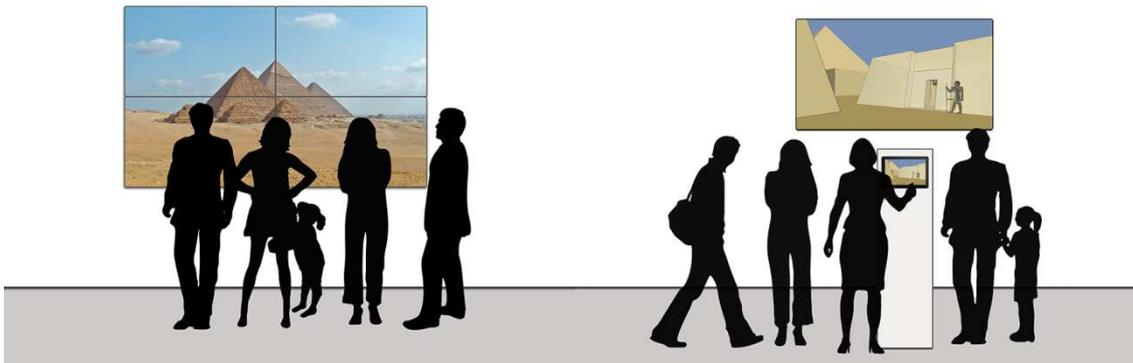


Fig. 4 – Conceptual Sketches for Digital Presentations, video wall and Interactive Display with Screen and Tablet (© TU Wien)

The digital exhibition objects should be perceivable by several people at the same time by a guided presentation without the necessity of interaction. Interactive exploration was an additional option to provide a lively representation that could be explored to encourage discovering and to allow a selective deepening of information about the exhibited objects. The user-interface for interaction should be intuitive and simple with simple touch operations on a tablet display.

Giza – Spatial and Temporal Overview

The video sequence that was intended to provide a spatial and temporal overview of Giza was structured into three different time periods (the contemporary time, the period of the Old Kingdom, the time of discovery – hundred years ago). For displaying the current situation in Giza, aerial panoramic images were used to present the layout of the Giza cemeteries in relationship to the three major pyramids.



Fig. 5 – left: video derived from an aerial panoramic image, right: the drone used to obtain aerial panoramas (© AirPano)

The video sequence explaining the situation in Giza at the period of the old kingdom was generated from a 3D reconstruction of the antique Giza plateau. Furthermore the visualization of temporal development of the Giza cemeteries was created as an animated sequence. As the reconstruction was based on scientific hypothesis, an abstract visual style was used to indicate the hypothetic quality of the 3D model.



Fig. 6 – Images from the video sequence that explained the temporal development of the Giza cemeteries (© TU Wien)

Another sequence displayed the tombs where the most important objects were discovered, thereby statues representing the persons were used to create a connection to the position and function of these persons in the Egyptian society.



Fig. 7 – Images from the video sequence highlighting the tombs where the persons were buried (© TU Wien)

Bridging the period of the Old Kingdom to the time of the discovery a visualization illustrated the sections of the Giza area that were excavated by the international archaeological teams.

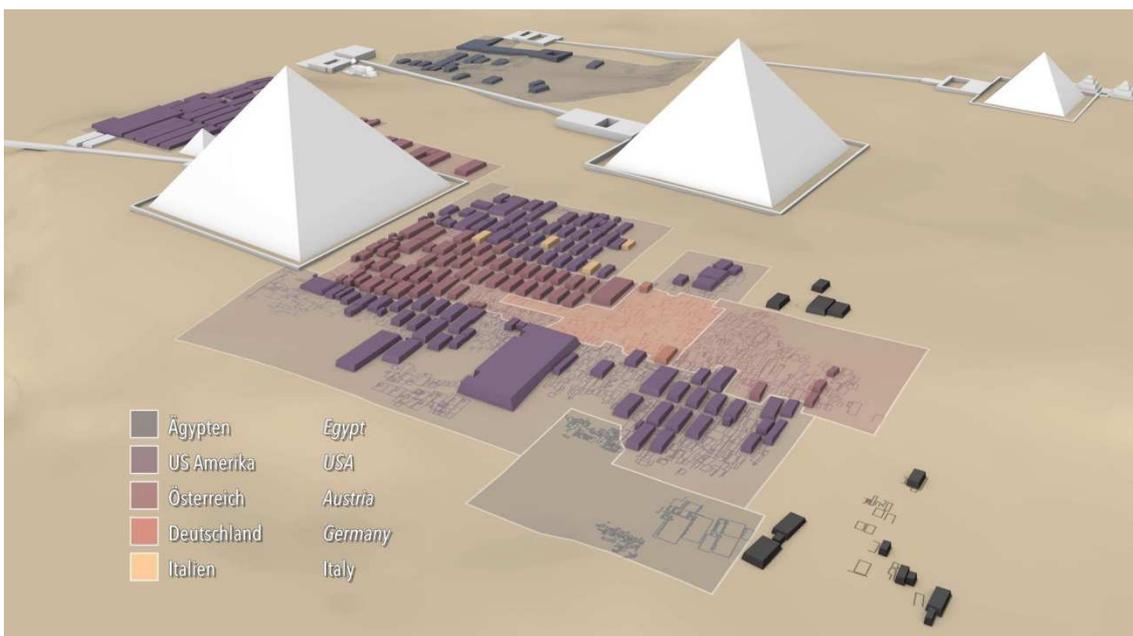


Fig. 8 – Image from the video sequence showing the areas of the international excavation teams (© TU Wien)

The final sequence, from the time of the discovery, shows the situation of the findings in-situ and the transportation from the excavation area to the Kunsthistorisches Museum in Vienna.



Fig. 9 – discovery of funerary equipment and transportation by ship (© TU Wien)

Mastaba Prototype

As the objects found in the Giza cemeteries were originating from different tombs a virtual prototype of a Mastaba tomb from the Old Kingdom period was generated as an interactive 3D model. Hereby the intention was to explain the various components of the burial architecture (e.g. cult chamber, burial chamber, shaft) and where the exhibited objects were located in a prototypical situation. An information overlay showed the originating tomb and also the time reference, where it could be dated.

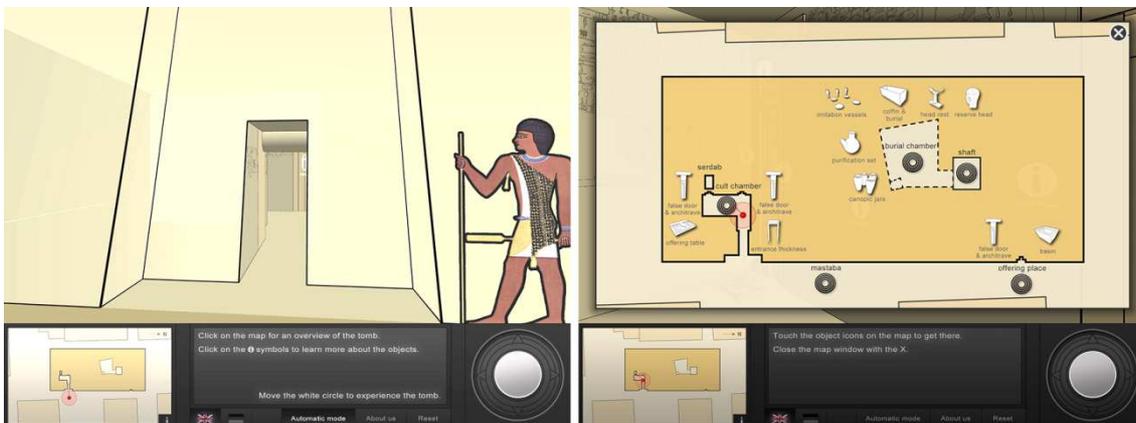


Fig. 10 – prototype Mastaba: 3D model, overview map, virtual joystick for movement, navigation map with hot spots (© TU Wien)

The visual style was abstract to indicate that the model refers to a prototypical tomb. A special shader was implemented to visualize the inner structure of the tomb as a distance dependent transparent model. The navigation allowed to access “hidden areas”, indicated with arrows, as the burial chamber is usually difficult to reach in the physical world to avoid tomb burglars, unfortunately very often not a real obstacle for grave robbers.



Fig. 11 – prototype Mastaba: symbols indicating information hot spots, information overlay (© TU Wien)

Documentation of the Excavation

The excavation that took place hundred years ago has been documented in different ways. Of particular interest were black and white glass-slides, the excavation diary of Hermann Junker, and several sketchbooks. The analogue black and white slides were scanned in high resolution and digitally restored, as they were partly covered with dust and scratches. Text fragments, covering various aspects of the life on the excavation site were selected and digitized. The sketchbooks were scanned as grey-scale images with a book-scanner and converted into a special digital facsimile format, suitable for interactive display.



“The core team of the workforce came from Qift in Upper Egypt. The rest of the workers were recruited from the neighbouring villages.”

Fig. 12 – interactive photobook: image and spoken text from the excavation diary of Hermann Junker (AEOS I 5926 © KHM)

The interactive photobook was structured into various chapters that described the typical activities on an excavation (e.g. arrival at the site, accommodation, digging, documentation, leisure time, transportation of objects). It could be explored by interacting with a tablet in front of a large display, the spoken text fragments from the excavation diary were emphasizing the displayed images and created a very lively atmosphere of

the life on the excavation site. Additionally an automatic mode was presenting the different chapters in the natural order of activities.

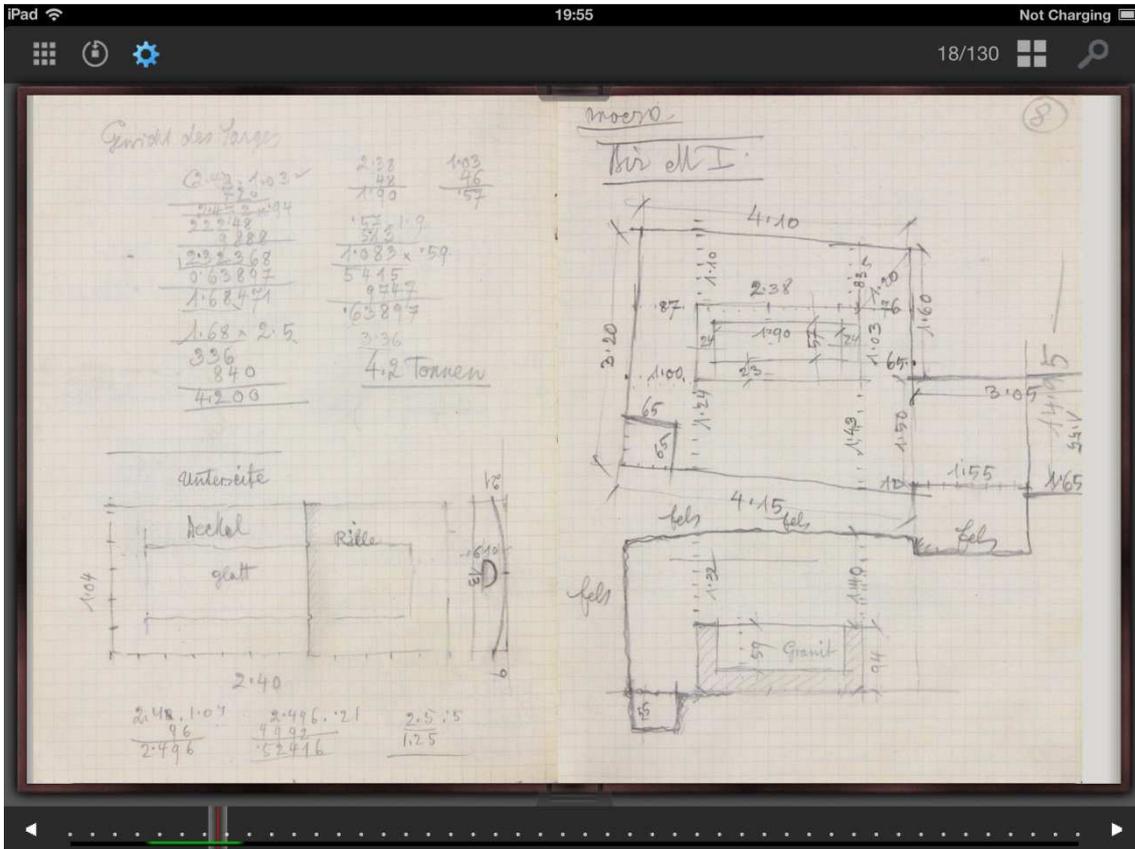


Fig. 13 – Interactive Sketchbook: drawing, sketches and comments from the excavation (© TU Wien)

It was possible to manually browse the digitized sketchbooks and zoom into details of the sketches and comments, an automatic browsing mode provided an overview of the entire content.

Technological Comparison of Excavation Tools

In addition to the digitized documentation of the historic excavation, some of the surveying tools (leveling instrument and theodolite) from that time period that were used onsite were displayed in comparison of a contemporary 3D laser scanner (RIEGL LMS Z420i).

An additional video sequence showed how the pyramids and the surrounding cemeteries were surveyed with a laser scanner and how these measurements were used in the reconstruction process of the Giza plateau.



Fig. 14 – surveying instruments: historic theodolite and leveling instrument, 3D laser scanner (RIEGL LMS Z420i) (© TU Wien)

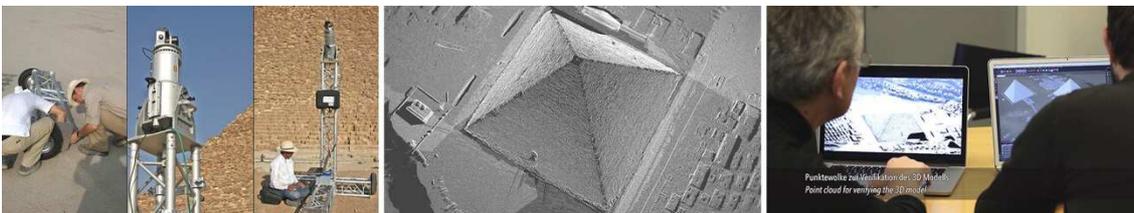


Fig. 15 – survey and reconstruction: preparing the laser scan, point cloud of the cheops pyramid, reconstructing Giza (© TU Wien)

Integration into the Exhibition Design

The intention was to blend the digital exhibition objects with the physical objects in a unified design. Every digital presentation had to provide an automatic presentation mode, so that interaction is not necessary but should be possible at any time. All explanations were generated in German and in English language. At the interactive installations switching languages was possible at any time in the presentation. An important technical feature was, that every digital presentation had to start-up each morning after electricity was activated in the exhibition rooms and should start the necessary infrastructure automatically (e.g. local WLAN, servers). At start-up the automatic presentation mode was selected. At a pre-configured idle time, the systems had to switch to automatic presentation mode again to avoid static display times. The interactive installations were installed on tablet computers (iPads) and were working either alone (e.g. the sketchbooks) or in synchronisation with other computers that managed to display the content on a large display (e.g. the

Mastaba prototype and the interactive photobook). Hereby the tablet was sending remote commands via WLAN to a server-version of the presentation application.

Anniversary Exhibition

The special exhibition was displayed for a four-month period in the beginning of the year 2013 at the Kunsthistorisches Museum Wien.



Fig. 16 – view from the entrance towards the video-wall, displaying the video about Giza (© TU Wien)



Fig. 17 – opening of "In the Shadow of the Pyramids": interactive photobook, interactive Mastaba prototype (© KHM)

Permanent Exhibition

After the special exhibition some of the digital presentations were integrated into the permanent Egyptian collection.



Fig. 18 – integration of the digital presentations into the permanent Egyptian collection (© TU Wien)

Discussion

The special anniversary exhibition had about 200.000 visitors during a four-month period. All digital presentations were working without problems in that time without any maintenance.

The most popular digital exhibition object was the photobook that created a lively impression of the everyday activities of the excavation work. Visitors mainly observed the automatic presentation mode and did not dare to use the interactive part with the intention of not disturbing the careful listeners. At some digital presentations the provided information was probably too dense for the average time spent by visitors. The major conclusions from observing the behaviour of the visitors were that story telling is very important, as well as a lively immersive experience. The technology used should be kept in the background – simplicity as well as stability of operation and interaction were necessary key factors. The information provided should generate the necessary context and support an underlying story that keeps the visitor interested.

Acknowledgements

Digital Exhibition Team: Peter Ferschin, Iman Kulitz, Stefan Niedermair, Galina Paskaleva, Benjamin Stangl, Karl Johann Mayer, Katherine Otero, Heimo Müller, August Gschwantner, Sonja Hochecker. Exhibition Curators: Regina Hölzl, Peter Jánosi. Exhibition Design: Gerhard Veigel. Exhibition Management: Sandra Maria Rust. Sponsors:



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Imprint:

Proceedings of the 18th International Conference on Cultural Heritage and New Technologies 2013 (CHNT 18, 2013)

Vienna 2014

<http://www.chnt.at/proceedings-chnt-18/>

ISBN 978-3-200-03676-5

Editor/Publisher: Museen der Stadt Wien – Stadtarchäologie

Editorial Team: Wolfgang Börner, Susanne Uhlirz

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