

The Card Box at Hand

Exploring the Potentials of a Paper-Based Tangible Interface for Education and Research in Art History

Project Idea

- **Conception and design of a tabletop tangible user interface** to support art historians' work techniques.
- Integration of the physical and the digital by **preserving and augmenting existing work practices** with images and text.
- User-centered approach: **starting from the users needs** to work with paper and **"collect things as tokens, as physical memories"** [1].

Application Context

- The application context is the academic discipline of Art History. In education and research, art historians work intensely with large numbers of images. **The investigation of the content of images, the identification, description, and interpretation of single motifs and their relation to relevant text sources** constitutes a crucial part of the work.
- In the academic field of Art History, computer work is of gaining importance, as materials are more and more stored digitally and as the domain goes beyond photographs of artwork. **Traditional GUI-based tools do not satisfactorily meet the art historians' needs during the creative and intense work** with many, sometimes hundreds of images.
- Art historians have a strong **tradition of working with image cards, card boxes, and image collages** (see the box about Aby Warburg below). Our approach aims to make the computer a more powerful and acceptable tool for art historians by integrating the traditional way of working with paper cards into a tabletop tangible interface.

The Art Historian Aby Warburg (1866 - 1929)

Aby Warburg was one of the founders of modern Art History and an intensive user of card boxes. He pinned photographs on black canvases to visualize his work - at that time an innovative technique [2].

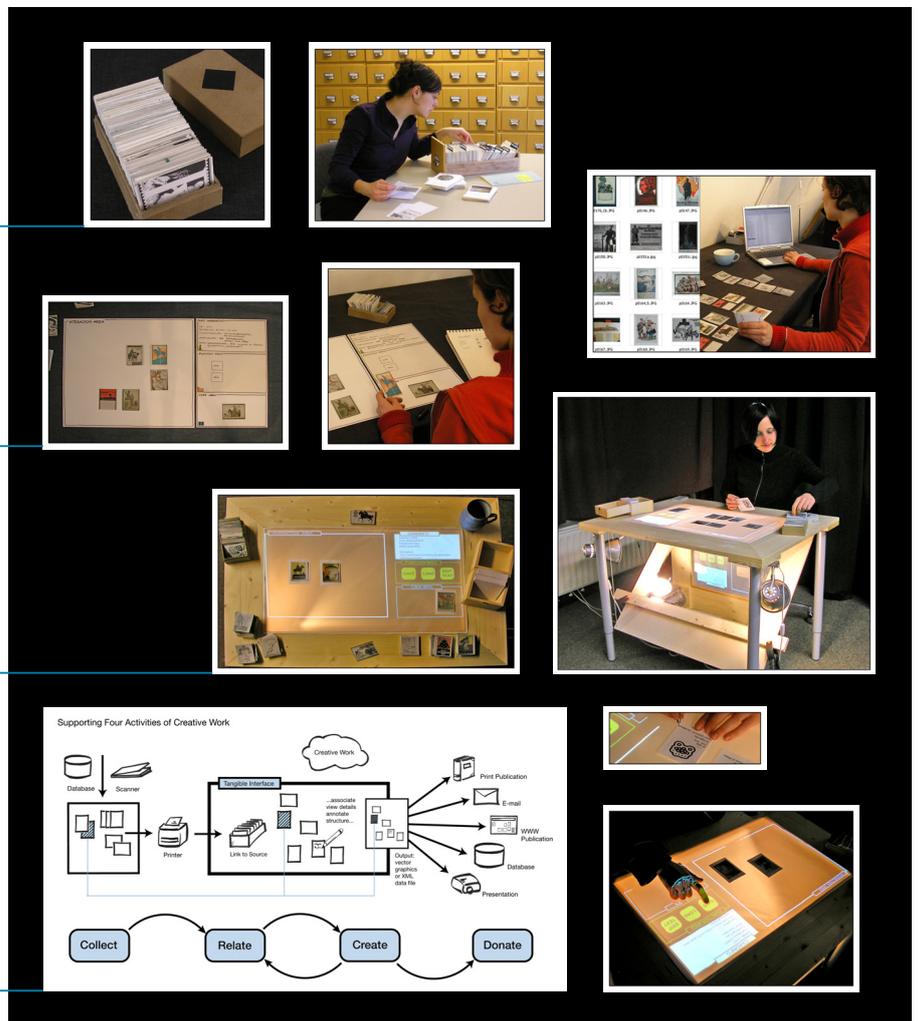


Method

- Using a user-centric approach, we applied participatory design techniques such as in situ interviews, observation and document analysis. Furthermore, we used **paper prototyping** in order to test design ideas for the tabletop tangible.
- In the **first working setup the reacTIVision System** [3] was applied.

Relevance

- Beyond the context of Art History, our research gives insights into **the human needs regarding paper-based creative work with image collections and supporting digital visualizations**, as well as insights into design principles for tabletop tangible user interfaces.



The collage includes several photographs: a person using the interface, a close-up of the interface showing image cards and text, a person interacting with the interface, and a diagram of the system architecture. The diagram, titled 'Supporting Four Activities of Creative Work', shows a central 'Tangible Interface' box connected to a 'Creative Work' cloud. The interface is linked to a 'Database' and a 'Scanner'. It has a 'Printer' output and a 'Link to Source' input. The interface also connects to 'Print Publication', 'E-mail', 'WWW Publication', and 'Database' outputs. Below the interface, a flowchart shows the four activities: 'Collect' -> 'Relate' -> 'Create' -> 'Donate'.

Supporting Four Activities of Creative Work

Ben Shneiderman has introduced four stages of activities as part of a generative theory of HCI [4], which can be applied to structure art historical work: **Collect - Relate - Create - Donate**.

A TUI's Potentials for Art Historical Usage

- TUIs enable the integration of digital tools into the traditional paper-based work.
- The **sensible integration of TUIs into established GUI-applications** is of major value.
- TUIs offer **good support for "relate" and "create" activities**.
- A paper-based TUI is well suited for working with a personal, pre-selected material collection.
- TUIs offer **physical handles to different media**.

References

- [1] Bruhn, M. *The Warburg Electronic Library in Hamburg: A Digital Index of Political Iconography*. Visual Resources, Vol. XV (1999), 405-442.
- [2] Bruhn, M. *Aby Warburg (1866-1929) - The Survival of an Idea*. In: *Enciclopédia e Hipertexto*. Edições Duarte Reis (2006), 495-508.
- [3] Bencina, R., Kaltentbrunner, M., Jordá, S. *Improved Topological Fiducial Tracking in the reacTIVision System*. In: *Proceedings of CVPR'05. IEEE (2005)*.
- [4] Shneiderman, B. *Leonardo's Laptop. Human Needs and the new Computing Technologies*. MIT Press (2002).