

Supporting Creativity Workshops with Interactive Tabletops and Digital Pen and Paper

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Tabletops in Creative Group Work

The impact of interactive tabletops on social factors in group work is of emerging interest for creativity support researchers. Tabletops may lower the burden of participation and can stimulate engaging explorations, which are important factors for creativity support tools. We believe that a combination of tabletops and digital pen & paper can provide an intuitive way of integrating individual content in creative group work. Therefore, we conducted an explorative design study during a full-day creativity workshop with creative professionals.

Creativity Workshop

The Creativity World Forum is an annual event organized by the „Districts of Creativity“ network that consists of 12 regions from 3 continents. As part of this event, we had the chance to employ a digital tool within a workshop based on the creativity technique “The Edison Principle”. Participants of the workshop were professionals from different countries working in creative industries like design, film making, art and music. The creativity method was conducted several times in small groups during break-out sessions. Based on the creativity technique we derived the following requirements:

- Provide collections of inspirational images from a repository based on specific themes
- Display images with short captions
- Support collaborative browsing
- Support focusing on specific images for group discussion
- Support creating and adding ideas to the themes by multiple users in parallel (no production blocking)
- Allow focusing on specific ideas for presentation

System Design

The technical setup of our system was based on a large, custom-built, 65 inch rear-projection multi-touch table with object recognition and four digital pens from Anoto. We used Microsoft WPF for implementing the interface.

We decided that the basic interface metaphor should be a zoomable pin board where images and idea scribbles were clustered according to the available themes. The view onto the pin board could be navigated by applying zooming and panning gestures, while manipulations (scaling, rotating, flicking) could be used to move and resize objects.

We integrated color-coded physical tokens for accessing the different theme clusters and for switching between browsing and presentation mode. By placing a theme token on the surface of the table, the pin board view was zoomed onto the associated theme cluster and manipulation of objects was activated for browsing.

When scaling images to larger sizes, a more detailed caption was displayed along with the images (semantic zoom). Idea scribbles could be added to the theme clusters by writing on different pages of paper assigned to each cluster. The pen strokes made on paper were instantly transferred to digital representations within the currently accessed theme cluster. In presentation mode, when no theme token was on the table, the view onto the pin board could also be navigated by tapping gestures that led to an animated zoom onto the selected object.



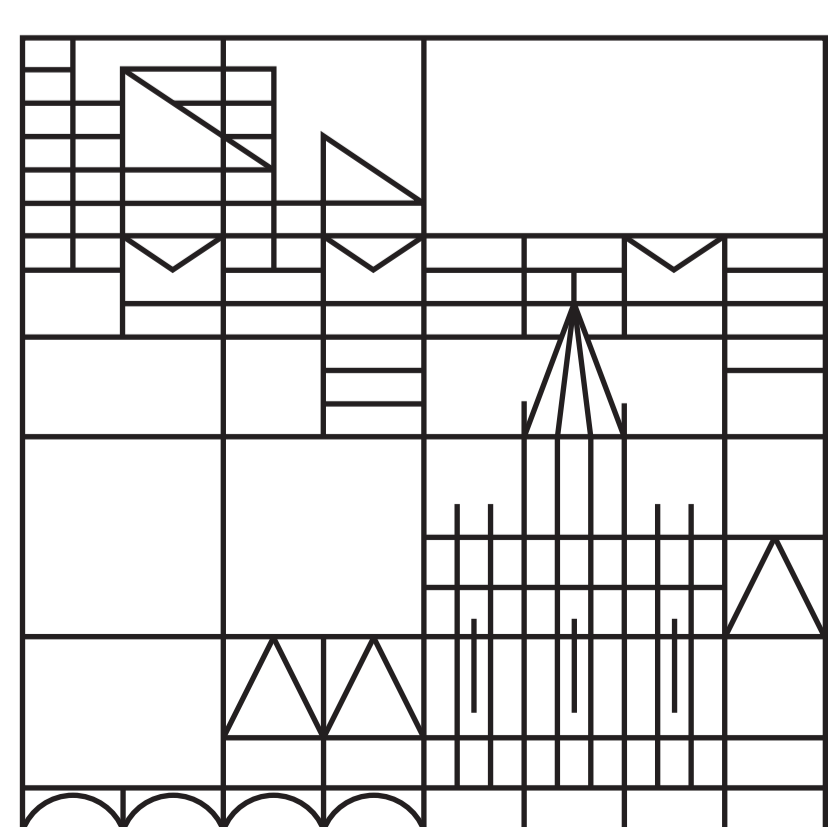
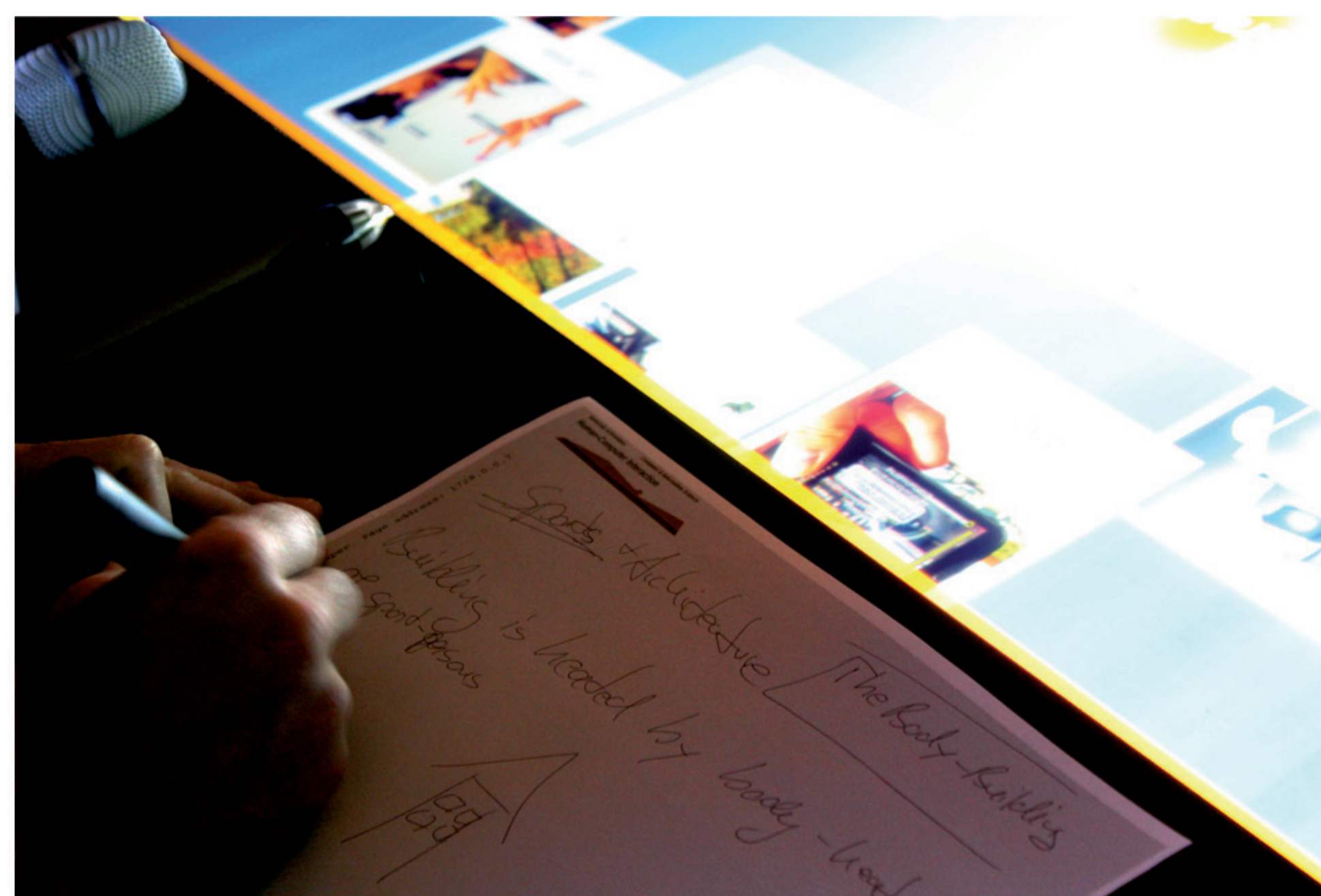
Creative professionals using the system during a breakout session of the workshop; the tabletop facilitates image retrieval and image browsing via color-coded theme tokens while individual content is integrated with digital pen & paper.

Results

During the full-day workshop over 60 creative professionals used our tool. We collected feedback with questionnaires from 16 participants. Additionally, we observed the workshop with 4 researchers and video recordings. From the questionnaires, we found that the participants rated the tool as intuitive and enjoyable and that the overall interaction imposed no burden on the participants. 12 participants stated that they could in general imagine this combination of technology in creative work environments.

The best rated aspects (scores based on a 5-point Likert scale) of the system were parallel input (4.5), the zoomable pin board metaphor (4.3) and increased group awareness (4.2). We got mixed answers on the question if the system distracts from the primary task of the group (2.7). However, from our observations we found that the novelty of the applied technologies themselves was distracting for some of the participants, especially in the first sessions.

Additionally, we observed several interesting behaviors of the participants such as the following: Participants placed some of our digital pens in their own pockets or tried to write on the paper with regular pens and markers. This indicates that the digital pen was not perceived as technology, but was treated just like a traditional pen. Fortunately, no one tried to write directly on the digital representations of the ideas on the table. In some cases, the theme access token was used for gatekeeping and to negotiate leadership within the groups. Finally, we found that the zooming mechanism is a reasonable tool for focusing attention on specific objects. However, it only works well if one member of the group has the dedicated role of the presenter.



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