

---

# Multi-Scale Information Composition: a New Medium for Freeform Art Curation in the Cloud

**Andrew M. Webb**  
Interface Ecology Lab  
Texas A&M University  
College Station, Texas  
andruid@ecologylab.net

**Rhema Linder**  
Interface Ecology Lab  
Texas A&M University  
College Station, Texas  
rhema@ecologylab.net

**Yin Qu**  
Interface Ecology Lab  
Texas A&M University  
College Station, Texas  
yin@ecologylab.net

**Matthew Carrasco**  
Interface Ecology Lab  
Texas A&M University  
College Station, Texas  
matthew@ecologylab.net

**Andruid Kerne**  
Interface Ecology Lab  
Texas A&M University  
College Station, Texas  
andrew@ecologylab.net

**Nic Lupfer**  
Interface Ecology Lab  
Texas A&M University  
College Station, Texas  
nic@ecologylab.net

**Kade Keith**  
Interface Ecology Lab  
Texas A&M University  
College Station, Texas  
kade@ecologylab.net

## Abstract

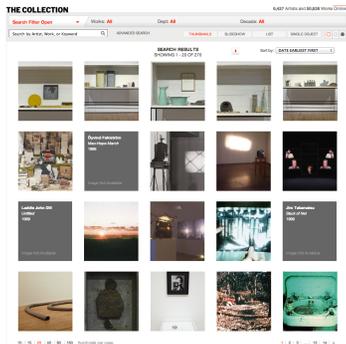
We develop a new medium of freeform curation for digital arts catalogues that integrates an infinite zoomable canvas, sketching, and spatial arrangement of rich catalogue elements. We characterize media of curation on two levels: the individual *elements* that are collected and how those elements are put together through *assemblage*. The elements of prior digital arts catalogues are assembled using linear lists or grids. These assemblages do not scale well, making them agonizing to wade through when collections are large. Assemblage in our new medium supports curating across multiple scales, easing demands on visual attention, while opening conceptual horizons. We present our artifact, *The Digital Curated*, as an example of a digital arts catalogue represented in our new medium. We narrate ways in which one would explore this catalogue to make evident the new medium's benefits.

## Author Keywords

information-based ideation, visual interfaces, creativity support environments

## ACM Classification Keywords

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



**Figure 1:** The Museum of Modern Art has one of the better digital catalogues. Yet, clicking on the Medium:Installation link from an artwork by Bill Viola brings us here, to 20 of 270 results [13]. It looks pretty, but form is trumping function. We can see neither the scope of the collection, nor its associationality. Further, the page lacks a label for Installation. As a result, the user could forget what this collection represents, as I myself did, while preparing the present research.

## Introduction

In their best cases, the digital arts have worked to challenge and transform people's senses of technology's potential, e.g. addressing what is possible, what is appropriate, what is intimate, and what is scary. Yet, while boundaries have been blurred and hybrids assembled, the form of the arts catalogue has hardly advanced. We develop a new medium of curation that applies digital arts and sciences methodologies to the digital arts catalogue. The medium is freeform and referential, visual and semantic, scalable and expressive. Deeply structured metadata, textual exegesis, rich imagery, video, and sketching are integrated with fluid interaction techniques.

## Media of Curation

We consider the construction of media of curation. The affordances and structures of a medium of curation impact user experience. Our framework of analysis and synthesis address the representational characteristics of media of curation on two levels. First, we address the medium of the individual *elements* that are collected. In personal digital curation these are forms such as bookmarks and clipped Web content. At the same time, we address the medium of *assemblage*, that is, how a medium enables these elements to be put together. For example, on Pinterest people curate *Pin* elements into *board* assemblages.

In prevailing digital art catalogues, each element consists of a few digital media assets and some descriptive metadata. Works for a particular artist are grouped (linked) together. Facets, such as medium and genre, may be specified (or not). As soon as collections grow large, the user is often left to fend through long lists, with perhaps 10 items on a web page. These are agonizing to wade through. They are hardly usable. The use of grids of

thumbnails may ameliorate the problem, to some extent. However, they don't scale very far, particularly since unless metadata for each entry is simultaneously displayed, the presentation is uninformative. Linear representations quickly fill a display. In short, the medium of the elements resembles that of the print art catalogue. The medium of assemblage is in many ways worse (see example, Figure 1), because catalogues as print books afford thumbing through. Thumbng through a printed catalog typically constitutes a rich, high fidelity experience because the media assets are nicely printed photographs, and the grain of the paper is tactile. In contrast, digital lists and grids can be experienced as arbitrary edifices, in which order, selection, and presentation read as machinic.

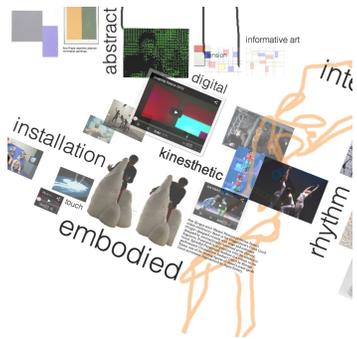
## Information Composition

We consider precursors to the present new medium of curation. In spatial hypertext, elements were flexibly organized by users in 2D space, using features such as size and weight [12, 14]. The elements were typically plain text scraps, which don't support re-finding or engage viscerally.

Information composition extended spatial hypertext by emphasizing the visual [8]. Composition is an artistic method. Composition literally means to assemble elements to form a coherent whole. Information composition added emphasis on images, overlap, and translucence to spatial hypertext's flexible 2D medium of assemblage. From the start, information composition constituted a medium of curation, in that elements typically included source URLs and so afforded re-finding. The medium of information composition was found to improve navigation while browsing a collection of web pages, as compared to linear text [9]. Composition was subsequently found to improve creativity during open-ended tasks through a field study of students [8] and

a laboratory study [10], and to contribute to phenomena of situated creative learning and distributed creative cognition [7].

Webb et al. extended information composition by enhancing the medium of the elements of curation [19]. In this form of information composition, the elements that users collect and assemble are *rich bookmarks*. A rich bookmark is an image or text clipping, which a user chooses from within a web page, enriched by contextual metadata, including the URL and title of the source document. Rich bookmarks can contain additional structural metadata, such as a paper's journal title, authors, references, and citations. Composition of rich bookmarks was found to support reflection and interpretation during information-based ideation.



**Figure 3:** Annotations label themes in the Digital Curated, such as embodied, kinesthetic, abstract, and rhythm.

### **New Medium of Curation: Multi-Scale Information Composition**

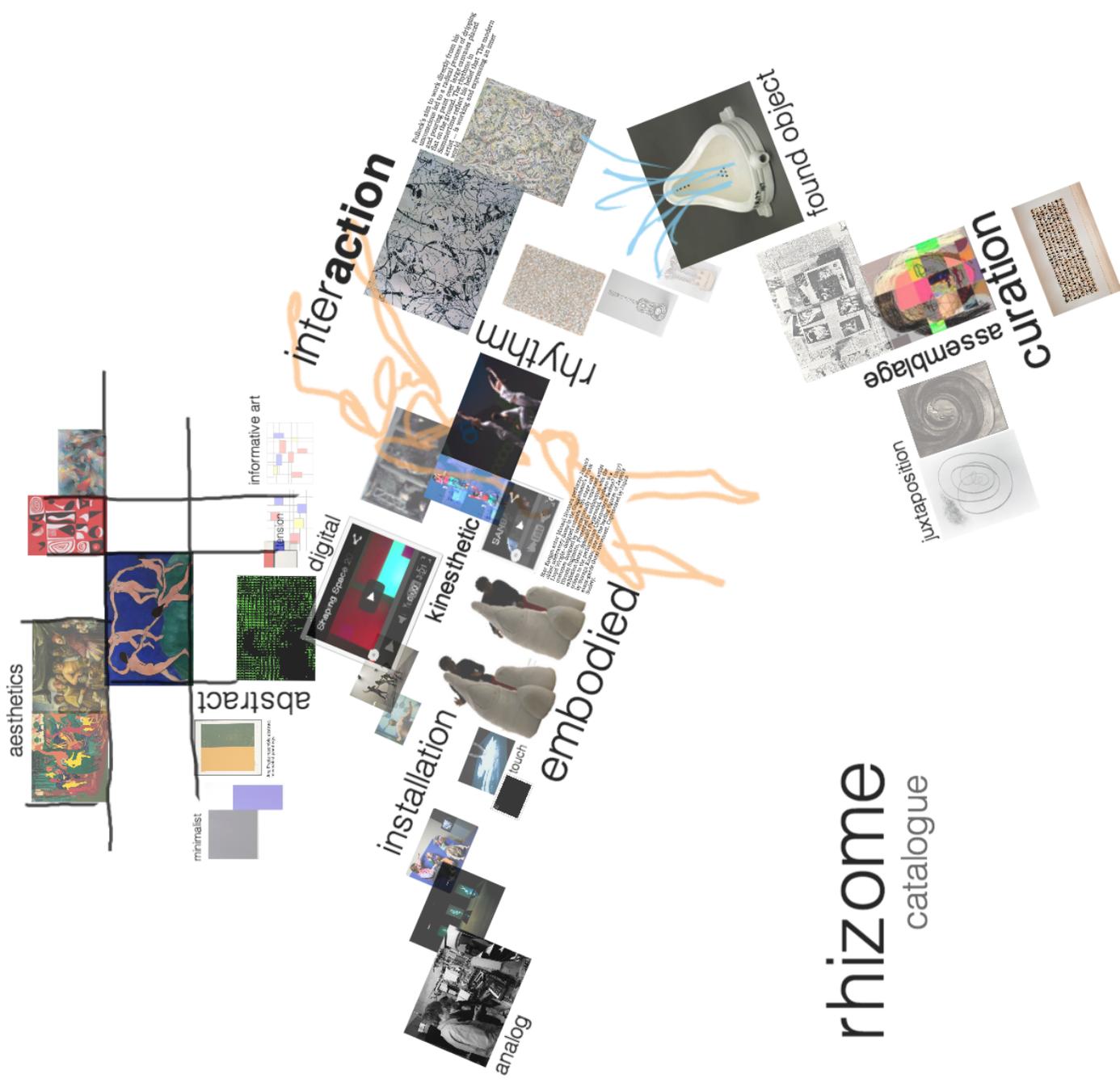
The present research extends prior work on information composition through the incorporation of sketching and a zoomable user interface in a cloud-based interactive system, which is freely available to users, called IdeaMÂCHÉ [5]. Sketching adds freeform lines to the composition of image and text rich bookmarks. It can be thought of as a graphical form of annotation. Zoomable user interface techniques enable assembling information on and across levels. This, in turn, enables conceptually and cognitively scaling the assemblage of a curation. Incorporating curation tools into the cloud makes data available anywhere, freeing the user from working on particular computers. And more. Through IdeaMÂCHÉ's web browser plug-in, which processes drag and drop events, all of the content a user browses directly affords incorporation into the curation environment, which also resides in the browser.

We illustrate principles of multi-scale information composition as a new medium [5] for freeform art curation through an example curation, *The Digital Curated* [18] (see Figure 2). In this exemplar, we curate media from museums, exhibitions, and scholarly literature, synthesizing the topics of this extended abstract, itself.

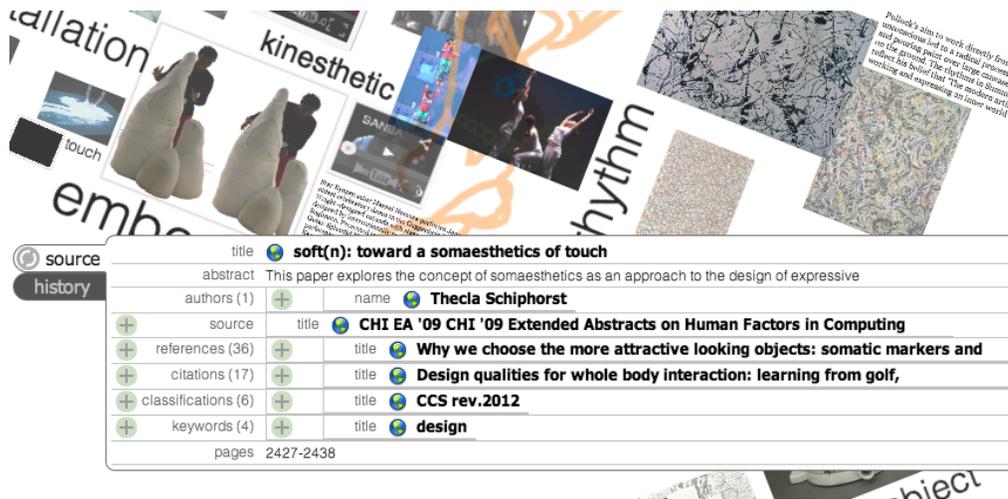
### **Visual and Semantic Elements of Curation**

The composition's elements of curation consist of rich bookmarks, textual annotations, and sketches. Annotations are used in *The Digital Curated* to call out themes, such as aesthetics, abstract, kinesthetic, embodied, digital, analog, rhythm, found object, and assemblage (see Figure 3). Each rich bookmark, in turn, consists of a clipping (image, text, or video) enhanced with metadata. For example, in the area delimited by the labels embodied, kinesthetic, and touch, we see rich bookmarks e.g. from works by Schiphorst [16], Rokeby [6], and Candy and Edmunds [3]. The clipped images depict amalgams of gestures, everyday users, dancers, sculptures, wearables, and projections. A YouTube video is embedded. It can be played, paused, and scrubbed directly from within the curation,

Activating a rich bookmark presents its metadata (see Figure 4). For an ACM article, this metadata is quite rich; e.g., for soft(n) [16], we expand the reference list, and in turn, discover an article on second and third wave HCI methodology [1]. We see, through the metadata field for this article's abstract, again without leaving the composition as curation, that this involves topics of multiplicity, context, boundaries, experience and participation that arise as technology spreads throughout everyday cultures, while context and application types broaden and intermix. Thus, we discover an interesting conceptual juxtaposition between nested, hidden



**Figure 2:** Static rendering of the overview of an inherently dynamic medium: multi-scale information composition. This work, entitled *The Digital Curated* [18], depicts a digital arts catalogue where artworks are represented as rich bookmarks. The assemblage of rich bookmarks expresses the curator's ideas about the relationships among elements and a synthesis of the whole collection.



**Figure 4:** Metadata for soft(n) [16] rich bookmark is displayed in-context. Nested fields such as references and citations, which contain metadata for other scholarly articles, can be expanded, recursively, to reveal more detail. Clicking the title for these related articles enables the user to browse the actual articles, in a browser tab.

metadata, and themes articulated by the assemblage of the visual, semantic whole.

### New Medium of Assemblage

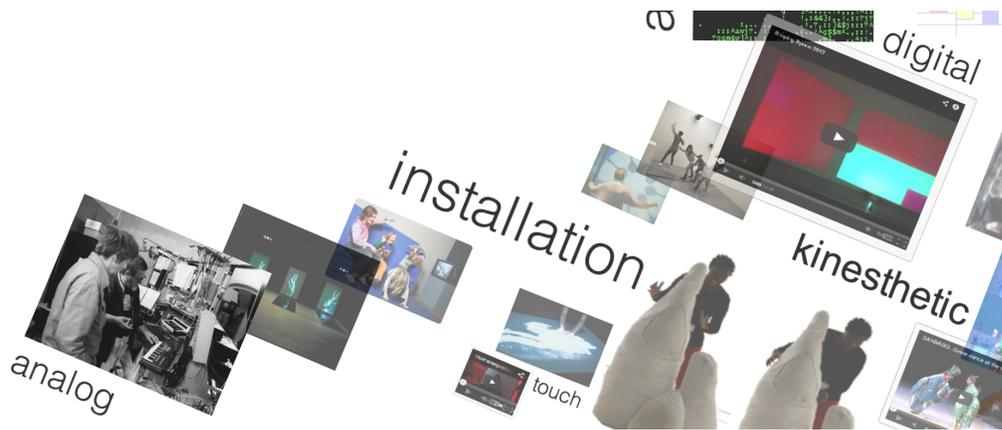
Cultural theorists, Deleuze and Guattari, describe the assemblage of cultures and societies as a rhizome, a meshwork of interconnected heterogeneous elements without a clear beginning or end [4]. The relationships among elements are as important as the elements themselves. A rhizome is a map conveying relationships rather than a tracing, which accurately reproduces the elements within. We argue that our new medium of digital arts catalogue constitutes maps, not tracings, and so functions rhizomatically. With an infinite canvas,

curators can continually evolve digital arts catalogues in this new medium. Curators express relationships between artworks through use of scale, spatial juxtaposition of elements, and sketching. Further research can also enable visitors to annotate these multi-scale spaces for themselves, and to engage socially amidst them.

### Multi-Scale

When we first arrive, we see that over 50 elements have been assembled in four or five clusters. In a linear or grid representation, this collection would overwhelm cognition, and so be rendered almost meaningless. Here, we see the clippings in the clusters are assigned a smaller size relative to most of the labels. Thus, the curation as composition is authored at multiple scales, incorporating techniques originated by Perlin and Fox [15].

At the initial, top level, we perceive a gestalt reading of the whole, but can see little detail in individual clippings as rich bookmarks. To focus, we use the scroll wheel to zoom in and examine a subset of the composition, across the analog-installation-kinesthetic-digital region. The focus of the zoom action is easy to control, because it is centered around the point of interaction. Things get bigger. With metadata from Foundation Langlois, a series of rich bookmarks of works by Paul Sermon, Steina and Woody Vasulka, and Bill Viola, lead to a transition, through the analog label across to digital installations with David Rokeby's Very Nervous System [6] (see Figure 5) and then to the kinesthetic-embodied cluster, described above. The historic transition is expressed spatially not just by position, but further, by a rotation of near 30 degrees. This juxtaposes the two clusters in orientation, while connecting them in space.



**Figure 5:** Zoomed in view of the installation theme. Use of scale creates a visual transition between themes of analog and digital.

#### *Juxtaposition and Arrangement*

Spatial areas and rotation are used to articulate themes. Annotations are positioned spatially proximate to and with the same rotation as the rich bookmarks they relate to. For example, 'rhythm' is positioned closely between a clipping from an article by Latulipe et al [11] and one of a painting by Jackson Pollock (see Figure 6). On a more macro level, we can trace from embodied to kinesthetic to rhythm, then, through a forking path [2], to interaction in one direction, and found object and assemblage in another. Kinesthetic, embodied, and touch are rotated similarly, promoting readings in which they cohere even more.

#### *Sketching*

Sketching is a means for visual annotation, which can promote synthesis and emergence. In a playful pastiche style, a figure recalling the Matisse dancers has been sketched through the embodied-kinesthetic-rhythm region.

Again, its rotation aligns with these annotations and associated rich bookmarks, promoting integrated readings. To organize the elements of curation in the area labeled aesthetics - abstract - (minimalist, informative art), a grid has been sketched, with a style recalling Mondrian. This echoes a rich bookmark from an article on informative art, which also looks Mondrian-esque. From a clipping of Duchamp's *Fountain*, we see wavy sketched lines that suggest urine splashing back, up and out of the readymade urinal, toward 'rhythm' and 'interaction', into clippings of a guitar and harpo-lyre from the Metropolitan Museum of Art, and a Pollock at the Guggenheim. How rude!

#### **Discussion**

The *Art of Assemblage* was the title of an exhibition at The Museum of Modern Art, in New York, in 1961, featuring works e.g. by Apollinaire, Gide, Picasso, Schwitters, Ernst, and, the originator of readymade, Marcel Duchamp [17]. The Digital Curated develops a digital catalog connecting form and content by invoking assemblage, not with chair caning and paste, but with clippings and metadata, position, rotation and sketching.

Through the composition of rich bookmarks, the assemblage of this new medium of curation is rhizomatic. The multi-scale representation enables elements to be reproduced accurately, with great detail, enabling micro conceptual and visual assemblage, and yet combined pointillistically, at more macro scales.

The MOMA curator, William Seitz, wrote of assemblage as involving ordinary objects, placement, juxtaposition in, "... not only a technical procedure, ... but also a complex of attitudes and ideas" [17]. He associates with assemblage, harmony of contrary and similar elements, explanation in Gestalt psychology, an abstract aesthetic of



**Figure 6:** The theme of rhythm juxtaposes work by Latulipe et al [11] with that of Jackson Pollack. A connection is formed from rhythm to Marcel Duchamp's fountain through arrangement of elements with 19th century guitars from the Met.

multiple confrontation, and the syntax for a sharp break with previous modes of aesthetic coherence. We have authored *The Digital Curated* using IdeaMÂCHÉ to function as an exemplar to demonstrate for you how to use multi-scale information composition in the cloud to imbue these qualities into a new freeform medium of curation for the digital art catalog.

## References

- [1] Bødker, S. When second wave hci meets third wave challenges. In *NordiCHI*, ACM (2006).
- [2] Borges, J. L. The garden of forking paths. In *Labyrinths: selected stories and other writings*, vol. 186. New Directions Publishing, 1964.
- [3] Candy, L., and Edmonds, E. A. *Explorations in art and technology*. Springer, 2002.
- [4] Deleuze, G., and Guattari, F. *A Thousand Plateaus: Capitalism and Schizophrenia*. University of Minnesota Press, 1987.
- [5] Interface Ecology Lab. IdeaMÂCHÉ. <http://ideamache.ecologylab.net/>, January 2014.
- [6] Jones, C., and Muller, L. David Rokeby, Very Nervous System (1983-): Documentary Collection. <http://www.fondation-langlois.org/html/e/page.php?NumPage=2186>, 2010.
- [7] Kerne, A., and Koh, E. Representing collections as compositions to support distributed creative cognition and situated creative learning. *New Review of Hypermedia and Multimedia* 13, 2 (2007).
- [8] Kerne, A., Koh, E., Smith, S. M., Webb, A., and Dworaczyk, B. combinformation: Mixed-initiative composition of image and text surrogates promotes information discovery. *ACM Trans. Info. Syst.* 27, 1 (2008).
- [9] Kerne, A., Smith, S. M., Choi, H., Graeber, R., and Caruso, D. Evaluating navigational surrogate formats with divergent browsing tasks. In *Proc CHI Extended Abstracts*, ACM (2005).
- [10] Kerne, A., Webb, A. M., Smith, S., Linder, R., Lupfer, N., Qu, Y., Moeller, J., and Damaraju, S. Using metrics of curation to evaluate information-based ideation. *Accepted and in press. ACM Trans. on Computer Human Interaction* (2014).
- [11] Latulipe, C., Wilson, D., Huskey, S., Word, M., Carroll, A., Carroll, E., Gonzalez, B., Singh, V., Wirth, M., and Lottridge, D. Exploring the design space in technology-augmented dance. In *CHI EA*, ACM (2010).
- [12] Marshall, C., Shipman, F., and Coombs, J. H. Viki: Spatial hypertext supporting emergent structure. ACM Press (1994).
- [13] Museum of Modern Art. The collection (medium:installation art). [http://www.moma.org/collection/browse\\_results.php?criteria=0%3ACL%3AI%3A20](http://www.moma.org/collection/browse_results.php?criteria=0%3ACL%3AI%3A20), January 2014.
- [14] Nakakoji, K., Yamamoto, Y., Takada, S., and Reeves, B. N. Two-dimensional spatial positioning as a means for reflection in design. In *Proc ACM DIS* (2000), 145–154.
- [15] Perlin, K., and Fox, D. Pad: an alternative approach to the computer interface. In *Proc. SIGGRAPH* (1993).
- [16] Schiphorst, T. Soft(n): Toward a somaesthetics of touch. In *CHI EA*, ACM (2009).
- [17] Seitz, W. C., of modern art (New York)., M., of Contemporary Arts (Tex.)., D. M., and museum of modern art, S. F. *The Art of Assemblage*. Museum of Modern Art New York, 1961.
- [18] Webb, A., Linder, R., and Kerne, A. The digital curated. <http://ideamache.ecologylab.net/v/lj3V2VT0eR/>, January 2014.

[19] Webb, A., Linder, R., Kerne, A., Lupfer, N., Qu, Y., Poffenberger, B., and Revia, C. Promoting reflection and interpretation in education: Curating rich

bookmarks as information composition. In *C&C* (2013).