

Points of Departure: Curators and educators collaborate to prototype a "Museum of the Future"

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ABSTRACT

Art museum curators and educators worked closely together to develop *Points of Departure*, an exhibition in which artworks and educational media were seamlessly integrated. Four multimedia prototypes were developed and deployed in the galleries: interactive *smart tables* featuring curatorial video introductions to each of the six exhibition themes; handheld iPAQ *Gallery Explorer* PDAs displaying video clips of featured artists; a Flash-based *Make Your Own Gallery* activity in which visitors were invited to curate their own exhibition and comment on it; and *Making Sense of Modern Art*, a kiosk (and Web-) based program providing in-depth treatment of the artworks on display and the issues that surround them. Evaluation of visitor response to these varied educational technologies is currently underway and will be reported at the ICHIM conference in Milan.

KEYWORDS: curator-educator collaboration, gallery-based multimedia, smart tables, handheld computers, PDAs, video, visitor feedback systems, art museums

INTRODUCTION

A bit of history

Ten years ago the first ICHIM

conference in Pittsburgh hailed the arrival of new technologies -- then dubbed either "hypermedia" or "interactivity" [1]-- as a means of educational outreach and enrichment for museum visitors. The first MicroGallery™ had just opened at London's National Gallery, a marvel of scholarly interpretation, elegant design, and state-of-the-art programming [2]. At the time, no one questioned that the best place for multimedia, that newfangled interloper and distinctly non-art experience, was in a separate room at a suitable remove from the National Gallery's painted treasures. In fact, the actual MicroGallery was a cross between a lounge and a library, with subdued lighting appropriate to the computer touchscreens that had replaced books as sources of illumination. This seemed the best we could hope for, as most of us were fighting for the conceptual and financial headroom that would allow interactive multimedia programming to be considered as an element in our public programming in the first place [3].

Now here we are, ten years later: kiosks, CD-ROMs, and web sites are rampant, and in art museums the old study room paradigm has hardly been challenged [4]. It is a vestige of hard distinctions drawn between curating and educating, between the white cube of

the gallery space (equated with unmediated experience) and purposeful contextualizations, between connoisseurship aimed at a pre-educated visitorship and fear of pandering to the populace. So it came as something of a surprise, even after six years of success and recognition for our multimedia educational resources at SFMOMA, when an exhibition was spawned in part by an interactive program. That exhibition is *Points of Departure: Connecting with Contemporary Art*, on view from March 21–October 28, 2001 in the Museum's fifth floor galleries. *Points of Departure* is the result of a curatorial collaboration between the Painting & Sculpture and Education departments. Not surprisingly, it is the first exhibition we have produced (and one of the first of which we are aware) that discreetly but intentionally integrates new technologies directly into each gallery amid the artworks [4].

PRECIPITATING FACTORS FOR CHANGE

Since 1999, the Interactive Educational Technologies (IET) team at SFMOMA has been engaged in the development of *Making Sense of Modern Art*, a broadband Web- and kiosk-based exploration of key issues surrounding contemporary art in general, and major works in our collection in particular [5]. Our attention has been focused on:

- interface design and programming of more than a dozen Flash templates through which the content is delivered
- selection of featured artworks that provoke frequent visitor questions and embody a variety of artistic concerns
- identification of key issues and visitor questions related to these works
- research, interactive storyboarding,

and writing of screen content to address these questions and issues

- location and licensing of still and video archival resources to illustrate them
- endless scanning and processing of images and video
- production of video interviews with living artists, curators and art historians
- authoring and publishing of these elements in Flash presentations for kiosk, Web and CD-ROM [6]

The program represents a significant commitment of time and resources by the Museum. By last fall we had produced the overarching structure for the program, a publishing tool allowing further development with minimal recourse to outside contractors, and multiple layers of content on artists as diverse as Robert Rauschenberg, Louise Bourgeois, Eva Hesse, Sol LeWitt and Richard Serra, among others.

It was nonetheless a surprise when, in a curatorial meeting brainstorming future exhibitions, our deputy director suggested that we base an installation of the permanent collection on *Making Sense of Modern Art*. We were aware that while art from the first part of the 20th century has achieved wide acceptance (on the coattails of the Impressionists), works by the abstract, minimalist and conceptual artists of the Sixties and Seventies are still often difficult for the general public to accept. The desire to showcase permanent collection works from this period, many of which had been recently acquired, along with the desire to frame these works in new and meaningful ways for our audience, made a collaboration between the Painting & Sculpture and Education departments natural. We had already succeeded in producing multi-

layered multimedia content about a number of key artists and their works, so it was logical to include many of them. But the exhibition would also afford us the opportunity to develop new multimedia content about artists like Jenny Holzer, Gerhard Richter, Jasper Johns, and Andy Warhol [7].

But of all the threads that led to *Points of Departure*, perhaps the most colorful ones were the luminescent threads in Flavia Sparacino's black denim coat at the 1999 ICHIM conference. It was their sequential playback of the words "MIT Wearables" that stopped me and a colleague in our tracks in a conference hallway, and then had us trotting down same hallway to meet the woman who wore them. Flavia, it turned out, was a researcher at the MIT Media Lab working on her Ph.D. in Interactive Cinema and Perceptual Computing. Her dream was to create a wearable computer-based, interactive tour of an art exhibition that would be smart enough to configure itself on the fly, using pattern recognition to recognize the artworks and a host of narrative segues to connect what you were presently looking at to works you had previously seen. Flavia had also developed the concept for the "smart tables" used by New York's Museum of Modern Art for their exhibition *Un-private House* [8].

We decided to work together, and over the coming year exchanged visits across the country. Although the final solutions implemented in *Points of Departure* were not the experimental prototypes initially put forward by Flavia, her ideas were key in provoking us to rethink the ways multimedia could be used to reach gallery visitors *in situ* in an integrated way. Her prototypes, including wearable computers and smart glasses

that contained tiny LCD computer displays, also got our somewhat nervous curators and staff used to thinking outside the box, if only for this one admittedly "experimental" show. If the companion exhibition in our fourth floor galleries, *010101*, was about artists in technological times, *Points of Departure* would be about the Museum in technological times -- an opportunity to prototype the Museum of the Future. We would try a number of strategies and then evaluate what worked best for our visitors -- and what we felt most comfortable with.

SIX GALLERIES, SIX THEMES

The core curatorial team for the show, which included curator of painting and sculpture Janet Bishop, curator of education and public programs John Weber, and myself, assembled a preliminary pool of candidate artworks that drew heavily from two streams: key works treated in *Making Sense of Modern Art* and major recent acquisitions and fractional gifts [9]. Many museums have experimented in recent years with thematic, non-chronological approaches to installing their collections, ranging from the Walker Art Center in Minneapolis to New York's MoMA and the new Tate in London. We applauded these deviations from the traditional art historical canon, as they opened up space for new approaches and interpretations, and echoed some of the cross-pollinations we have been trying to foster in our program *Making Sense of Modern Art*. However we also felt that many of these re-installations have fallen short of their potential to energize and inspire a wider audience, largely due to their over-dependence on text panels and half-hearted inclusion of multimedia to communicate an array of sophisticated ideas. In *Points of Departure*, we

decided we would augment the standard introductory text panels with more personal video clips of the curators and artists expressing the gist of each theme.

Looking at the initial checklist of core works, six themes emerged that seemed at once essential to artistic practice of the past forty years and mystifying to our public.

They were:

1. *Pushing Paint*: artists' fascination with the sticky, gooey substance of paint, above and beyond issues of abstraction and figuration
2. *Found, Recycled, Repurposed*: artists' use of found materials, ranging from Duchamp's selection of a urinal as a *Fountain* to Betye Saar and Bruce Conner's intricate assemblages
3. *Language*: why visual artists have used language in their work, from Judy Chicago in the 1970s through the identity artists of the 1980s and 1990s
4. *Line, Shape, Volume, Field*: an exploration starting from the visual contrast between two monumental works by Cy Twombly and Louise Bourgeois, and extending to other artists as well.
5. *Grids*: the grid as an organizational and compositional tool shared by minimalist and pop artists from the 1960s forward
6. *Style*: the oeuvre of Gerhard Richter problematizes the question of style at the beginning of the 21st century. Is style still important? Clearly, Richter seems to say. Might it also be an arbitrary choice? Richter would have us believe that as well [10].

THE INTERPRETIVE CHALLENGE: INTEGRATING EDUCATIONAL MEDIA IN THE GALLERIES

Given an evolving gallery layout and exhibition checklist, the challenge facing the Interactive Educational Technologies (IET) team was:

- to deploy interpretive resources that would reach people in the galleries "just in time" when they want to get more information, and gain insight into artistic and curatorial motivations
- to provide multiple modes of delivery and "entry points" suited to different learning and gallery-going styles
- to dose technology to serve as a discreet complement to the artworks, not to steal the show. Now that we had been invited into the privileged gallery space, we had to exercise care not to become raucous interlopers

Over a six-month period of intense preparation, we developed four distinct modes of delivery, each corresponding to a particular kind of content:

Smart Tables

Our primary delivery platform became the *smart table*, which was developed in collaboration with the Michigan furniture manufacturer Steelcase. The smart table was our multimedia alternative to the wall text, placed one per gallery, each with its own custom content. Initial hardware concepts called for internal projectors paired with cameras and sophisticated motion sensing software to detect hand movements on the table surface. Our final solution was far simpler: find the largest off-the-shelf touchscreen LCD on the market, and design a simple but elegant vertical wooden enclosure that

blended with the other gallery furniture and contained the CPU. Audio was served via two Soundsticks that were tethered to the top of the unit with spun steel cables, as well as a single speaker enclosed within, with adjustable volume and sound venting through the top. Two considerations were paramount in determining the form factor:

1. *The "smart table" should not draw attention to itself.* From the beginning, we had opted for a screen that was either horizontal or close to horizontal, so it would not vie with the visitor's perception of the artworks hanging on the walls [11]. Corollaries of this rule were: the table should not stand out like space-age techno-furniture, and it should not be easily confused with a piece of sculpture. In a word, the plainer the better, in harmony with the spare gallery surroundings. Designer Charlie Forslund at Steelcase admirably rose to this challenge (figs 1-3).
2. Given the first premise, the next question became: *To audio or not to audio?* The question of whether to place a speaker in the smart table was a delicate one. We knew we didn't want to inundate the galleries with sound, imposing voice-overs on every visitor who entered. But one of the virtues of the smart tables was that they were horizontal, and as such encouraged group interaction or sharing in a way that vertical computer displays do not [12]. Limiting audio output to the two audio wands that fit on each table worked against the very informality we were seeking to encourage. We ended up putting a speaker into each table, and adjusting the volume level on an ad hoc basis in each gallery so the

sound was no more than a murmur from afar, but increased as you approached. Currently these enclosed speakers serve as a backup and reinforcement for the two audio wands, which provide a far crisper and more satisfying audio experience [13].

Other considerations were paramount in determining the content. The goal of the *smart tables* was to augment the standard museum wall text with something that lived and breathed. We followed the following premises:

1. *Have the curators tell the story themselves. Use multiple voices.* We spent six hours videotaping the curators and assistant curators in Painting Storage months before the exhibition opened. We asked them a set of structured question about each of the six themes in turn. In essence, it all boiled down to: "Why don't you just tell us in plain terms what you were thinking about when you put these artworks together? And how would you recommend visitors look at these works? What should they be on the lookout for?" The curators overcame their stage fright to varying degrees and expressed the major points of each theme again and again, in many different ways. In the process, they projected themselves as real, thinking people, sometimes witty, sometimes faltering, sometimes passionate and opinionated. In other words, someone other than a monolithic Museum Voice. *Someone a visitor could relate to.*
2. *No generalization without an illustration.* The two great flaws in wall texts are that people read them before they see the art, and that

they are rarely illustrated. Result: people fall off a cliff of abstraction by the third paragraph. Most of the insightful generalizations the curators have made through long experience preparing the show are lost on people who have yet to see the art. We strove to illustrate each statement spoken by a curator with an artwork drawn from the gallery the moment the point was made.

3. *Make it short, keep it varied.* We edited mercilessly—so much so that we called this part of the process *SoundByte 1.0*. Six hours of total footage turned into two to three minutes of curatorial intro per table, comprised of multiple clips as short as 15-20 seconds each. These clips revealed a refreshing spontaneity, and shifted from one side of the screen to the other as first one curator, then another, took up the ball.
4. *No QuickTime window -- Use the real estate!* Thanks to a spacious 1280 x 1024 screen resolution and fast 1GHz CPUs, we were able to avoid an onslaught of talking heads in small windows. The computers allowed us to play opening videos at 640 x 480 pixels, and Director masked the controls. Up to three artwork illustrations came up at the same time alongside the large video window, spreading what in former days would have been the A and B tracks of a single small QuickTime window out across the entire screen, and making for a much more engaging experience (fig. 4).
5. *Whenever possible, bring the artists themselves into the mix.* Each smart table featured an additional menu of video clips of artists whose works were in that gallery—sometimes interviews produced on-site at SFMOMA in which the artist

discussed that specific work, e.g., Robert Rauschenberg on his *Erased de Kooning Drawing*.

6. *Use animated activities to encourage visitors to think like artists.* Seeing and hearing the artists makes them into real people; applying their methods makes their problems and processes real as well. For example, on the smart table in the "Language" section, visitors could choose from several images and then select words or phrases to place on top of them, providing an immediate lesson in how words inflect images and vice versa, and heightening their sensitivity to the works in the gallery (fig. 5) [14].

The curatorial montages we produced according to these guidelines comprised the "intro loop," or opening layer, to which each smart table defaulted. The three levels corresponded roughly to the questions:

Level	Questions	Speakers/ Agents
1 Intro loop (default)	Why would anyone make this? What's it doing in this big important building?	Curators
2 Artist Videos	Why did I make this? How did I make this?	Artists
3 Activity	What would you be doing if you made this?	Visitors

iPAQ Gallery Explorers

One component of our initial blue-sky brainstorming with Flavia Sparacino had been a "museum wearable" computer, replete with head-mounted SVGA display piping video and Flash animations to visitors as they circulated like cyborgs through the galleries. While that science fiction vision has not yet come to pass (to the relief of some curators!), we replaced it with a perhaps more practical, off-the-shelf implementation, using Compaq iPAQ Pocket PC PDAs (fig. 6).

It stands to reason that audio tours will soon migrate to the handheld PDA platform, thanks to its capacity to sustain wireless messaging, audio, text, and image. But what we were most impressed by was the iPAQ's capacity to offer portable video, providing direct contact with the artists themselves at the moment you're in front of their work. In *Points of Departure*, we provided video clips of three artists per gallery, drawn from archival footage or interviews we have produced ourselves. Clips were accessed from thumbnails of the artworks using a straightforward HTML interface designed by Idea Integration (fig. 7). While these "Pocket PCs" are not yet optimized as video playback devices, making for slightly cumbersome navigation [15], visitor response has been overwhelmingly positive [16]. To stand before a sculpture of a nest of spiders by Louise Bourgeois and see her amid a very similar work (telling how it reminds her of her mother) is extraordinary. To watch Brice Marden show how he manipulates a brush as you stand in front of the painting whose creation he is describing, or to watch Chuck Close, Gerhard Richter, or Andy Warhol at work in their studios as you stand before their finished work is revelatory.

Make Your Own Gallery

After modeling six ways in which curators make sense of contemporary art in six themed galleries, at the end of the exhibition we provided visitors with an invitation: *Make Your Own Gallery* (fig. 8). This Flash-based activity offered on two kiosks gives visitors a chance to try their hand at selecting and arranging artworks in a virtual gallery space. They are free to pick and choose from any of the artworks they have just seen, across thematic categories. Then we invite them to comment on their selection in writing, title their gallery and submit it for public viewing. This is a first opportunity to gain a window into our visitors' thoughts as they share with us their selections and comments about the artworks in our collection.

Making Sense of Modern Art

At the beginning and end of *Points of Departure* is *Making Sense of Modern Art*, our flagship program, which is presented on two flat-screen kiosks alongside the *Points of Departure* galleries and on SFMOMA's website, www.sfmoma.org/msoma (fig. 9). As if developing everything all of these prototypes wasn't enough, we also added new in-depth content about seven important works in the exhibition, some of which were being seen for the first time at SFMOMA. These multi-layered features answer key questions about artists, the artworks and their times, and re-insert the works into a broader (and ever-growing) overview of 20th-century and contemporary art.

CONCLUSION

As curator of education and exhibition co-curator John Weber put it, "This show is about the art, but it is *for* our visitors." For us it is the beginning of a new paradigm in art museums' use of educational technologies, where

curators organize the exhibition with visitor needs in mind, and these educational technologies are integrated into the exhibition design rather than added as an adjunct or afterthought. Furthermore, by identifying and crafting content for four different platforms and delivering a different quality and shape of experience on each, we are hoping to give ourselves ample grist for the mill of evaluation. Over the next six months we will seek to clarify the kinds of messages, digital and otherwise, visitors want. We will also gain a clearer sense of when and where they prefer to get these messages [16]. Initial reports indicate that responses are overwhelmingly positive, and include pragmatic suggestions for how to improve certain aspects of the hardware implementation. We expect the experiments undertaken in Points of Departure to pave the way for future exhibitions, and for SFMOMA's new technology use for years to come.

ACKNOWLEDGMENTS

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REFERENCES

1. The ICHIM title was officially unpacked as "International Conference on Hypermedia and Interactivity in Museums—not to be confused with hyperactivity in museums! See Bearman, D., Ed., *Hypermedia & Interactivity in Museums: Proceedings of an*

- International Conference, Archives and Museum Informatics, Pittsburgh, 1991*
2. It used Macintosh IIx computers, 19-inch Radius touchscreens, and custom code in C.
 3. Samis, P. The Rocky Road to Multimedia: Museum Politics and Organizational Change. In *Museums and Interactive Multimedia*, MDA and Archives & Museum Informatics, Cambridge, U.K., 1993, 374-376
 4. One exception is the Minneapolis Institute of Arts, where as early as 1991 director Evan Maurer had seen the potential of interactive multimedia to reach out to audiences in new ways and provide a context for the artworks on display. He hired Scott Sayre, a recently graduated Ed.D. in Educational Technology to spearhead the effort. At the MIA, the computer stations were always placed in close proximity to the artworks they treated, albeit typically not in the galleries proper. When the MIA expanded its galleries in 1998, they built networked study niches into the walls, anticipating full multimedia coverage of the permanent collection over time. For an early paper on the MIA's approach, see Sayre, S. The Evolution of interactive interpretive media: A report on discovery and progress at the Minneapolis Institute of Arts. In *Museums and Interactive Multimedia*, MDA and Archives & Museum Informatics, Cambridge, U.K., 1993, 41-51
 5. Accessible from the SFMOMA website at www.sfmoma.org/msoma.
 6. The Museum has worked with Perimetre-Flux Studio on interface design and art direction, based on a number of template ideas we had developed in-house. We have worked with Idea Integration, San Francisco on the development of Pachyderm™, a Flash authoring tool that draws assets from an SQL database and populates the templates, creating interactive Flash presentations publishable to kiosk, CD-ROM, or Web. See Samis, P. and Wise, S. Making the Punishment Fit the Crime: Content-driven Multimedia Development. In *Proceedings of 'Museums and the Web 2000'*. Pittsburgh: Archives & Museum Informatics, 2000 (CD-ROM). Also available on the Web at www.archimuse.com/mw2000/papers/samis/samis.html
 7. At the same time, the Museum was undertaking *010101: Art in Technological Times*, its first major interdepartmental exhibition since the arrival in 1998 of its new director, David Ross. As we thought about an appropriate exhibition counterpoint to the potentially jarring presence of an entire floor of digital (or digitally influenced) art, it seemed that an exhibition of painting and sculpture was in order. A variety of reasons led us to focus on art made since 1960. Once that decision was made, we knew a "teachable moment" was at hand, as our visitors are often puzzled by Minimalist and Post-Minimalist art.

8. In that exhibition, visitors could sit down at a broad white circular "dining table," where placing an icon-bearing "coaster" at your "place setting" called up projected information about an architectural project featured in the show. When all the place settings were filled, people stood around looking over the shoulders of the seated users. At any point, a user could send the image they were currently consulting to a shared space on a rotating turntable mounted at the center of the larger table. In this area, information sharing between visitors to the gallery and visitors to the museum's website were also promoted. It was a remarkably well thought out solution, although it did not include use of audio or video. For background on Flavia's work, see Sparacino, F., Larson, K., MacNeil, R., Davenport, G., and Pentland, A. Technologies and methods for interactive exhibit design: from wireless object and body tracking to wearable computers. In *Cultural Heritage Informatics 1999*, Pittsburgh: Archives & Museum Informatics, 1999, 147-154
9. We were assisted by curatorial associates Heather Jain and Rachel Teagle, exhibition designer Kent Roberts, and my multimedia team. Both John and I have had extensive prior curatorial experience: John served as curator of contemporary art at the Portland Art Museum before coming to SFMOMA and has curated or co-curated many exhibitions at SFMOMA since 1995. I served as curatorial assistant on over forty shows in four different departments at SFMOMA between 1988-1994.
10. The final exhibition checklist also included works by Jasper Johns, Lee Krasner, Philip Guston, Franz Kline, Joan Mitchell, Robert Rauschenberg, Ed and Nancy Reddin Kienholz, George Herms, Joan Brown, Martha Rosler, Jenny Holzer, Lorna Simpson, Glenn Ligon, Lawrence Weiner, Andy Warhol, Chuck Close, and Carolee Schneemann, among others.
11. The final smart table lids were set at a 15° angle for optimal viewing and to minimize reflection off the LCD screen.
12. For early experiments with turning monitors on their backs to facilitate social interaction, see Milekic, S. Collaborative digital environments for Art Education and Exploration. In *Museums and the Web 1999*, Pittsburgh: Archives and Museum Informatics, 1999, 36-45
13. Now that we have the tables in the galleries, we can begin to assess table design modifications for the future, including optimization of the internal audio components. The good news is that the current configuration works unobtrusively, and we have not had to turn the speakers off.
14. Animated activities were available on only three of the tables, with the "Language" table being the most fully realized. In the other three cases, the third layer was devoted to a more in-depth textual analysis of each artwork in the gallery as it related to that gallery's

theme, punctuated by additional video commentaries. While we expect each smart table to offer a 3-6 minute experience for the average visitor, each contains about twenty minutes of content if fully viewed. Taken together, the six smart tables contain a total of two hours of content.

15. In a paper survey conducted by Mandy Smith and Deborah Lawrence, 89% of visitors polled indicated that the iPAQ significantly improved their gallery experience. While the opportunity to view the artists and hear them speak about their work was the single greatest attraction, fifty-four percent reported they would like other kinds of information delivered through the PDAs as well.

16. While the interface was straightforward, the programming was not. At this point, Windows Media Player and Internet Explorer do not talk to each other, so once a clip ends, you must exit the Media Player to regain your IE interface and the menuing functions that lead to other videos. Idea also had to disarm all the other buttons on the device (setting them all to the home page). The video clips were stored on a 64

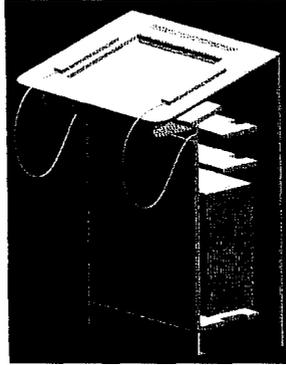
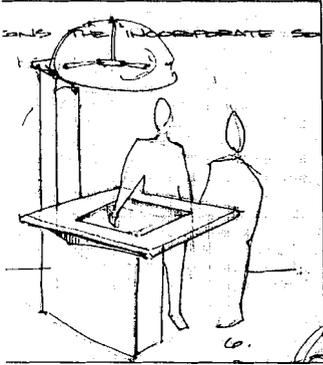
MB Compact Flash memory card in a PCMCIA card sled attached to each iPAQ. These sleds also have the advantage of housing a supplemental battery. Combined battery life per unit assuming maximum screen brightness and continuous video play is about two hours per recharge – more than enough for a single exhibition but still short of ideal for a full museum audio tour. This is obviously just a first step in a field ripe for exploration.

17. Initial results will be reported at the ICHIM Conference in September 2001 in Milan.

ABOUT THE AUTHOR

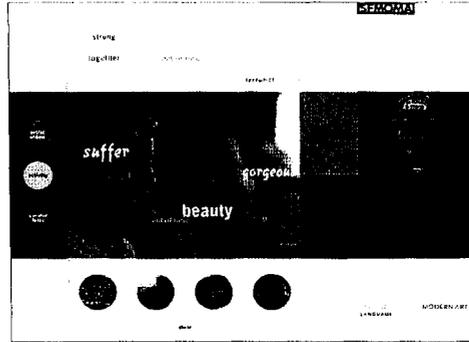
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Smart Tables



Fig's 1-3

Early conceptual sketch with sound dome; study for table as built; table in gallery



Fig's 4-5

Language smart table: curator intro video montage illustrated by artworks (Level 1); activity screen: visitor chooses an image and adds words to transform it, with optional curatorial commentary upper right (Level 3)



Fig's 6-7: Smart tables in galleries. Visitor watches artist video in line of sight of artwork

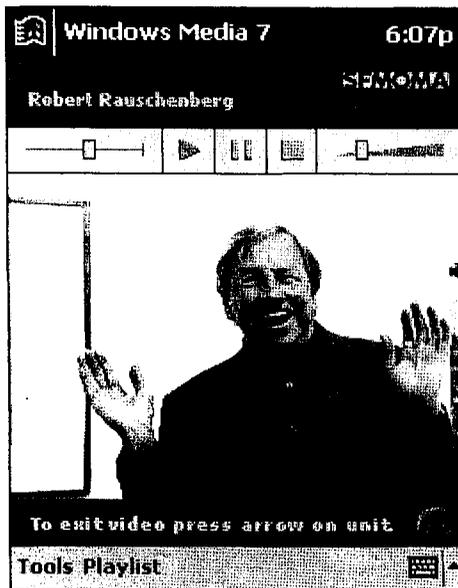


Fig. 8: IPAQ Gallery Explorer interface: Artist Robert Rauschenberg narrates the story of his *Erased de Kooning Drawing*

Fig. 9: Visitor watches artist Gerhard Richter on a Gallery Explorer while standing before a Richter seascape

Fig. 10
Make Your Own Gallery: Visitors could select artworks from all six galleries and make their own grouping in a virtual gallery space. They could then save, name and add comments to their galleries for future visitors to see.

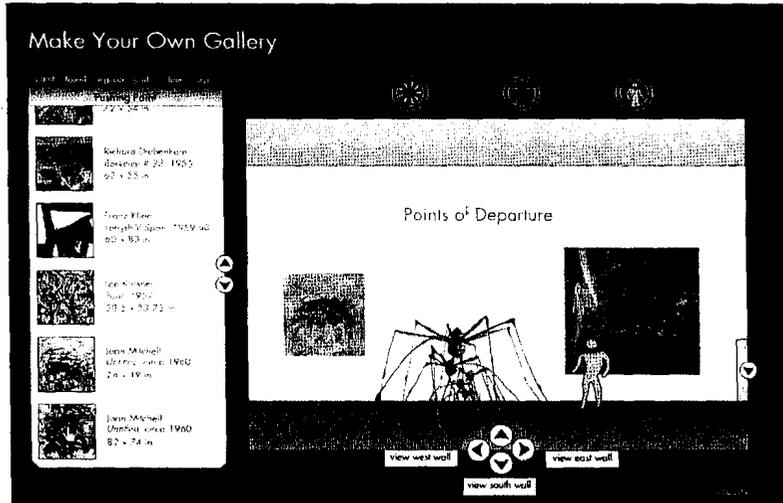


Fig. 11
Making Sense of Modern Art: Points of Departure section. This in-depth multimedia program was presented on flat screen kiosks adjacent to the main exhibition galleries. It is also available as a broadband feature on the SFMOMA Web site.

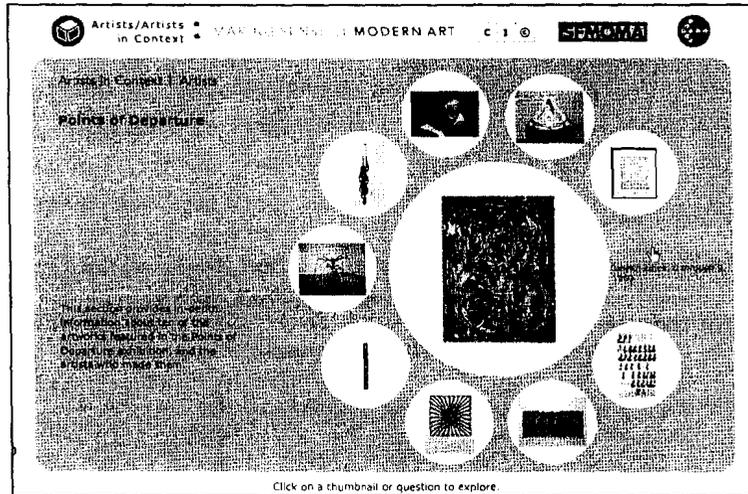


Fig. 12
Making Sense of Modern Art: Comparisons Across Time.
This section allows visitors to compare dissimilar artworks based on shared art historical concepts such as artistic gesture, the use of found materials, or emphasis on process.

