

The Infiniti Interactive Mirrors

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A [Less] Conspicuous Display

No industry conference rolls out more media than the Detroit Auto Show. Creating a presentation that stands out against its not-always-pleasant blitz of lights, music, and videos can be a daunting task. But this year, [George P. Johnson Company](#) managed to capture eyes and interest with a surprising set of interactive mirrors.

Built for carmaker Infiniti, they were set into a wall in the company's exhibition space. As visitors approached, an ultrasonic sensor picked up their movement and played a video that instructed them how to use the mirrors. Most importantly, visitors were asked not to touch the screens, but to instead, hold their hands over hotspots.

"Of course we had no ambition that people would not touch them," says Nikolai Cornell, senior project designer at George P. Johnson, "but we found that there's something magical to having something happen without touching."

Like many innovative projects, the mirrors were the result of a long evolution. Roughly based on Cornell's graduate thesis project, they came into being thanks to a collaborative effort between George P. Johnson, [The Designory](#), and motion graphics company [Mindflood](#). In the end, they were a memorable addition to a show where sensory overload is the norm.

The Concept I

Bringing Movement To A Static Display



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The mirrors originated at Pasadena's Art Center College of Design when, a year ago, Cornell was a graduate student looking for a new way to display photographs.

"Usually, with a photography exhibit, you've got white walls and the photos are set up on the walls, and that's pretty much it," he explains. "And so I said, 'How can I bring this to life?'"

His answer was a kiosk-like experience that unfolded on a large, back-projected mirror. Instead of navigating with a mouse or a touch screen, users interacted "gesturally," by waving their hands in front of the glass.

Though nowhere near as lavish as the Infiniti presentation, the project was arresting enough to be remembered by Jamie Barlow, a friend of Cornell's who worked at George P. Johnson.

The Concept II

Reflective Construction

At the time, George P. Johnson was designing Infiniti's pavilion for the Detroit Auto Show and wrestling with an unfamiliar problem. Infiniti was looking to emphasize its design philosophy and wanted a show pavilion that was quieter and more meditative than the norm.

In looking over Cornell's project, the team realized it would mesh well. "I wanted something a little more mysterious," remembers senior project designer Joel McCall. "I saw it and said, 'That's perfect. That's what Infiniti wants to do.'" The client agreed, and George P. Johnson hired Cornell as a consultant to reinvent his thesis on a larger scale.

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Cornell's first task was to find the right piece of glass. In general, mirrored glass is not hard to come by; in fact, modern high rises are filled with it. The problem is that it's impossible to project anything on it as is.

"You have to coat it with a kind of material that will hold the image," says Cornell. "Obviously, it has to be a material that's transparent. Even a thin piece of paper works OK."

In this case, though, paper wasn't good enough. It turns out that light from the bulb from a high powered projector bleeds through most screens, leaving an unattractive bright spot somewhere on the glass.

To avoid the problem, Cornell researched materials for weeks before he found one that would capture the image without allowing the bulb to be visible. The winner turned out to be a transparent laminate that had to be painstakingly affixed to the glass.

Tracking User Input

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One other aspect of the project needed a big upgrade: the sensing system. In Cornell's thesis project, users simply waved their hands in front of the glass to advance the presentation. There were no real links or hotspots.

"I'm not a sensor system designer," he admits. "That's what's nice about working for a company like this one. They gave me the freedom to make it happen and also to get the people to build it right."

To get the job done, he decided to hire Philip van Allen, the very art teacher who had introduced him to sensors in the first place. For his part, van Allen was intrigued by the project. Most kiosk systems, he knew, use either a touch-sensitive screen or a video camera to help track user input. But because of the pavilion's spare and elegant architecture, neither of these would work well for the mirrors.

In other words, van Allen had to come up with something entirely new.

A System Of Three

Van Allen soon realized that he had one advantage: perfect accuracy wasn't necessary for the project.

"The whole idea with this kind of interaction is that you're not going to be drawing something on the screen," he said. "It doesn't need 100 hotspots; the most we needed were eight or nine."

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Eventually, he devised a system based on three sensors. The first was an ultrasonic proximity sensor that went off whenever anyone approached the screen. It would be responsible for changing the presentation from attract to mode introductory.

For navigation, he used two heat sensors that mounted above the mirrors. By triangulating between them, a Java program was able to plot the location of a user's hand on a two-dimensional grid. By plugging that information into a Flash application using XML, he was able to create a viable interactive experience.

A Bridge Between Abstract And Technical

While George P. Johnson worked on the technical aspects of the mirrors, Long Beach-based branding firm The Designory was already planning the content.

To begin, the firm took a hard look at the physical structure George P. Johnson was building for the show. Its focal point was a design center, where Infiniti would present its philosophy at an abstract level. But the pavilion would also feature several cars, each of which came with detailed product specifications.

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Not surprisingly, The Designory chose to use the mirrors as a bridge between the abstract world of the design center and the more technical presentation of the cars. At the same time, they knew they had to tailor the story to the show's environment. "You have to recognize that it lives in an auto show," says art director Noah Huber. "And there's a lot of people and noise. So how deep should it go and to what level of the brand?"

In the end, they decided not to be too ambitious. They divided the messaging into key concepts that could be explained in videos of fifteen seconds or less. Around them, they would create a world that could hold a user's attention for a few minutes, educate them on a few concepts, and leave them wanting more.

A Simple & Subtle Storyline

To help out with video production, The Designory undertook an extensive search for outside talent. Eventually, the company hired Mindflood, a small interactive and motion graphics firm that had the skill set and enthusiasm that the project demanded.

The Designory gave Mindflood an intense workshop on the Infiniti brand. “We spent a good deal of time going over the storyboards and discussing the way things should feel and the impact they should have,” says Huber, “and to really express to them all the little subtleties that would make the simplicity happen.”

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After that, the two firms followed a traditional production process. The Designory first created storyboards using Photoshop, and Mindflood took them into After Effects and translated them into full-motion video. At the same time, the firm also built a Flash shell that contained all of the movies that would be triggered by inputs from the mirror’s sensors.

“It was our job to develop the content that would be seen,” says Chris Lund, creative director of Mindflood. “It was basically a collection of still shots, video, typography—all telling a story about Infiniti’s design.”

Production I

Typefaces, Point Sizes and Pixels

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In a project featuring so many innovations and unknowns, there was no substitute for a dry run. And so, George P. Johnson set aside some space in its clean room so the team could build a mockup with the same screens, projectors and sensors that would eventually be used in Detroit.

“We were lucky that George P. Johnson decided to do that,” says Chris Kief, the development director at Mindflood. “They’re used to plug-and-play technology, but since this had never been done, you couldn’t do that.”

Of all the problems they discovered in their dry run, one of the biggest was type. With such a large screen, every pixel worked out to be roughly the size of a person’s thumbnail.

“Anything that didn’t use a whole pixel was a problem,” says Chad Weiss, senior creative director at The Designory, “If Photoshop isn’t using a whole pixel, it tries to fill in the image, so there were some places where it was doing weird pixel shifts.”

Needless to say, they exhaustively examined each typeface they wanted to use in all of its weights and point sizes. “It was a function of taking a look through an entire alphabet,” says Huber, “it was really being careful to go through all the characters and make sure they were good.”

Production II

Cold Hands and Sensors

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Probably the busiest person during this time was van Allen, who had tweak the code and hardware to ensure that the sensors could accurately gauge the location of a user's hand.

"It was OK the first time," he says, "but it wouldn't have been good enough. Sometimes it was seeing [your hand] in the wrong place—there was a lot of calibration to do."

One big problem was the sensitivity of the input. Hands are not all the same temperature, and the cooler one was, the harder the sensors had to work to track it. Eventually, though, van Allen was able to work out most of the kinks. After that, the whole set was packed up and moved to the show.

Launch I

Serendipity On Site

It took several weeks for the pavilion to travel from George P. Johnson's offices to the show floor, but even while it was moving, the team made good use of its time. Mindflood and The Designory refined their presentation to make sure that the fonts and colors were perfect, while van Allen and the others continued to tweak the hardware and software.

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Once the materials arrived in Detroit, the installation took its final shape. Overall, there were few glitches, but one of them turned out to be serendipitous. A "mistake" in the code occasionally caused the attract loop to suddenly stop and shift forward to the first screen, as though someone had approached.

"We were going to fix it, but we realized it worked as a call to attention," says van Allen. "So I rewrote the code to have that bug in it as an intentional thing."

Launch II

Peace In The Infiniti Pavillion

As opening day approached, the team wavered between excitement and tension. Would the visitors like the mirrors? Would they understand how to interact with them? Or would they even notice them at all? Needless to say, on the first day of the show, everyone had their fingers crossed.

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Luckily, the mirrors worked out exactly as planned. The brightness of the screens and the elegance of the interaction melded into a quiet experience, well-suited to the topic. Throughout the show, the Infiniti pavilion proved a peaceful—and welcome—respite from the more exuberant presentations of its competitors.

As for the future of the project, it's currently traveling the auto show circuit. And as for Cornell, he'll probably be making some noise in Detroit again next year. It turns out the former grad student liked working on the project so much that he's taken a full-time job at George P. Johnson. Chances are, we'll be hearing more from him.