

How High Can Expectations Go? Practitioner Issues and Risks of Interactive Installations

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The experience is common: You and your interaction design teammates have collaboratively conceived, designed, and installed a fancy multimedia installation, following every important user-centered design principle, actively involving all stakeholders in the design process, validating every requirement and concern, and finally installing the myriad of equipments needed. And you did all this well before reaching the previously defined deadline. Then, when everybody's smiling and admiring the work piece, comes in the dreadful client, who starts smoothly and coldly stating the installation doesn't fulfill the established goals, proposing scary changes that you and your teammates regard as complete nonsense, or even prejudicial to the project. The client now looks like a totally different person from when you made the winning presentation and the contract was signed. You and your team are unable to understand

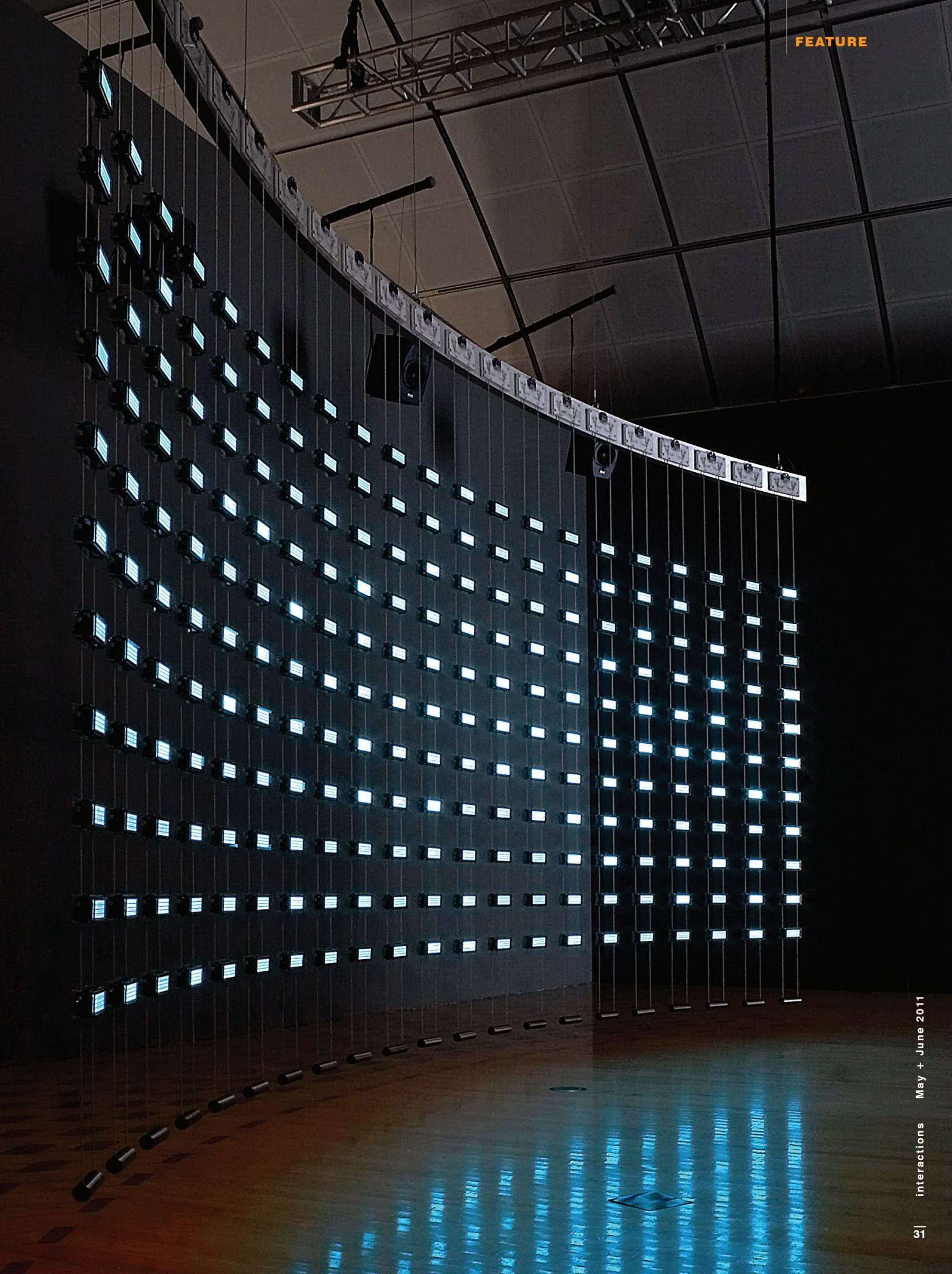
how exactly it's possible that the interactive installation doesn't fulfill the established goals.

Truth be told, in this profession, client expectations are easily raised at the beginning of an interactive multimedia project, since everybody in general—clients, users, designers, and programmers—enjoys the flexibility and potential of recent technological advances in the field.

In fact, designing interactive installations for diverse venues and different contexts has become increasingly popular [1]. Science centers wish to exploit the interactive element to bring more visitors and explain difficult concepts in a more appealing way. Museums wish to attract visitors of all ages and promote collaborations between them, not to mention looking and feeling modern. Stores and shops have also started to embrace interactive installations as a way to improve relationships with existing clients as well as capture the attention and

interest of new segments, exploiting installations featuring the so-called wow effect. Moreover, rapid evolution in available computing power, as well as decreasing cost in display technologies—such as projectors and LCD displays—has also led to increased interest from retailers wishing to improve their stores' attractiveness, museum curators wishing they had a nicer way to display the richness of cultural heritage, and science center managers who are technology enthusiasts and thrive with the idea of refurbishing their centers with the latest innovations. And the list goes on and on. Success seems almost certain in such a context. However, the experience is common: The project fails to deliver the intended effect.

In a recent interview published in *Wired* magazine, Fred Brooks stated, "You can learn more from failure than success. In failure you're forced to find out what part did not work. But in success you can believe everything you

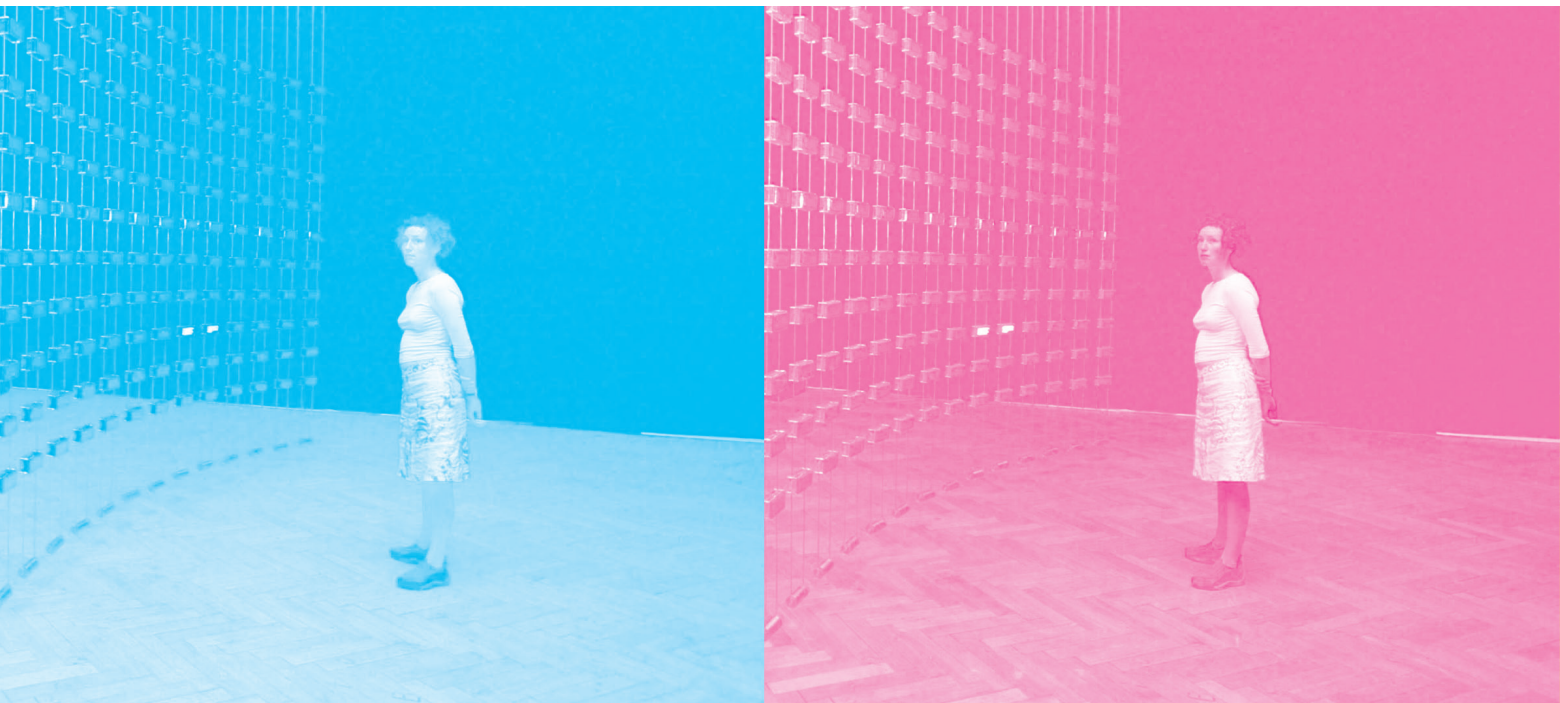


did was great, when in fact some parts may not have worked at all” [2]. Certainly, both academics and practitioners have their success and failure stories (hopefully, more of the former). So, in some bad cases, you might be wondering, what went wrong?

Through our own experience, studying failures seems to effectively lead to better policy, thus increasing success rates in the long run. This idea is widely touted but rarely followed. Therefore, based on our industrial experience from more than 50 different inter-

ers, since their work is more focused at the frontier between humans and machines. And, as we all know, the higher expectations are raised, the greater the risk faced by the project team.

A well-known risky deployment of interactive technologies



An Industrial Case of Interactive Installation Development

Portugal-based WowSystems specializes in new digital media, novel interaction paradigms, and interactive installations. The company, a spin-off from the University of Madeira, draws on several years of research around innovative interaction paradigms, like gesture-based interaction.

While in the past we have analyzed and described some case studies all about interactive installations’ development [3], it now becomes more useful to reflect upon failures, following the course mentioned by Fred Brooks.

active installations projects during the past three years, coupled with academic experiences from several large applied R&D projects, we analyze and share some of the issues and risks faced by interaction design practitioners working in interactive installations.

People’s Expectations Have Become Too High

We live in a society full of expectations. In the past three years, people’s expectations regarding technologies have never been set to a higher bar than they are today. This leads to increased pressure on interaction design-

occurred in 2001 with the opening of the Prada store in New York City [4]. An unexpected mismatch between the expectations of the retail technology designers and the real-world use of those technologies demonstrates the difficulty in choosing the right solutions from the very large design space. As Greg Lindsay reported in 2004, a quarter of the store’s budget went into IT innovations, but only three years later, “the multimillion-dollar technology spend is starting to look more like tech for tech’s sake rather than an enhancement of the shopping experience” [4]. In this case, the

failure derived from diverse factors, such as overflow traffic (the store designers weren't expecting so many visitors), technical failures (RFID wasn't 100 percent accurate), and interaction design flaws, such as non-intuitive controllers (e.g., floor pedals to

an RFID-tagged shoe and watch themselves inserted into real-time, virtual scenery related to the type of shoe they were trying on. Our design had the following characteristics: As a shopper walks around the experimenting floor, the shoe's RFID tag is read by the

views of the streets or sidewalks that are typical of the city that the virtual scenery replicates. For instance, the photos show a shopper trying a shoe model that had a design inspired by modern life in Tokyo. Therefore, our interactive mirror displays scenery based



control the opacity of a glass wall in the fitting room). The fitting room included an interactive mirror with a motion-triggered video camera that recorded the shopper and played back the video after a pause. With Prada's vast budget, we clearly agree with Brooks's statement: "We might think that the limiting factor on many design projects is money, but that's not true."

In a similar project, we designed and installed an interactive mirror for a shoe shop, illustrated in the image here. The client's expectations included the following: The shoe shoppers would step inside

reader, and then the model's attributes are fetched from the product database and sent to the multimedia server that displays two synchronized scenarios—one for two top-down projections (left photo) and one for the front, "mirror-like" view (right photo).

The mirror-like front view displays the shopper in real time and places her in scenery by using a motion-detection and silhouette-extraction algorithm. This algorithm is adaptive regarding the different lighting conditions at the shop—usually brighter during the day and darker at dusk and night. The top-down projections are

around Tokyo's neon signs and bright buildings. Simultaneously, the floor projections display a Tokyo sidewalk with Japanese signs and warnings, as well as other visual elements, and add interactivity by displaying neon lights over the floor according to the shopper's position.

Upon final installation, however, the solution didn't fulfill the client's expectations. Post-project analysis suggests one of the reasons this happened was simply because the expectations were too high. Contrary to the Prada example, however, our solution fitted the consumers' profiles very well,

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and the satisfaction levels that shoe shoppers expressed helped us defend the project's solutions.

The Solution Space Has Become Too Large

Imagine for a second that you have to conceive 15 interactive installations for a science center. If you think about it, there are literally hundreds of different ways you can conceive, design, and develop the installations. Using infrared motion-sensors gives you dozens of different ways to control and interact with digital content, from page-flipping gestures performed with hands, to slowly triggering multimedia contents in large displays according to the users' steps. Camera-based interaction and augmented-reality systems provide another large set of possible design solutions. Combining different technologies opens up an even larger design space (3-D displays, touchscreens, multi-touch surfaces—the list goes on

and on). In other words, today's technology is so flexible that it becomes difficult not only to design and decide but also to present alternatives to clients.

Because of the diversity of possible technological combinations for any interactive installation, the solution space has become too large. This, we argue, is an issue that contributes to increasing risks in interactive installations' development. And it's one of the reasons why it is surprisingly easy to create bad designs.

A Crisis Context Opens the Way to Finding Excuses

Experience has shown that during an economic crisis some clients start focusing on finding excuses for not admitting a project's success—and therefore not paying.

The problem with frontline interaction design is that it's fairly easy to debate or discuss the final results of an installation: People's tastes are highly subjective and vary a lot. Requirements engineering as a discipline has many principles, techniques, and methods devoted to traditional software development. However, in terms of validating interaction design requirements, research literature is somewhat scarce. More effort should be put into how we can more effectively work collaboratively with stakeholders in order to better define the interaction design aspects of any given project's requirements. A promising approach seems to include "agile usability," which couples the well-known principles behind agile development with the familiar usability concepts. Nevertheless, the community needs to address this research challenge and find a better path to effective requirements analysis and validation,

whenever interactive installations are the core of a given project.

Guidelines from our Work

Fortunately, as with any crisis, there are ways out. We have been lucky enough to work around several practitioners' issues and risky situations in this field, and we have been working toward compiling sets of guidelines based on both successful and not so successful projects. While some of the more than 50 interactive installations already deployed were solely created as experiential activities—providing an increase in the level of learning by adding facts to an already well-formed conceptual mode—others were designed to enact a reflective activity, thus supporting a restructuring learning where new conceptual frameworks need to be built. Based on this experience, we have summarized into a set of guidelines some ways to help interaction designers survive and do well when the expectations are increasingly getting higher.

Make the vision stand out. This guideline is based on the story of the bricklayers who were asked what they were doing. The first one said he was laying bricks. The second said he was building a wall. And the third said he was building a cathedral. To remind practitioners that they are "building a cathedral," it is a good idea to hang exhibition posters that feature interactive installations, photos of the visitors, and, for instance, give away free tickets, whenever applicable, so that engineers and designers can experience the installations the exact same way clients and users do. For instance, in the most recent installation (the shoe store we described), we asked the team to

take their wives and girlfriends to the interactive shoe store and gave away a free voucher as well as free entrance to the store's pre-opening party.

Make the interaction model easy to grasp. One of the most interesting conclusions drawn from our experience is the importance of the interaction model and how it is learned and reapplied. If there is too much innovation put on a given interactive product, then that product could be difficult to learn at first. This implies that innovation comes at a price. This issue should be considered, taking into account the real needs of users, at least in what concerns interactive installations. There is, naturally, a dichotomy between the usability and innovation levels of any given interactive product. However, if the team is explicitly focused on making the interaction model easy to grasp, this dichotomy will not become too harmful for the product's usability. Our shoe store example is paradigmatic: Users control the digital contents in the interactive mirror by simply putting shoes on and walking around the store.

Support collaborative activities as feedback mechanisms. Another issue that drives the development team is the observation of the visitors' and users' behaviors, particularly finding out how collaborative activities can be supported as feedback mechanisms to enhance engagement and learning motivation. As an example, in game-driven installations we note social interaction reaches much higher levels than in other installations. That collaboration clearly enhances the level of users' engagement. At the same time, we believe the social interaction was increased by that same engagement, working

as a feedback mechanism, feeding the interaction and also being fed by it, reaching levels of focus that can support the formation of new conceptual models, thus enacting a reflective learning.

Know the customer from the client. Interactive installations are meant to be fun, enriching, and enticing to everyday customers. A successful installation will attract more customers and more business, therefore making your client happy. The focus should be on your client's customers and not on your clients. A good defense mechanism to support design decisions is to convincingly and accurately document the customers' satisfaction and deliver that documentation to your client with a partnership attitude. Collecting evidence such as happy customers' photos, videos of people interacting with the installations, even surveys or informal interviews, can be useful to convince your client, especially if cross-checked with sales or other business figures. Please your client's clients.

Carefully manage client expectations. One way to achieve this is to present the client with architectural designs of how the interactive installation will look at the end of the project. If we provide the client with a visual scale and 3-D layout, the idea can be conveyed in a way that gives all stakeholders a feel of how the physical space will be used for the installations, just like in architectural programs. We are currently working toward a tool that could help overcome this difficulty. In the absence of helping tools, mockups or 3-D preview videos of the installations should be shown to the client with great care to check if expectations are well understood.

In the fast evolving world of interactive technologies, it is as difficult to find silver bullets as it has ever been since the inception of computers many years ago. Indeed, excellent design, more than process is the work of excellent designers. Thus to promote good design it is paramount to encourage younger generations of students to "reach for the stars" in everything they design or develop, hiring the best and rewarding them well, to compete globally in the digital media and interactive landscapes.

ENDNOTES

- [1] Liu, W., Fernando, O. N., Cheok, A. D., Wijesena, J. P., and Tan, R. T. Science museum mixed reality digital media exhibitions for children. *Proc. of the 2nd Workshop on Digital Media and Its Application in Museum and Heritage* (Chongqing, China, Dec.10-12). IEEE Computer Society, Washington, DC, 2007, 389-394.
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- [3] Campos, P. Sparking Innovation at Digital Media Companies. *Proc. of the 2009 Conference on Designing Pleasurable Products and Interfaces, DPPI'09*. (Compiègne France, Oct. 13-16).
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