Syncretic technologies. The learning potential of cross-cultural, non-textual interactive art: the case of Ranjit Makkuni's Planet Health Museum in Delhi.

Abstract

Ranjit Makkuni is an Indian interaction designer who currently runs the Sacred World Foundation, a laboratory in Delhi that develops experimental digital media based on natural interactions technologies, augmented reality and wearable computers. Makkuni started his professional career in the Xerox laboratories of Palo Alto, developing programming languages and the first GUIs (*Graphic User Interface*). The Xerox studies on GUI were then taken on by large computer companies such as Microsoft and Apple, to develop the near totality of operative systems and software which have spread in millions of copies around the planet.

However, at a certain point in his professional pathway, Makkuni effected a radical development; he considered the limitations of the applications that were produced by American companies principally for an American market and sold all over the world to people with extremely different cultures, habits and needs.

Following this line of thought, Ranjit Makkuni developed a syncretic aesthetic where interaction design devices get wrapped and decorated with Indian, multicolored traditional artwork and patterns as in the installations exhibited in the recent *Crossing Project* and *Gandhi Museum* in Delhi. Ranjit Makkuni pioneers the personalization of what he considers 'impersonal' technological devices through the inclusion of world motifs, patterns and crafts in products, thus restoring colors and ornaments as ways of inscribing personal narratives and stories in everyday objects.

This paper will focus on Ranjit Makkuni's work and especially on his latest exhibit in Delhi (*Planet Health Museum*) that explores the traditions of Ayurveda and Yoga and uses cutting edge non-textual interaction technologies. By examining Makkuni's work, this paper investigates the potential of interactive art based on non-textual interaction and synchretic technologies as dialogic, learning devices.

Fig. 1. Introduction to Ayurveda, interactive installation, Planet Health Museum. Credits: Sacred World Research Laboratory / Ranjit Makkuni, 2010

Fig. 2. Interactive Vata, Pitta, Kapha, interactive installation, Planet Health Museum. Credits: Sacred World Research Laboratory / Ranjit Makkuni, 2010

1. Introduction

In 2009 I had the chance to meet Ranjit Makkuni in his laboratory – the Sacred World Foundation – in Delhi, India. It is a small building, filled with astonishing traditional artwork from India and South-East Asia, and with the most innovative physical computing and interaction design devices. Following his work as a researcher at the prestigious Xerox Palo Alto Research Center for 17 years where he pioneered explorations in object-oriented computer languages and the first graphic user interfaces, Makkuni decided to move back to India and focus on themes related to cross-cultural communication and sustainability. While still in the US, Makkuni sensed the restrictions of the typical operational approach carried out by the majority of American and European research centers: at that time, a relative small number of companies and labs were designing the majority of hardware devices and software interfaces sold globally. Most of these hardware and software components were designed for the American and European markets and were then exported to other countries and markets with extremely different cultures, habits and needs. Makkuni decided therefore to move to India and set up a laboratory in Delhi in order to reverse this approach. Since the '90s, the Sacred World Foundation has created several interactive art exhibits and installations that have built bridges between technological and traditional Indian cultures, organizing design teams where engineers and IT specialists work together with local and international artisans and decorators. The results of these combined teams are extraordinarily polyphonic and plural interactive artworks that emerge from contexts of participative and collaborative design.

From my specifically situated point of view - being an interaction designer myself - the explorations on non-textual interaction are one of the most interesting themes that cross all the prolific productions carried out by the Sacred World Foundation. As Makkuni puts it: "In rural communities, villagers may be illiterate with respect to Silicon Valley's notions of GUI (graphical user interface), i.e., button pushing, point and click, but highly sophisticated with respect to hand skills and tactile interfaces. What is the equivalent of GUI in village contexts? What narratives are found in the village in the traditional performing arts of puppetry, theater, and mask dance? How do these narrative forms reflect a traditional society's perception of time and space? How might these inform the design of non-Windows based GUI?" (Forero and Simeone 2010, 82). The Sacred World Foundation has tried to address these questions by developing art installations where people interact with digital displays and computers using movements, gestures, voices, direct manipulation of objects and therefore going beyond graphical user interfaces based on keyboard and mouse. The technological components of Makkuni's interactive installations are often encrusted with decorations or directly embodied in traditional artisanal objects in order to be touched and manipulated. In the *Crossing Project* exhibit, visitors physically step into a rickshaw connected to a computer and screen in order to visualize videos from the streets of Banaras; in the *Eternal Gandhi Museum* children play with real puppets in order to control the multimedia animations shown on a digital projection. The physical, direct manipulation of objects and the gestural or vocal interaction are key components of Makkuni's installations; objects, narratives and memories are woven into complex, ramifying, transmuting dynamics where visitors interact with the sacred imagery of Hindu Gods and Goddess, mythical creatures, epic heroes.

Ranjit Makkuni's work is a dense matrix of polysemic notes which touches several cruci

2000; Low 1996; Melhuish 1996; Vellinga 2007; P. Dourish and Bell 2007) might analyze Makkuni's installations as responsive environments thus investigating their spatial, practical and cultural organization as infrastructures for the collective production and enactment of specific cultural meanings. Scholars who apply an anthropological perspective to human computer interaction design (Paul Dourish 2004; Clarke 2010; Liem 2011) may be interested in studying the organizational culture patterns behind the collaborative, participatory design processes in place at the Sacred World Foundation.

In this paper, however, I specifically focus on the potential of Makkuni's installations as learning devices. I am interested in the non-textual, non-GUI interactions as a way of tracing creative pathways that bridge tradition and innovation. In particular, this analysis focuses on the *Planet Health Museum* - Makkuni's latest exhibit in Delhi – and its educational, interactive environments. At a broader level, this research therefore explores how the cross-cultural, synchretic dimension of interactive artworks that combine the latest technological devices produced in the Silicon Valley with the mastery of Indian local weavers, carpenters, decorators may constitute a particularly fertile educational environment.

2. The educational potential of cross-cultural interactive art

According to Söke Dinkla, the main characteristic of interactivity is that it creates devices where the viewer intervenes in the action, often using technological interfaces (Dinkla 1994). Interactive artworks range from multimedia animations that can be controlled by a mouse and keyboard, touchscreens or even digital installations that can be influenced by the users' position in the space, movements, voices. These interactive machines take viewers (users) into narrative worlds governed by participatory, nonlinear, reactive dynamics.

The qualities and characteristics of interaction have been continuously challenged in the relatively recent history of interactive art. While most interactive art is still founded on classic textual interaction based on buttons and hyperlinks (such as on a typical website), a good number of artists are exploring non-textual interaction devices. Since Myron Krueger's first responsive environments, such as *Glowflow* (1969) where viewers walk on a floor covered by pressure sensitive sensors thus activating sound or light effects, to Jeffrey Shaw's interactive installations based on joysticks (1983), continuing on to the Otherspace's use of brainwaves to control some artificial creatures, interactive art has always pushed the boundaries of user interaction. The continuous advancement in sensor technologies has allowed a tracing of a broad range of users' physical manifestations of experience: voice, gestures, direct manipulation of physical objects, position in space, biometric parameters (e.g. skin conductance or heart rate) which can all be used as triggers to control an interactive art environment.

These non-textual interaction environments are particularly effective in terms of users' perceptual, emotional and cognitive engagement and can constitute particularly productive learning environments.

A large number of scholars have investigated the potential of non-textual, interactive environments as a means to design more engaging educational and learning processes.

Papert and his colleagues have experimented with several interactive environments based on tangible, physical objects such as Legos (Papert 1994). Their work is based on a constructionist paradigm, a transdisciplinary approach coming from the idea that learners actively construct mental models to understand and interpret the world around them (Harel and Papert 1991; Glasersfeld 2002; Phye 1997). Learners' situated experiences within the world, their active engagement through processes of interpretation and social negotiation of knowledge, are key components of learning processes. Moreover, as argued by Papert and his colleagues, children and adults seem to learn more quickly and deeply if they are involved in activities where they are asked to actively construct new knowledge rather than just having chunks of information poured into their minds (Ackermann 2001).

Chris Dede and Sasha Barab's studies on immersive learning environments have shown that: "The more a

virtual immersive experience is based on design strategies that combine actional, symbolic, and sensory factors, the greater the participant's suspension of disbelief that she or he is 'inside' a digitally enhanced setting. Studies have shown that immersion in a digital environment can enhance education in at least three ways: multiple perspectives, situated learning, and transfer"(Dede and Barab 2009).

Eric Klopfer has argued that mixed physical-digital environment based on augmented reality applications "can place learners in real-world contexts that promote transfer of learning from one context to another" (Klopfer 2008).

Other scholars have conducted comparative studies to evaluate differences between augmented-reality-enhanced learning practices and traditional processes. Some key findings have shown that augmented reality can be particularly effective in fostering personal (and social) engagement in learning situations that invite learners to actively explore open-ended problems and multiple pathways (within mixed realities and real-world settings) (Zagoranski and Divjak 2003; Shelton and Hedley 2002; Liarokapis et al. 2002). In a similar light, Dunleavy et al. studied how augmented-reality simulations can create engaging, collaborative environments based on particularly effective situated-learning techniques (Dunleavy, Dede, and Mitchell 2009).

Two research groups at the MIT Media Lab (Lifelong Kindergarten and Fluid Interface) have explored the learning potential of tangible computing by designing several concepts for interactive environments such as *Hook-Ups*, *Twinkle* (Resnick and Silverman 2005) or *Siftables*, a set of small interactive computers equipped with a display, wireless communication and motion sensing that can be used in a wide array of educational games (Hunter, Kalanithi, and Merril 2010).

The American Anthropological Association itself produced *RACE: Are we so different,* a reactive environment exhibited at the Boston Science Museum in 2011 [1] where a set of installations address race and racism from three distinct yet interconnected perspectives: science, history and everyday experience.

Within this research pathway, the Sacred World Foundation has a distinctive positioning as regards content: "In the era of accelerating change, the foundation's projects work with the world's spiritual cultures as a backdrop to conduct new forms of media documentation so that perennial wisdom can be captured and made accessible to all", and again: "Given the divisions between the sacred and the spiritual that exist in modern life, the foundation is developing various kinds of products to bridge the gap, to allow people to interact with meaningful tools and media, and experience self realization while going about their secular activities" [2].

Several other new media artists have explored the spiritual dimensions of life addressing themes such as religions, sacred worlds and their representations, myths and rituals. Some of these projects have recently been exhibited in contemporary art venues or presented at some of the most important interactive art events such as *ISEA*, *Ars Electronica*, in Linz, Austria, or *Transmediale* in Berlin, Germany. Ben Rubin's *Beacon* project is a permanent LED light installation at the National Museum of American Jewish History in Philadelphia (2010), U.S., where generative sculptures of lights represent interpretations of the 5000 pages of the Talmud [3]. The group Hehe built fictional representations that borrowed elements from several traditional myths such as in *Sortir le Dragon en hibernation* (2004), a choreographed set of 13 lights which reacted to sound, controlled by a computer [4]. In *Eye Catching* (2003), Jennifer Steinkamp projected three computer animated trees on a wall in front of two columns that hosted two ancient Medusa heads. The trees' animated branches swayed like Medusa's serpentine hair [5]. The *Talmud project* (1999), from Small Design Firm, was an interactive environment where users were able to manipulate blocks of texts coming from the Koran and the Talmud (in English and French translations), building a sort of sacred imaginary city of words (Bullivant 2006).

Most of these artworks aim at representing cross-cultural bridges from technological worlds and spiritual dimensions of life and can constitute powerful machines that help viewers/users to reflect on key elements of their daily experience. By immersing the viewers/users into reactive, animated, alive imaginary landscapes, the artworks call into question cultural beliefs and attitudes towards spirituality.

Within these cross-cultural experimentations, Ranjit Makkuni's non-textual, movement-based interactive art installations explore multi-modal mapping, action-response and psychophysical feedback interactions as an active means to creating new modern computing paradigms to preserve spiritually-oriented cultural resources. Ranjit Makkuni's interactive artworks representing responsive pilgrimage circuits, sacred geography, ecology and goddess traditions aim at building immersive learning machines to spread those cultural resources that will allow the modern technological society to access the Indian sacred traditions. This is what Makkuni defines as 'cultural learning' (Makkuni 1992).

3. Ranjit Makkuni's work

After his studies in architecture (MA in Design Theory from the University of California Los Angeles, UCLA, and a BA in Architecture from the Indian Institute of Technology in Kharagpur), Ranjit Makkuni started his investigation of computer interfaces while at the Xerox PARC (Palo Alto Research Center) in Palo Alto, California. Founded in 1970 as a division of the Xerox Corporation, PARC has pioneered explorations in the interaction design field and shaped the foundation for important hardware and software developments such as graphical user interface (GUI), object-oriented programming and ubiquitous computing among others (Moggridge 2007). During his affiliation with the lab (starting in 1985), Makkuni contributed to the development of several concepts and patents oriented towards 'cultural learning'.

In his keynote speech at the *Doors of Perception Conference*, John Perry Barlow recounts an episode of a meeting with Ranjit Makkuni at the Xerox PARC: "Ranjit Makkuni ... was in charge of creating their video conferencing room. There was one room in Palo Alto and another in Portland ... so electronically mapped into one another that you can essentially locate others in the distant room in virtual relation to yourself. You could see their body language and you could hear them speak with great clarity. It's a lot like being there. And I said, Ranjit, does this actually work? And he said, Oh no. And I said Why not? What's missing? Oh, he said, the prana is missing. Well, prana is the Hindu word for both breath and spirit. I think the central question ... is whether or not prana can fit through a wire" (Barlow 1994).

Another early project carried out at the Xerox PARC was an electronic sketch book that used interactive videos as a way to preserve and present the art of Tibetan Thangka painting. The thangka is a Tibetan silk painting with embroidery that usually represents episodes from the life of Buddha, influential lamas, deities or bodhisattvas. Even though the composition of a thangka is highly geometric and the final design is often a combination of pre-defined visual elements on systematic grids, this art of painting often requires a deep understanding of the symbolic elements involved to capture the spirit of it. Makkuni's *Electronic Sketchbook* was an interactive database that allowed novice students to explore and interact with traditional diagrams and images, learn compositional techniques and explore thangka's role, using symbolic meaning in Tibetan life. Sample sketches, catalogues of painting elements, curatorial analyses are interwoven within the user interface. The *Electronic Sketchbook* came to life in a highly dialogic setting where a master Thangka painter, a renowned Tibetan monk, Xerox designers, art historians and Tibetologists of the Asian Art Museum, San Francisco, California, worked together across a participatory and emergent design process (Makkuni 1989).

Following his period at the Xerox PARC, Ranjit Makkuni returned to India and founded the Sacred World Foundation. When I asked Ranjit Makkuni if he missed the Xerox PARC and his research labs in US he told me something that has stuck with me since then: "I decided to leave the US and move to India because I was tired of living inside my CV" (Simeone 2009). The Sacred World Foundation was a chance to put more participatory processes with a significant involvement of India's own artisanal and spiritual traditions into Ranjit's personal trajectory as an interactive designer. As stated on the Sacred World Foundation's website: "The foundation's field laboratory has a base in India, The Sacred World Research

Laboratory, a developing nation and emerging economy. It is engaged in projects so that developing nations can become centers of innovation and create their own insights into interaction, and cultural conscious product design"[2].

The *Crossing Project* is one of the Sacred World Foundation's most widely-acclaimed projects: an interaction design exhibit [6] shown in several locations across India (Mumbai, New Delhi), Europe and US and that won the Prix Ars Electronica, Linz, Austria, in 2002. The *Crossing Project* explores the sacred geography of Banaras, a holy city in Hinduism (Eck 1983). The installations aimed at recreating the multi-layered dimension of Banaras as seen by people with radically different cultures and points of view. In particular, as a sacred city (and as seen by Hindu people) Banaras contains spiritual energies and power spots embedded in its river, ghats, temples, buildings. The *Crossing Project* wanted to use immersive interactive technologies to plunge the viewer into some of Banaras' sacred locations and myths and to show these sacred dimensions behind the physical world (Makkuni and Khanna 2006).

Another of the Sacred World Foundation's projects was the creation of the *Eternal Gandhi Multimedia Museum* [7], a digital multimedia museum established in 2005 and located at the site where Mahatma Gandhi was assassinated (Makkuni 2007). The Museum presents historical records of Gandhi's life and revives his values through which India obtained freedom.
More than in the previous projects, the *Eternal Gandhi Museum* is strongly based on physical interfaces: viewers/users have to spin wheels, touch symbolic pillars, manipulate sacred objects, collaboratively construct quilts in order to interact with the installations. Gandhi's vision is depicted through photographs, paintings, film footages, and video clips activated through tactile computing.
The scale and the dimension of the collaborative process behind the design of the artworks has, as well, been greater than the past: in this project, Ranjit Makkuni directed a team of over 200 artists, scientists, and craftspeople from all across the world, blending the traditional art of glass from Murano (Venice), with the work of wood carving decorators from India and technological tangible interfaces developed at the MIT Media Lab.
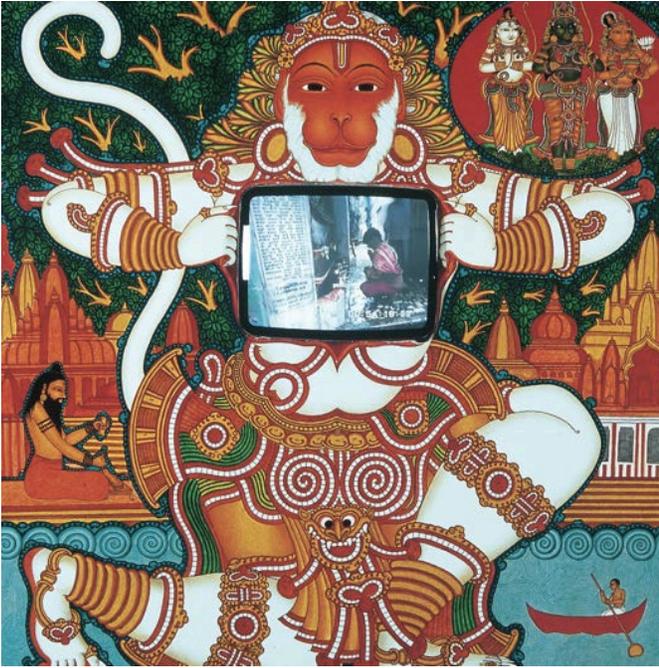
Fig. 3. Crossing Project: Living, Dying, and Transformation in Banaras, interactive installation. Credits: Sacred World Research Laboratory, 2001
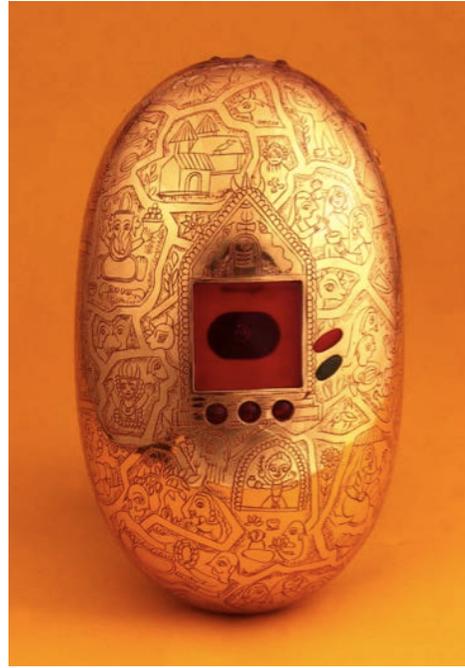

Fig. 4. Crossing Project: Living, Dying, and Transformation in Banaras, interactive installation. Credits: Sacred World Research Laboratory, 2001

4. The Planet Health Exhibition

Planet Health is the Sacred World Foundation's latest project, produced in New Delhi for the Ministry of Health & Welfare in the Government of India. *Planet Health* is a multimedia museum that contains a set of interactive artworks exploring the concept and experience of health from multiple perspectives. Most of the installations are related to Ayurveda and Yoga which are seen as strictly interrelated and connected to a wider spiritual approach.

In a way, the museum challenges some of the most wide-spread ideas about Yoga and Ayurveda and on the way they are interpreted, taught and experienced today.

Most recently published Yoga books are almost entirely focused on *asanas*, a collection of physical exercises that are supposed to awake spiritual energies (Coulter 2010; Desikachar 1999; Iyengar 1995; Silva Mehta, Mehta, and Mehta 1990). The majority of these books report that asanas are very old and originated several thousands of years ago. However, as argued by Mark Singleton, this vision does not take into account the historical conditions that accompanied the international diffusion of Yoga in the 20th Century (Singleton 2010). According to Singleton, most of the asanas we know today are the result of a re-interpretation of old traditions by important teachers such as Swami Kuvalayananda (1883-1966) or Krishnamacharya (1888-1989), who, starting from the 1920s and 1930s, formulated an innovative, synchretic dynamic asana practice, blending indigenous Indian physical culture systems with the latest European techniques of gymnastics and naturopathy. The asanas taught today are the fruit of this intense period of cross-cultural innovation.

Ayurveda has a similar story (Terzani 2004). It is usually described as an extremely old tradition whose legendary origins as a healthcare system date back to 1500 BC when Ayurveda's fundamental and applied principles got organized and enunciated. Ayurveda traces its origins to the sacred books Vedas and Atharvaveda, in particular. During India's early modern and modern age and under the British colonial rule, Ayurveda was abandoned in favor of western medicine until it was re-codified into a more modern way (and as an Indian nationalistic symbol against the British rulers) only at the end of the 19th Century. Yoga and Ayurveda, as they are usually taught today, are then a modern, highly innovated version of their traditional philosophies.

The *Planet Health Museum* tries to recuperate some of the earlier traditions and philosophies of Yoga and Ayurveda and to present them to a wider audience by using reactive environments. Viewers/users explore some of these ideas through a series of actionable, non-textual interactive art installations. Visitors play with tree computers, interactive musical sculptures, digital kiosks in order to have a glance of Ranjit Makkuni's vision of this holistic health systems. Most of the installations are highly immersive and require visitors/users to actively manipulate physical objects in order to control multimedia animations.

For example, the interactive *Vata, Pitta, Kapha* body sculptures contain embodied sensors where visitors can touch these electronic-enhanced bodies as an ayurvedic physician would do in order to diagnose diseases. The buttons embodied in key locations of the sculptures act as triggers that control some educational multimedia animations on ayurvedic philosophy and processes.

In the *Offering Table*, an interactive installation lets people place flower offerings that light up LED messages of peace and love thus recreating some physical gestures of a traditional *puja*, a Hindu religious ceremony. In another installation, *Flute tree*, an herb tree is shaped like a flute and visitors have to blow through the branches to retrieve soothing passages of traditional Indian music.

Most of the installations are a synchretic combination of tangible, digital computing and materials such as wood, bamboo, tree bark, moss, cinnamon sticks, recycled steel.
Compared to previous exhibits, the physical dimension of the sculpture in *Planet Health* is greater both in scale and composition. Whilst in the *Crossing Project* displays and computers were encrusted in multicolored decorated frames that worked as a means to personalize the digital elements, here the technological components almost disappears, since they are integrated in more complex, corporeal sculptures.

Some of these sculptures are made of plain, rough materials whose pure, natural beauty acts as a minimalistic decoration for the technological devices. In some installations, the technological components are so well hidden behind or nested within these sculptures that the sheer materials themselves seem to have a life of their own. In the *Go Green Story* installation, a message from the Dalai Lama seems to literally emerge from a branch of wood; in the *Aranya* sculpture, digital sounds come out of an intricate sculpture that resembles a wooden nest.

The exhibit mimics the daily sacred worlds of the Hindu tradition and its stratified, ubiquitous philosophy embedded within the physical world. The spiritual dimension hidden behind physical objects from daily life emerges through the bodies of the non-textual interactive artworks.
By manipulating these interactive machines people enter into an immersive world where they actively negotiate their situated knowledge of Yoga and Ayurveda, where they can see, question and reflect upon their emotions, beliefs and habits. Nature, structure, style and significance of these health systems within one's own experience are questioned and challenged through immersive learning processes. Users react to the interactive art installation with their mindful bodies (Damásio 1994); this embodied quest (Csordas 1990), this experiential immersion seems to be a powerful way to spark learning (or educational) dynamics. The exhibit acts as a centrifugal and centripetal force with a double social function: it multiplies the points

of view, exhibiting interstitial stories (and unusual visions) while at the same time enacting values and behaviors to be followed and celebrated according to the Sacred World Foundation.

Fig. 5. Offering Table, interactive installation, Planet Health Museum. Credits: Sacred World Research Laboratory / Ranjit Makkuni, 2010

Fig. 6. The Flute Tree, interactive installation, Planet Health Museum. Credits: Sacred World Research Laboratory / Ranjit Makkuni, 2010

5. Conclusions

As noted by Adam Greenfield about Ranjit Makkuni's work: "Whether clay pot or beer mat, these projects all capitalize on the idea that distinctly local application of intelligence, and not the generic, one-size-fits-all vision embodied in computers, will turn out to be among the most important and useful legacies of our technological moment" (Greenfield 2006, 22).
Greenfield sees the power of Makkuni's interactive art installations as frameworks for anthropological responsiveness: a place where radically different points of view meet and come into play; a fertile, reactive landscape where visitors/users can experience synchretic visions that mix state-of-the-art technologies with Makkuni's view of Indian spiritual traditions.

Ranjit Makkuni does not have an extensive academic anthropological background, therefore, some of his projects might not have a strong, theoretical grounding. However, some of his productions can be considered as interesting explorations situated at the margins of cultural anthropology. Makkuni's design ideas, process and philosophy could be used as a model to build new interactive art-based educational environments. Anthropologists could use non-textual interactive art as a means to open new, powerful

communicational channels to a wider audience and to create educational frameworks on anthropological themes.

Synchretic, immersive interactive art machines built in collaboration with anthropologists could act as a bridge to connect academia to a wider public and to spread some moments of *anthropological enlightenment* (Sahlins 1999), the unexpected and stunning differences hidden behind our daily lives. As Clifford noted: "this is why we will always need historically-engaged ethnography - to keep us surprised, listening, receptive to emergence, peering into the shadows shed by our enlightenment" (Clifford 2003, 22).
Non-textual, interactive art has the potential to transform immersive, physical spaces into sites of plurivocal and polycentric multiplicity thus enacting people's own sensibility towards the appreciation of the cultural differences and dislocations encountered within their daily lives.

6. Acknowledgement

Notes

[1] http://www.understandingrace.org/home.html, accessed 14 September 2011.
[2] http://www.sacredworld.com/index.htm, accessed 4 September 2011.
[3] http://earstudio.com/2011/04/06/beacon-at-the-national-museum-of-american-jewish-history-philadelphia/, accessed 14 September 2011.
[4] http://hehe.org.free.fr/hehe/dragon/index.html, accessed 14 September 2011.
[5] http://www.tumblr.com/tagged/jennifer+steinkamp, accessed 14 September 2011.
[6] More information and pictures of the exhibit can be found at:
http://www.sacredworld.com/index.htm, accessed 4 September 2011.
[7] More information and pictures of the exhibit can be found at: http://www.eternalgandhi.org, accessed 4 September 2011.

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