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## The Constructivist Museum

*We need to place hand, eye, tongue, and mind all together to work upon the real world. We need to invoke the shimmering variety of experiences that border upon and can extend the complex but well-worn patch of daily life for which the student is so well prepared by common sense.*

*People indeed like to know where they are; the trick may be to lead them to more agreeable places, until they recognize that they too can begin to know and to feel at home in almost any domain where other human beings have dwelt in pleasure.*

(Morrison 1995: 288)

*We all love to instruct, though we can teach only what is not worth knowing.*

(Austen, *Pride and Prejudice*)

### Introduction

If we take seriously the constructivist challenge – the implied charge that through direct instruction “we can teach only what is not worth knowing” – what does that mean for learning in museums? How can we fulfill our responsibility as teachers to lead our visitors so that “they recognize that they too can begin to know?”

What will a constructivist exhibition look like? In fact, what will the whole museum look like if it is designed along constructivist principles? No museum in the world today may fit the criteria completely, nor is it likely that some ever will do so. As is true for so many concepts included in this book, constructivism consists of a family of ideas, clustered around a few principles, but no actual exemplar may illustrate all the components. This chapter lists those components that combine to make up a constructivist position on education, and that should be considered in designing the Constructivist Museum. Each represents matters of degree, not absolute standards, and a museum can be constructivist that incorporates many of the components on the list, not necessarily all of them.

There are three basic ideas required in order to hold a constructivist view. Each implies specific conditions that must be met to apply the ideas to any educational setting. Museums, with their own particular opportunities and limits, provide one setting where these conditions apply in a specific way. Schools, clubs, and other institutions would have their own means for implementing a constructivist agenda. The basic questions that need to be addressed are:

- What is done to acknowledge that knowledge is constructed in the mind of the learner?
- How is learning itself made active? What is done to engage the visitor?
- How is the situation designed to make it accessible – physically, socially, and intellectually – to the visitor?

Each of these questions is involved in the considerations discussed below.

### **Connections to the familiar**

A fundamental attribute of any constructivist position is the need for the learner to be able to associate an educational situation with what is already known. The importance of “prior knowledge” (Roschelle 1995), meaning all the ideas and concepts that the learner brings to a situation, is a major factor mediating any learning that can take place.

A large body of findings shows that learning proceeds primarily from prior knowledge and only secondarily from the presented materials. Prior knowledge can be at odds with the presented materials, and, consequently, learners will distort the presented materials. The educator’s neglect of prior knowledge can result in the learner’s learning something opposed to the educator’s intentions, no matter how well those intentions are executed in an exhibit, book, or lecture.

(Roschelle 1995: 37)

It is not only difficult but almost impossible to learn something without making an association with familiar categories.

Adults who are suddenly able to see after having been blind all their lives, have great difficulty in making any sense out of the perceptual field that greets their eyes. They cannot distinguish the foreground from the background, the “shapes” from among the multitude of sensations; they lack the repertoire of ordered perceptions that is necessary to make visual meaning out of their environment. As we indicated in an earlier chapter on the complexity of research methods, we can carry out no research without imbuing it with our mental constructs. Even observation is not neutral.

After the moment of the observer’s birth no observation can be undertaken in all innocence. We always know something already, and this knowledge is intimately connected with what we know next,

whether by observation or in any other way. We see what we expect to see, what we believe we have every reason for seeing, and while this expectancy can make for observational error it is also responsible for veridical perception.

(Kaplan 1964: 132-3)

Likewise, in order to incorporate new ideas, new concepts, new knowledge, we need to be able to associate what we are intended to learn with what we already know. The Constructivist Museum makes a conscious effort to allow visitors to make connections between the known and the new. Possible connections range from feelings about physical space to concepts about ideas. It is worth considering separately each attribute of the museum that allows us to make such connections.

### *Associations with place*

The first kind of connection that visitors make is with the building that they enter, its location, its appearance, and its general atmosphere. Traditionally, museums have been imposing structures, often in neo-classic style (reflecting the period in which they were built), more recently in various modern styles, but usually large, impressive, and perhaps a bit austere compared to the surroundings with which most visitors are familiar. The intention of the architecture is usually to make a grand statement, to illustrate the mighty quality of the museum and the importance of what it contains. Unfortunately, this is not necessarily the most accessible image for many visitors and potential visitors.

In describing museum buildings, Thompson (1990) comments that they changed in the early nineteenth century from being private palaces to becoming monumental public buildings, progressing to becoming aesthetic statements in their own right, such as the Museum of Modern Art or the Guggenheim. He goes on to say:

The design of museum buildings today remains heavily dependent upon traditionally-held views of the physical environment and its relationship to people. That is, while museums built during the past forty years may look much different than the "private residential, manorial or palatial architecture" (Parr 1959; p. 313) which typified traditional museums, most of the changes reflect technological and aesthetic progress, rather than a more informed and sophisticated approach to meeting the needs of the visitor. As in the past, it often appears today as if these users were nearly forgotten during the design process, and as a result, carefully-articulated visitor-related goals for a museum are often not met in the final product.

(Thompson 1990: 74)

If museums adopt a constructivist stance, they must ask themselves what image they provide for their visitors. Even if the large, architecturally imposing building may not be an unfamiliar presence to visitors, it may suggest a bank, a courthouse, or other public building entered only when necessary, rather than a place that is desirable for learning and enjoyment.

Many museums occupy buildings that are specifically built to convey a cultural message, often one about the value of classical culture, about which only some groups within society have any knowledge.

The museum building may sometimes be one that relates architecturally to the law courts, the police station, and other repressive agents of social control . . . In many cases the messages of the buildings may be enough to deter those who don't know about classical culture, who do know about the power of the law and who have not found many images of the past that have served them well.

(Hooper-Greenhill 1988: 225)

John Kuo Wei Tchen (1992) suggests that an anthropologist from another culture confronted with Western museums may regard them as a manifestation of a curious form of ancestor worship carried out in special buildings.

How can this quaint practice of these quaint people be described? These shrines exist in all shapes, materials, and sizes, but the most important of them are built in either neo-Greco-Roman style or the most modernist neo-neo design of the times. Such architectural edifices embody the parameters in which ancestor worship is practiced. The advanced hypermaterialism of the culture and the romantic exultation of the bio-individual define what they mean by modernism and freedom. They trace their lineage back to an Anglo-Puritan-Protestant capitalist work ethic of colonizers who originally settled in the northeastern corner of the United States.

(Tchen 1992: 106-7)

There is a whole field of environmental psychology that has addressed this issue, as discussed previously in Chapter 7 in relation to what visitors need in order to learn. Anita Olds (1990) stresses that museum visitors need:

- 1 Freedom of movement: Visitors need to feel free to move in the space of the museum and the exhibitions, to have their needs met, and to know where they are.
- 2 Comfort: Visitors should be in an environmentally comfortable setting, one which matches the human factor needs for sensory stimulation without aggressive affront to these senses, in the presence of design that works for them.
- 3 Competence: In the presence of much that may be unfamiliar, visitors should feel competent, they should not be overwhelmed by so much that is new and incomprehensible that the experience exceeds their adaptive capabilities. These environmental psychological considerations intersect most directly with the pedagogic aspects of constructivist principles.
- 4 Control: Visitors want to feel safe. Standing with your back to an open space is not a natural activity for humans, but is often required in museums. How is the environment designed to overcome this?

Only when museums combine freedom of movement with comfort and

opportunities to feel competent and in control can visitors become “fully *alive* . . . free to drop their self-consciousness, their roles and facades, their fears of knowing too little, or of needing to judge and analyze; free to allow the objects and events to become part of themselves” (Olds 1990: 10).

Others have also stressed the relationship between the environment and its influence on the meaning visitors make of the experience, often commenting negatively on museum experiences. Robert Coles, in reminiscing about museum visits with children he interviewed, comments:

I can still, even now, [ten years later] remember the description I heard [from the children] of the enormous rooms, the marble floors, the hushed silence that threatened to envelop the children, so they felt, and dared them the urge to make noise as a statement of self-assertion . . . The enormity and splendor of many museums bears down on the eyes and ears, strained to see and to hear so much under such awesome and, yes, constrained or regulated circumstances.

(Coles 1992: 16)

An attitude survey among non-visitors to museums in London (Trevelyan 1991) is entitled *Dingy Places with Different Kinds of Bits*, and concludes “a significant portion of non-visitors received a negative experience of museums as children” (Trevelyan 1991: 11).

The Getty Center focus groups (Getty Center 1991) unearthed similar responses from non-museum visitors, and a visitor survey at the Liverpool Museum and the Walker Art Gallery concluded that “the massive flights of steps and the scale of the buildings are seen as forbidding to some” (Sudbury and Russell 1995: 8–9).

About thirty years ago, a fashion in school design in the United States dictated building “open” schools (not to be confused with “open education,” a pedagogic movement, not an architectural one) with few interior walls and large, common areas. Teachers and school administrators responded to this awkward and dehumanizing approach, which left little room for privacy, by designing small, enclosed shelters within the structures where a few children could gather in relative privacy to read and study, or where classes could meet without having to share space with other groups. Where this was not possible, staff complained about the noise, the inability to concentrate on work, and the generally awkward nature of the space. Similarly, museum spaces are often designed with little concern for the needs of visitors for privacy and comfort in order to learn.

Of course, most museum staff have very little choice in the building they occupy. The structure may have been built in previous generations, or the committee that determined its shape may have little connection with designers and educators who develop exhibitions and programs. Like teachers in open space classrooms, they may need to consider modifications within existing space. The internal environment can be modified and developed so that it becomes accessible to people. This usually means some way of decreasing the

scale and providing human-size, familiar surroundings. The Constructivist Museum would include at least some spaces that are recognizable to visitors as settings for relaxed, engaged activity which can take time and in which the viewer would feel safe.

No matter how grandiose the overall construction, no matter how high the ceilings or vast the great hall, it is possible to humanize space, make it accessible, and make it feel comfortable (see Semper 1996).

### *Orientation*

Orientation in museums is a powerful issue of its own, related to general comfort, but worth discussing separately from the overall impression made by the surroundings. Before visitors can even focus on the messages the museum intends to deliver, they must know where they are. The Constructivist Museum, recognizing this fundamental component of developing learning environments, is concerned with visitors' orientation. Both the physical surroundings of the building and its grounds and the orientation within those surroundings need to be considered.

Being relaxed, comfortable, not preoccupied with other concerns does not assure that people will learn, but it's a necessary condition: the opposite feelings definitely hinder learning. Describing the museum situation ten years ago, Wolf suggested that most museums had not addressed this issue:

The element that has been missing most in achieving that connection [of engagement that can lead to a meaningful learning experience] has been the kind of orientation visitors need to maximize their chances for self-enrichment. Museum professionals have been experimenting with every teaching fad and gimmick that have been developed by the educational research community but in the process have made little significant progress in creating constituents who possess "museum literacy" so that they can capitalize on being in the museum environment.

Museum literacy is just another way of describing museum orientation – that mechanism or support that visitors need in order to successfully process their (logistical and conceptual) experience.

(Wolf 1986: 17)

A considerable body of visitor study research has emphasized the needs visitors bring with them to museums; needs that must be met before visitors can attend to the content of exhibitions or programs. Children on school trips need to mark out their surroundings and "take ownership" before they engage the educational programs (Balling and Falk 1980). Hayward and Brydon-Miller (1984) found that visitors to an outdoor history museum had only vague ideas about the time period portrayed and what they might find at the site. They were most interested in orienting for immediate practical needs, and only after these needs were satisfied were they willing to attend to an orientation film.

Every one of us has experienced the panic that comes from suddenly losing our bearings. Whether it is in an unfamiliar street, a public transport station, or even a once familiar setting that has been changed too much by new design, different color, or unrecognizable signage. We know that the sense of uncertainty and confusion can predominate over all other feelings.

Overcoming visitors' fears and uncertainties requires extensive orientation signage using redundant, overlapping means to let visitors know where they are, where all the services are, and where the rest of their group is likely to be. For the Constructivist Museum, this means investing heavily in explicit orientation aids – signs, maps, color codes, distinctive graphics and ideograms, as well as the most effective orientation means of all: human beings who can explain, interpret and answer mundane questions about the space and its organization. All these methods make people comfortable in their surroundings and better able to focus on making meaning at the exhibitions.

### *Conceptual access*

Finally, there is the matter of intellectual comfort, the ability to associate the content of the museum exhibit with prior knowledge, with what is already known. Even if I feel relaxed, comfortable, and in control in a physical setting, I cannot access an exhibition that provides me with no clues to what is known to me already. A collection of totally foreign objects with labels in a language I do not understand will not only prevent me from learning what the curators intended, but will also prevent me from making coherent meanings of my own.

To make the unfamiliar more familiar, two different methods can be employed: it's possible to connect what is (presumably) familiar to the visitors with the unfamiliar content of the galleries, or it is possible to expand exhibition policy so that ordinary and therefore (presumably) familiar objects become the focus of museum exhibition. The approaches are not independent, but can be used in a variety of ways to invite, surprise, or tease the visitor.

*Familiar objects* Perhaps the easiest method for allowing visitors to make connections to museum exhibitions is to make sure that at least some aspect of the material on display is familiar to visitors. Alma Wittlin (1949: 237) did this in the 1940s when she added current British coins to an experimental exhibition on ancient currency. The tea kettle in the exhibit on steam power; the pocket knife among the prehistoric tools; the familiar local building illustrated next to the classic temple to give a sense of comparative scale; the garden tool mounted next to the animal claw it closely resembles are all examples of efforts to bridge the gap between the familiar and the unfamiliar.

A recent example of the addition of common objects to artifacts that may not be familiar to visitors is discussed by Cotton and Wood (1996) in connection with the new prehistoric gallery at the Museum of London. Their example of common objects in a gallery also illustrates how even simple items require interpretation when a connection with historical artifacts is attempted. What,

precisely, will be the message received by the visitor? And to what extent is that association justified by the evidence available?

Included in these cases are a number of modern items, juxtaposed with their supposed ancient equivalents, in order to allow visitors to begin connecting with the "then and now". Some of the connections make deliberately provocative assumptions and go beyond the strict limits of inference. However, we feel this is defensible if it helps visitors gain a foothold in the distant past. Thus, for instance, a modern beer glass is displayed next to a decorated pottery beaker (are the latter drinking vessels?), a pile of squashed aluminium cans alongside a hoard of scrap bronze (can our modern regard for renewable resources be equated with such a hoard?), and a Swiss army knife is displayed with flint and quartz handaxes (are such tools really "multi-purpose"?).

Cotton and Wood (1996: 66-7)

*Exhibiting the known* A second approach is to develop exhibitions and programs that expand the museum's collection to include the "ordinary" activities and material of people's lives so that a connection can be made in the mind of the visitor between the foreign, strange objects of the older collections and their everyday material culture.

Thus, when staff at the Victoria and Albert Museum decided "to fulfil the need to make the Indian collections more accessible to a wider audience" (Akbar 1995: 84), they created a post for a South Asian Arts Officer. The incumbent, among other activities, developed a project that invited South Asian women into the museum to design and make their own textile tent hangings "on a scale equivalent to those at the V&A following visits to the gallery." Akbar's description of some of the problems they faced illustrates issues involved in providing access to a museum for non-museum attending audiences, people unfamiliar with it.

The basic concept was well received because it touched on real experiences of real people. Of course Mughal tents are also opulent and far from the vulnerable and insecure structures of poverty and displacement, but the tent offered a form that could be embellished and decorated. The participants could use decorative motifs to express the feelings and experiences of women today, thereby combining traditional forms with modern concerns. Throughout the project we remained aware that this was essentially a museum project, that the objects were our major resource and that we had to introduce the women, many of whom had never visited museums before, to 'museum culture' and the concept of object-based learning. Most of all we had to make the learning experience an enjoyable one in order to retain the women's continued interest and to ensure further visits to the V&A and other museums, preferably undertaken independently and unsupervised.

(Akbar 1995: 86)

A French museum educator (Rozé 1993) developed a multi-national museum project that brought together 1,000 children from 25 countries around the common theme of rivers, with each contingent developing an exhibition about their own local, familiar river and sharing the results.

When the Boston Children's Museum developed "Bridges," an exhibition based on the cultural differences found in the city and the ways in which various teenagers coped with them in their own lives, the museum capitalized on the common experiences of its visitors to develop an exhibition that celebrated multi-culturalism. Science centers in India often start with building a science playground, where visitors can enjoy coupled swings and other modified playground equipment that illustrate physics principles while engaging in familiar playground activities.

At the same time, the exhibitions mentioned above bring in a less-than-familiar element to provide novelty with the familiar. "Bridges" forces the visitor to recognize that many cultures exist in the city, the rivers project introduced the children to rivers in countries foreign to them, and the science center modifies typical playground equipment. The Constructivist Museum will add novel components in an effort to extend the range of visitors' understanding and allow them to link the old with the new.

The list of locally relevant exhibition themes likely to be recognizable by visitors as part of their background is increasing rapidly as museums strive to make additional connections with their public and to expand their audiences. A common aspect of front-end evaluation studies is precisely to find out what themes, concepts, and objects visitors will identify with and recognize. What can we say about dinosaurs that will resonate with our visitors? What images do they have of colonial times, Roman London, gravity, or pre-Columbian art? Examples of museum connections to new audiences (Chapter 7) and museums' expansion of their interpretive role (Chapter 1) illustrate ways for the Constructivist Museum to allow a wider range of visitors access to its exhibitions.

Museum staff also need to consider the personal connections visitors may make with modes of presentation and ways to think about exhibits. In stressing the need to recognize visitors' meaning making as the primary way in which visitors interact with exhibitions and the requirement that they be able to connect with the content of the galleries, Silverman argues (1995) that we have to fashion a "better fit" between the contents of the museum and the ways in which visitors make meanings.

In striving to educate visitors and to develop "museum literate" people who know how to view and appreciate objects according to specific paradigms, we as museum professionals have long overfocused on the task of providing visitors with information, facilitating the traditional or "expert" discourses as aspects of visitors' meaning making processes, such as their abilities to see formal elements in artwork, or to provide historical context for artifacts from the past. In the process, the more personal and subjective ways in which visitors make meaning (such as

through life experiences, opinions, imagination, memories, and fantasies) are at best ignored and more often invalidated in museums, where they tend to be regarded as naive and inappropriate.

(Silverman 1995: 165)

### *What is familiar?*

I started the previous section with the term “presumably” modifying familiar to stress that particular familiarity, especially in the sense of being able to make an intellectual connection, cannot be assumed for visitors. What will appear familiar when placed in a museum setting can only be determined empirically. It is a good rule of thumb to assume that you know less about your visitors than you think you do. It is certainly better to be confirmed in your belief from visitor studies than to be surprised as a result of your inadequate assumptions in the absence of empirical data. The results of front-end evaluations often come as a surprise to museum staff who are already immersed in the intended topic of an exhibition and are startled to discover what images and ideas the public does or does not associate with a subject.

Winter (1992: 50) points out that a pre-Columbian art exhibit intended to lure Mexican-American visitors to a museum because it is about their culture may instead send the message that the museum supports the destruction of their culture from those who loot cultural sites. In an evaluation of school programs associated with an exhibition about twentieth-century design at the Brooklyn Museum, Hein *et al.* (1987) noted that the aesthetic elements of the exhibition were largely ignored by many school groups, who focused on the content of the images – New York skyscrapers, machines, and other streamlined objects – to reinforce the purpose of their visits, studying New York City history.

### **Learning modalities**

Recent educational theory has shifted the focus to learners and their variable ways of learning: their learning styles. A question to ask of any gallery or exhibit that strives to be constructivist is whether it allows viewers to engage with it using a range of learning modalities.

One way to categorize learning modes is sensory, and how we can use them to learn. How many of the senses can be used in the exhibition? In an effort to make a traditional diorama exhibition more accessible to all visitors, considering both physical limits of some and the range of intellectual modes of all, Boston's Museum of Science added material that would engage the sense of sound, smell and touch as well as the traditional components of dioramas – visual material and text that engaged only the sense of sight (Davidson 1991). After the extensive changes, not only was visitor time in the gallery doubled, visitors demonstrated qualitatively more rich learning after the change. For example, before and after the changes, visitors were asked to describe adaptive characteristics of beavers (the exhibit is intended to show the range of ways

New England animals have adapted to their environment). While in the pre-test not all visitors could think of even one change, and even visitors who responded positively could mention only beavers' teeth, tail and fur as adaptive features, all visitors questioned in the post-test could mention some attribute that allowed beavers to adapt to their environment and the answers included many more features, beavers' eyelids, oil on their skin, webbed feet and other subtle attributes. Family groups also engaged with the exhibits in different ways, splitting up and following paths that utilized reading, smelling, listening or touching, to regroup and share information they had each gathered (Davidson *et al.* 1991).

Gardner's multiple intelligence theory (Gardner 1985) represents the most extensive effort to date to expand the means educators use to reach learners. He argues that there are at least seven ways to engage in thinking, each of which describes a unique cognitive style for understanding the world. These seven intelligences – linguistic, musical, logical–mathematical, spatial, bodily–kinesthetic, interpersonal and intrapersonal – are cognitive processes, ways of interpreting and organizing phenomena. More recently Gardner (1997) has suggested that there may be additional distinguishable intelligences. The end result of using each intelligence is a particular form of creativity, (for example, application of musical intelligence may lead to competence as a performer, the application of interpersonal intelligence can lead to success in vocations that require relationships with others), while their absence can often be recognized from known pathologies.

The theory of multiple intelligences directly challenges psychological conceptions of a single factor that determines intelligence which can be extrapolated from the results of various psychological tests. It suggests instead that humans have a range of unique cognitive forms for expressing thought and creativity and it argues for valuing all these forms, not only those traditionally associated with school success.

For educational practice, this theory encourages expanding educational activities beyond traditional verbal material organized to appeal to logical–mathematical thinking. All human beings possess all of the intelligences, although individuals may have preferences for particular ones. Therefore, when planning exhibitions or programs, museum staff should consider multiple ways to involve their audience by exploiting all the senses (activated for musical, spatial, and bodily–kinesthetic intelligences) as well as other learner capabilities. In discussing the application of multiple intelligence theory to classrooms, Armstrong (1994: 124) suggests ways that an educator can expand her practice beyond traditional approaches – for example, by having students draw, create 3-D objects, assemble songs, design class simulations – that take advantage of learners' multiple intelligences.

The Constructivist Museum will provide opportunities for learning using maximum possible modalities both for visitor interaction with exhibitions and for processing information.

## Accessibility

Exemplary, imaginative work supporting a range of learning modalities is found in efforts to accommodate that large fraction of the visitor population classified as “disabled.” The need to compensate for limitations in visitors’ ability to use one sensory mode usually results in the addition of material – audio, tactile, or other – that makes the exhibit not only minimally accessible to one select group, but more accessible to all. A useful illustration for this principle is curb cuts, now found in all sidewalks in many countries.<sup>1</sup> Originally installed to benefit those with mobility limitations, curb cuts are routinely used by parents with strollers, bicyclists and joggers, people wheeling groceries or luggage, and all those who desire to make their path a little easier.

Further, physical accessibility is closely associated with intellectual accessibility. By acknowledging the various physical modes visitors may employ, we tacitly acknowledge their different learning styles or types of intelligences.

The opportunity for exhibitions and programs to reflect the incredible range of learning styles that visitors bring with them is limited only by imagination and, unfortunately, by the intense constraints of time, money, and space that restrict all exhibit development. Some examples of ways to expand access include:

- “Layered text” designed for various categories of visitors, so that expert knowledge, information for lay visitors and information for children can all be available. Unfortunately, this approach often degenerates into simply having too much text.
- Audio labels as well as written ones.
- The addition of drama or other live interpretation to an otherwise static gallery.
- Additional resources, such as reference books, CD-ROM computer resources, or demonstrations near the exhibition (see below).

*Lessons from extreme situations* Many consider efforts to extend intellectual access to the entire population, to consider the needs of those who are designated “special,” to be a modern concept. In fact, this idea goes back to the very beginnings of the scientific study of education. Our modern interest in how people learn and how to make the world accessible to them is derived from scientific study of learning of very special individuals and populations that began almost two hundred years ago.

A historically important early development in understanding learners was the attempt by a young French doctor, Jean-Marc Itard, to educate the “Wild Boy of Aveyron” at the beginning of the nineteenth century. In his effort to work with this *homme sauvage*, Itard

created a whole new approach to education, centered on the pupil, closely adapted to his developing needs and abilities, seconded by instructional devices – an approach we have accepted so thoroughly as our ideal that we scarcely imagine any other or credit anyone with its discovery.

(Lane 1976: 5)

This dramatic educational situation illustrates a recurring theme in the history of educational theory – work with special needs learners provides knowledge that is applicable to all learners. Piaget received the inspiration for his lifelong preoccupation with intellectual development from early experiences giving intelligence tests, then used to classify children in institutions. He noted that the reasons children gave for their answers appeared to be much more interesting than the answers themselves (Evans 1973).

That people with a special attribute can tell us something about everyone is evident in writings ranging from Oliver Sacks's elegant case histories to Reuben Feuerstein's (1979) clinically developed instrumental enrichment program. Feuerstein, an Israeli psychologist/educator, has devised an elaborate educational system based on Piagetian theory to enable his staff to reach the most difficult children. He and his coworkers have had success in educating children who have been given up as impossible to communicate with by others. The central concept of their system is that in order to function, the mind requires not just interaction with the external world, but some mediating influence, some person who makes possible contact between the student's internal and external worlds. All of us require this. People who have not had sufficient, developmentally appropriate mediation are incapable of making adequate connections and responding appropriately. They need more detailed and specific mediating activity. The important point, according to Feuerstein, is that such deficiency does not represent an unchangeable state; rather it is a lack that can be modified. Thus, he places major emphasis on the learning of thinking skills and on developing diagnostic instruments that are flexible and can be modified by the diagnostician to meet the current level of the learner.

An example of this approach to education, from another famous learner-teacher pair who have inspired many to broaden their view of educational possibilities, is the familiar story about how Annie Sullivan made contact with Helen Keller (Lash 1980). "Teacher" needed to find the "hook" that allowed the student to learn. In the case of Helen Keller this turned out to be the feel of water on her hand. She was able to make the connection between the symbol for water and the substance to which it referred. Once Helen Keller grasped the principle of signing, her progress was rapid. This example, like many that Feuerstein refers to, is so dramatic that we see it as an extreme case, but the concept is applicable to all learning – in all instances we need to ask: What is it that allows the learner to make a connection with what is to be learned? In the Constructivist Museum this question is constantly asked.

*The learning environment: universal design* An additional aspect of both the Helen Keller example and Feuerstein's work is that these are not stories about *learners* but stories about the interaction between *learners and their learning environment*. It was the dynamic interplay between Helen Keller and Anne Sullivan that resulted in growing understanding (for both of them); it is the constantly shifting, careful intervention of the trained diagnostician in response to the learner's actions that are the basis of the Feuerstein approach. Anderson (1997) has argued that

The principal barriers to access to museums are social class, poverty, educational disadvantage, ethnic and cultural background, disability and an individual's own attitudes. These factors often operate in combination, so that a successful strategy to overcome them requires a coordinated programme.

(Anderson 1997: 61)

Universal design is a relatively new expression of an idea that has been around for a long time: creating environments and artifacts that work well for *everyone*, including people with disabilities. Far from being simply an architectural or an accessibility concept, universal design in a museum is an educational concept incorporating all factors that limit access. It defines an exhibit approach that accommodates a wider population of museum visitors and, in the process, enhances the experience for all visitors.

Technically speaking, universal design means creating environments and programs that provide opportunities for learning and enjoyment for all visitors, regardless of ability or disability, age, educational background, or preferred learning style. Practically speaking, universal design creates programs and services that are user friendly in the broadest sense.

(Burda 1996: 24)

The first American Association of Museums Accessibility award, presented in 1995, was given to the Boston Museum of Fine Arts in recognition of efforts made in the imaginative installation and programming for an exhibition of Audubon watercolors. The physical space was made accessible, partly by placing objects at different heights, by careful consideration of light levels, and taking special care in developing explanatory labels. In addition, programming – including a workshop in which a speaker used cardboard wing shapes and a blind naturalist imitated bird calls – was included that made the objects accessible to people with visual impairments. The 1996 award was given to the Denver Museum of Natural History for an exhibition that employed techniques previously pioneered in the New England Habitats exhibition in Boston to make a diorama hall accessible. Not only can an inclusive exhibit engage a wider range of visitors, it can do so more attractively and at no greater cost than an exhibit with specialized access additions. Universal Design is an integral part of the Constructivist Museum.

### *Theater and drama in museums*

Both theater (Hughes 1993) and drama (Hayes and Schindel 1994) represent ways to extend modalities for visitor learning in the museum. Drama, the use of theatre techniques that engage the learner actively (through interaction with a first person interpreter or by being drawn into a theatrical process), and theater, usually a more formal situation involving a script and a production that engage the visitor emotionally and intellectually but not necessarily physically, can help to expand the visitors' access to the content of the museum.

Drama and theater are gripping, powerful media to draw visitors into a scene, make the human connection to objects apparent to some, and allow visitors'

imaginations to expand and associate rich meanings with the objects displayed. Theater and drama also provide a relatively inexpensive means to add a modern component to an outdated permanent exhibition. If women's roles or the contributions of non-dominant cultures have been neglected in an historical exhibition, theater can make amends without having to completely redesign the exhibition. The addition of a theater piece to a colonial exhibition of fine furnishings added a powerful social dimension to a traditional display of decorative arts (Munley 1982).

The Constructivist Museum, in its effort to reach all visitors and provide maximum potential for connections to its collections, will include the power and challenge of dramatic interpretation in its galleries.

### Other resources

Museum exhibitions are by definition limited; they usually occupy a specific space, include only selected objects, paintings, or models, and limit themselves to a predetermined set of concepts. Museum resources on any topic covered in an exhibition often far exceed what is on display. Yet, the additional materials are seldom closely associated with a gallery.

A recent phenomenon is the addition of a computer component to a gallery. Computer screens have generally been found to attract visitors. Their holding power is less clear, especially if the computer is slow, there is no place to sit, or the screen is difficult to read. But computer resources can offer much greater options than are usually associated with exhibitions.

A particularly rich computer resource to enhance an art museum's exhibitions has been developed at the Detroit Institute of Art (Robinson *et al.* 1996). Staff have installed a Computer Hypermedia Interpretive Program (CHIP) to provide information on art, artists, art techniques and history that allows visitors to find information on both individual works of art and on the relationships between various works through historical and cultural connections.

They describe the program in terms that are compatible with and supportive of the Constructivist Museum:

Tara Robinson proposed a program, to be built in prototype, that would represent the depth and breadth of the collections instead of dealing with individual curatorial areas or with isolated themes . . . CHIP was not planned as a virtual museum, but as a supplement to an actual gallery visit. It was to provide novice museum visitors with stimulating interpretive materials and strategies in order to help them increase their enjoyment and understanding of art. Adult visitors were to be encouraged, via CHIP and other educational strategies, to think of the museum as a resource in the process of life-long learning.

(Robinson *et al.* 1996: 81-2)

Some art exhibitions include an adjacent room or a corner of the exhibition

with books about the artist or period; science and children's museums have also set up resource corners to supplement exhibitions. But seldom has this strategy become an integral part of the museum experience as a whole. Are there communities where the local library and the local museum are a joint venture, and the various topics covered by the library are interspersed with the exhibitions? Are there universities that have integrated their museum and library catalogues so that each provides access to the other? Are there instances where the boxes of materials related to exhibits that are produced, marketed, or otherwise distributed by folk art, history, crafts, and science museums are directly associated with the galleries where their principles or their origins are on display?

Another approach has been to develop open storage areas: galleries where a museum's extensive collections are available to be viewed, although they may be only minimally interpreted by modern standards. But for the visitor who, having seen the exhibition, wants to study more deeply, or who came to the museum with this interest already developed, the open storage provides an opportunity to involve the new or ongoing interest, to browse at length among the eighteenth century glass, the Native American collection, or the vast array of scientific instruments or mounted sea birds.

Museums have become adept at placing a shop near the exit of a major exhibition to exploit visitors' desire to know more or, most often, to take home a souvenir of their visit. But the principle applies to a much wider range of resources associated with exhibitions; resources that might be consulted, borrowed, or bought, always related to the material in the gallery. The Constructivist Museum will provide resources of all types for those visitors who are motivated to continue their interaction with the subject of the exhibition.

## Collaborations

Museums have begun to expand their associations with libraries. In a recent exchange of ideas on a museum education electronic discussion group, the following accounts appeared:

Seattle Art Museum has been forging a strong relationship with the Seattle Public Library in a number of ways. We have been working with The Center for Technology in the Public Library, which recently became the Technology Resources Institute for Public Libraries, to develop educational materials for the World Wide Web . . . We are working with the Fine and Performing Arts Department of Seattle Public Library to offer "Internet and the Arts" trainings for teachers and students. We have also been working together in building community programming. It's been great, and has promise to get even better!

(Murphy 1996)

The Art Gallery of NSW and the State Library of NSW (which is only 5 minutes walk away, across a park) have started sharing an exhibition

called ARTEXPRESS (Outstanding works submitted for the Higher School Certificate examination in Visual Arts). This enormously popular show has been at the Art Gallery for 14 years but, starting 1996, the Library has started to mount a regular satellite show of works in series and students' "Process Diaries" at roughly the same time (January–March). Another collaboration, on a less public basis, has been in the development of a non-commercial CD-ROM based on the collection of the State Library's collection of early Australian art, for distance education students at Charles Stuart University.

(Cooper 1996)

Of course, collaborations between museums are also possible. The rain forest and its significance to our lives was recently the topic of collaborating exhibitions at three museums in Fresno, California (O'Donnell 1995a). The Fresno Metropolitan Museum, Fresno Art Museum, and Chaffee Zoological Gardens each mounted complementary exhibitions. Their purposes for doing so may have included issues distant from concerns about how visitors learn ("a trio of exhibits that is being marketed together with the help of the local convention and visitors' bureau" (O'Donnell 1995a: 21)), but the resulting displays and interactive components were likely to allow a wide range of visitors to find something that intersects with their own knowledge and interests.

Finally, museums can also collaborate with other educational institutions to make their approaches particularly appropriate for a wider range of visitors. Renewed interest in museum–school partnerships has been reviewed (Science Museum of Minnesota 1996, Hirzy 1996), as both schools and museums look for new ways to provide relevant venues for all children to learn. A novel museum–university partnership is provided in the hands-on science/learning lab at the Fort Worth Museum of Science and History (Martin and Reynolds 1996). The museum, in partnership with educators at Texas Christian University, has developed a discovery room that serves public visitors, university preservice education students, inservice teachers and school groups. The multiple use allows the collaborating partners to have selected adults and children learn "side-by-side," to carry out research on children's learning, and to increase museum service to the community.

Whether through technology (collections or other resources on CD-ROM disk), open storage, collaborative exhibitions, or partnerships with other institutions, the Constructivist Museum will make available to the visitor a much larger array of materials and objects than would be possible using only the objects of a single exhibition. And it will do so without returning to the overwhelming and alienating array of objects that characterized older museum exhibitions.

## Time

It is axiomatic in any educational theory that it takes time to learn. The analogy of cooking can help here. No matter what the recipe, the mixing of ingredients

to make a finished product requires the passage of time: it isn't enough to assemble the correct components in the proper amounts, nor yet to mix them as instructed. It takes a certain amount of time for the expected product to emerge. The advent of microwave ovens has made time a much less significant variable in some cooking. No parallel to microwaves has yet been discovered for learning. Ideas still need to "percolate," "simmer," or "stew" if they are to end up more than "half-baked."

All the best educational situations in the world will not lead to learning, no matter how it is defined, unless the visitor spends some time engaging with the exhibition. What have museum staffs done to extend the time that the visitor spends in the exhibition, therefore increasing the probability that something meaningful will be learned? The Constructivist Museum will do all it can to lengthen visitor time in the exhibition.

The simplest way to extend visitor time, without changing any other aspect of an exhibition, is to provide for visitor comfort – the addition of seating to a gallery will extend visitor time at the exhibition. Museums have discovered the value of stools in front of interactive exhibits; visitors settle down and are more likely to spend the period of several minutes that may be required to engage with the content of the material under the microscope, with the component parts that need to be assembled, or with the multi-minute loop projected on a screen.

A new technique to promote business efficiency is to insist that meetings be held in places without chairs; this tends to speed up the proceedings considerably. Just the opposite strategy should be the goal of museum staff; they need to do all they can to keep their visitors in the gallery.

The desire to extend visitor time does conflict with the marketing push for more and more visitors, which is often motivated by museums' increasing concern about justifying their existence. The dilemma this tension creates cannot be resolved easily. Museums need to demonstrate that visitors who stay longer have a more enriching visit.

### **Social interaction**

Increasingly, we appreciate the central role that social interaction through language plays in learning. We also know that museum visitors come predominantly in social groups; individual visitors account for only 5–20 per cent of all visitors.

Social interaction allows learners to go beyond their individual experience, to extend their own knowledge and even their ability to learn. As Matusov and Rogoff (1995) state in discussing a perspective on the social component of learning based on Vygotsky's contributions:

In varying communities of practice, learners participate in different activities explicitly or less deliberately designed for their learning. The

learners' development includes not only what they are learning how to do, but also how they are participating in the community using (and demonstrating) their developing skills and knowledge.

(Matusov and Rogoff 1995: 100-1)

One of the newer concepts developed in formal education is 'cooperative learning,' the idea that by sharing information and working together students will learn more and will learn better. Schools have embraced this idea and, among other practices, have developed seating plans that cluster children together in groups of three or four to facilitate working together.

David Uzzell (1993: 126) describes "socio-cultural" visitor studies that he and his students carried out. They devised worksheets that posed issues leading to cognitive dissonance. Various versions of the worksheets required that students work either individually or in pairs.

In the individual condition, the children experienced cognitive conflict, whereas in the collective condition they experienced socio-cognitive conflict. It was found that group performance was significantly superior to individual performance thus supporting the hypothesis that socio-cognitive conflict is a salient factor in learning. This superiority was not attributable to modelling.

(Uzzell 1993: 126)

Uzzell found similar results in exhibit situations designed to require family groups "to interact with each other in order to understand principles behind working gear wheels" (Uzzell 1993: 126). The version that required such interaction encouraged family conversational exchanges about the exhibition. "Not only did the social-interactive exhibit encourage much more social interaction among family members, but this interaction was qualitatively different to that prompted by other interpretive media" (Uzzell 1993: 126). Matusov and Rogoff discuss findings from their research on the consequences of using social learning practices in elementary classrooms:

in joint problem solving, third and fourth-grade children experienced with cooperative schooling built on each other's ideas in a collaborative way and embedded their instruction in collaboration more often than did children from a traditional schooling background. Children with a traditional schooling background emphasizing individual competitive performance predominantly used guidance based on withholding information, consistent with known-answer questions used by teachers in traditional schools.

(Matusov and Rogoff 1995: 101)

Adult educators have long recognized the power of using students' shared experiences as an adjunct to education. A key concept in educating adults is the idea of a "learning community."

Adults often learn most effectively in groups that they join by choice, groups characterized by discussion, interaction, and collaboration and in

which participants both receive and provide academic and social support. Such groups value the individual; at the same time they require that the learner communicate and reflect within the group.

(Baldwin *et al.* 1990: 7)

Elsa Feher (1996) describes how she and her colleagues developed benches for two in order to facilitate communication at an exhibition. At the National Museum of the Boy Scouts in Murray, Kentucky, designer Michael Sand, a long-time advocate of the importance of social interaction to facilitate learning, built a number of exhibit elements that require cooperation. He hoped to engage people in a cooperative activity that would mirror the cooperative element of scouting.

Starting with the arrival at the Museum, visitors are invited to enter via a Confidence Course. I modeled the course on the high ropes challenge courses used throughout scouting, more recently in executive training and Outward Bound programs. It's easy if you cooperate, but you can't get through successfully alone.

(Sand 1996)

The Boy Scouts Museum also contains two interactive theaters that allow visitors collectively to influence the destiny of the audio visual presentations. In one, visitors are presented with a scenario of a patrol looking for a lost child and have to decide, by group vote, where to look next, with the continuing story line depending on their vote. Another exhibition allows visitors to select among possible options in a story that involves trusting your child.

In our observations of visitors at the Boston Museum of Science's diorama exhibition we noted significant changes in visitor behavior after the museum had installed additions that catered to different learning modalities. Not only did we observe visual, oral, tactile and olfactory learners, but when members of family groups who preferred these various learning modes reunited and discussed their experiences they had rich conversations based on the different modes they had employed.

Individual visitors bring their unique experiences, prior knowledge, and preferred learning styles to the exhibition. The interaction between individual visitors and the rich resource of the exhibition leads to unique outcomes for each visitor. By sharing these experiences with other members of their groups, visitors can enrich the experience for each group member. The Constructivist Museum not only accepts the possibility of socially mediated learning, it makes provision for social interaction and designs spaces, constructs exhibitions, and organizes programs to deliberately capitalize on learning as a social activity.

### **Developmentally appropriate**

No challenge may be greater than to make museum exhibitions that will be appealing, accessible, and meaningful for the wide range of visitors who

frequent the public halls of museums. All the factors discussed above are intended to achieve this goal. But at least as important a consideration for engaging learners as culture, social background, or preferred learning styles, is the visitor's developmental level. Almost a century of research in developmental psychology has taught us that not only are children different from adults but that both children and adults go through many developmental stages.

It is not sufficient to develop exhibitions that will appeal primarily to "adults" or to "children"; we have to consider the various stages of intellectual development in our audiences, as well as the wide range of socially mediated developmental stages among all visitors. Marketing experts have divided the population into "segments," teenagers, twentysomethings, older adults, or low status, college graduates, high income, etc. These categories reflect a recognition that social subgroups have particular usages of language and cultural characteristics, have different tastes and interests. How can the Constructivist Museum address this immense diversity in its audience?

One approach is to provide separate venues for different groups – a children's discovery room in one gallery, a nostalgic exhibition for older visitors in another, a serious treatment for scholars in a third. Or, alternatively, the same gallery may include exhibits at different heights, with different labels for adults and children, or might incorporate material intended to interest various categories of visitors. The difficulty with this approach as an exhibition policy is usually limitations of time and money. As a programming policy, this approach can be rich and rewarding, providing services for select groups of visitors depending on their developmental stage and interests.

Another avenue for addressing the different developmental needs of visitors is to try to focus on those attributes of exhibitions that will be accessible to all. This means, for example, minimizing reliance on words, or choosing standard display characteristics – height, reading level for text, for example – that are intended to reach the largest audience.

All these efforts involve necessary compromises; there is no simple formula that will solve the problem posed by the different characteristics and developmental stages of visitors. Museums' success in engaging visitors will depend both on the quality of the presentation and the local circumstances in which particular material is used. The attitudes and expectations of visitors to a particular museum influence the readability of labels and the willingness and ability of visitors to engage with a particular presentation method.

In the Constructivist Museum, staff will have addressed the developmental needs and have empirically examined whether exhibits and programs have the ability to reach their intended audience. They will have made policy decisions and confirmed that their practice matches their decisions. They have moved away from the closed museum focused on a small group of visitors:

The museum and gallery world is still a closed system, belonging to a very small group of people who are even more defensively protecting their territory against invasion from "outsiders." Their concept of

quality is based on a hierarchy of value, with the ideology of the industrialized West – legitimized as superior – controlling and determining this hierarchy. Concepts of progress, continuity, totality, mastery, and the universal claim to history are accepted as “true.” . . .

The point is not that value judgments must be abandoned, but that they must be understood to be conditioned by who we are – our backgrounds, our educations, our interests, our positions – in the society in which we live. There is no single tradition or story, no one position, that can speak with authority and certainty to all of humanity.

(Tucker 1992: 11, 13)

The Constructivist Museum will have policies that dictate its desire to reach a wide range of visitors and will have practices that have been demonstrated to do so. One of these without the other is not sufficient. Many museums have mission statements that indicate their desire to serve minorities, communities, etc. Their practice may or may not reflect this.

### **Intellectual challenge**

People need to connect to what is familiar, but learning, by definition, goes beyond the known; it leads to new “agreeable places.” How is this accomplished? I have suggested above that one path is seduction, enticing the learner by the lure of the familiar, the comfortable, the known, to explore more deeply. But another well-recognized path is the lure of a challenge. The trick, of course, is to find just the right degree of intellectual challenge to leave the learner slightly uncomfortable but sufficiently oriented and able to recognize the challenge that she will accept it. This central dilemma of all learning, alternatively called the problem of match (Hunt 1961), cognitive dissonance (Festinger 1957/1962), disequilibrium (the Piagetian term), or, to emphasize the social aspect of learning, the Zone of Proximal Development – an intellectual “space” you can only reach with the guidance of a “teacher” (Vygotsky 1962/1978) – needs to be emphasized in every exhibition. The staff in the Constructivist Museum consistently challenge themselves and ask: Will this challenge our visitors but provide them with enough familiar context so they can rise to the challenge? Again, the answer to this question resides not in some theoretical principle, but in empirical results from trying out various exhibition components with visitors.

A special dilemma (or opportunity?) for any educator is the issue of new ideas or concepts that don’t seem to make sense to the learner when first encountered but re-emerge much later, after additional reflection, exposure, or experience, to allow the learner to reach new understanding. Museums probably contribute significantly to our later enlightenment, as some of the memory research suggests. But it isn’t easy to plan for delayed understanding.

## Acknowledging constructivism

Embracing constructivism requires two self-conscious acts on the part of museum staff. One is to acknowledge that exhibition-making is not displaying truth, but interpretation. This issue is explored in studies of the development of exhibitions (Macdonald and Silverstone 1990, Roberts 1997). The other is to pursue aggressively the study of how visitors make meaning in the museum.

### *The constructed exhibition*

The Constructivist Museum needs to publicly acknowledge its own role in constructing meaning when it displays objects and develops programs. It's important that this human decision-making process – full of compromise, personal views, opinions, prejudices and well-meaning efforts to provide the best possible material for the public – be opened up to view. How can this be done?

All the methods discussed above provide means to open the museum to wider interpretation and access to broader audiences. In addition, the constructivist museum will increasingly include the public in the development of exhibitions. At the Museum of London, the Peopling of London Exhibition was also a “project.”

The project sought to widen the audience to the Museum, in particular by attracting new audiences from the ethnic minority communities; to challenge the notion that immigration was a post-war phenomenon; and to change the way in which the Museum represented London's history by presenting the histories of communities of people not represented in the permanent galleries. Moreover, it was intended to encourage the Museum's staff to think about new policies and practices.

(Selwood *et al.* 1996: 15)

The project included innovative means to both publicize the exhibition and gather material for it from many segments of the community. It included gathering oral histories, including community groups in the planning, and sending a mobile display van to markets, squares, and supermarket car parks throughout London to gain access to diverse voices that might otherwise not be heard. Perhaps most significant is the concept that the exhibition represents only one aspect of a larger effort to expand the museum community. At the Field Museum in Chicago, the exhibition on Africa was similarly viewed as a community building exercise.

Museums can also directly publicize the exhibition process by such methods as developing exhibitions about exhibitions, as was done at the Wadsworth Athenaeum (Lusaka 1996). Shocked that even some trustees believed that the museum's collections policy was arbitrary, the director mounted “Acquiring Art in the 90s: The Inside Story,” an art exhibition that discussed acquisition policy, included quotations and pictures of the curators and handouts about various aspects of acquiring paintings for a museum. The museum curators had to be

persuaded to “reveal their personal experiences to the public,” and shed the impersonal tone associated with museum exhibitions. In Columbus, Ohio, the art museum director invited four community leaders to serve as guest curators and install four different galleries (O'Donnell 1995b). The result, “an installation the museum couldn't have created on its own even if it had tried” (O'Donnell 1995b: 11), was highly personal selections that emphasized the guest curators' own interests (the local zoo director chose works that featured animals, the mayor favored family scenes, and a third curator emphasized his own African-American heritage).

All exhibitions are constructed and represent the personal views of curators. These two examples illustrate that this personal factor can be made public and can provide an additional means for visitors to associate with the museum by allowing them to see the human quality of the museum itself. The Constructivist Museum will maximize the visibility of the exhibition process both to expand its connections with the larger community and to add one more layer to the many levels of meaning made available to the visitor.

### *The process of studying visitors*

Museum staffs work hard to allow visitors to understand the contents of museums. One powerful way to improve their practice is to reflect on it by becoming involved in visitor studies. When a British Task Force designed a program for assessment of the new national curriculum in the 1990s (Black 1987), it included a comprehensive plan for teachers to get together at every level to compare their students' work and to share information about student results on the complex performance tasks they were developing. Similarly, in the United States, many argue that the most powerful inservice activity available for teachers is to come together to study children's work. The parallel activity for museum staff is to examine their visitors' engagement with museum exhibitions and programs.

Museum staff who begin to look at what visitors do and consider what visitors learn, often report this as an enormously enriching activity. Reporting on their three-year Museum Education Evaluation project at the Department of Museum Studies at the University of Leicester (Hooper-Greenhill 1996), the contributors note that they learned a great deal about how to carry on small-scale projects, about a range of approaches to evaluation, and how to improve their practice.

In addition, and perhaps the most important result of all, we have learnt how to think critically about what we as individual professionals, and what our museums, as social cultural and educational institutions, are trying to achieve, and why.

(Hooper-Greenhill 1996: 39)

The Constructivist Museum will view itself as a learning institution that constantly improves its ability to serve as an interpreter of culture by critical examination of exhibitions and programs. The most rational manner in which

to do this is for the staff to become engaged in systematic examination of the visitor experience; in short, to carry out visitor studies.

## Conclusion

Visitors make meaning in the museum, they learn by constructing their own understandings. The issue for museums, if they recognize this principle, is to determine what meanings visitors do make from their experience, and then to shape the experience to the extent possible by the manipulation of the environment. Every museum building will send a message (or multiple messages); every exhibition will evoke feelings, memories, and images; every encounter with an object brings about a reflection (even if it is only incomprehension and frustration); every social interaction reinforces connections, stimulates new ones, or triggers personal anxieties.

We know the range of visitor reactions to their museum experience is tremendous; we know that powerful, enriching, even life-changing moments are possible in museums. Visitors do learn in the museum. What the cumulative result of these experiences will be is up to future exhibition designers and museum educators working together and with their audience.