SCIENCE CITY AT UNION STATION:
A NEW MODEL FOR RECREATIONAL LEARNING

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The Kansas City Museum has created a new kind of educational attraction that combines key characteristics of museums, science centers, theme parks, retail and theater. Science City at Union Station offers goal-directed "adventures" based on exploration of more than 50 environments within a city setting. This novel form of recreational learning will be enhanced by its integration with Kansas City's newly renovated historic train depot.

Background

The Kansas City Museum opened in 1940 at Corinthian Hall, a three-story Beaux-Arts Classic "townhouse" built 30 years earlier by lumber baron R. A. Long. In the intervening years, this museum of history and science has become a popular regional attraction. Over time, as science and technology have become increasingly critical to our economy and our lives, the need grew for the Museum to play a greater role in informal science education. Due to the limitations of Corinthian Hall, the Museum responded with a plan to expand by creating a new science center while continuing to operate the former Long mansion as a satellite facility.

While pursuing a variety of sites in the early 1990s, the Museum worked at building community support among civic leadership as well as at the grassroots level. Key intermediate steps during this period were the presentation off-site of large traveling exhibitions, the construction on-site of a Challenger Learning Center, and the formation of the Science City Volunteer Council, an advocacy and fundraising group. The offer of an attractive downtown site in 1993 helped precipitate the settlement of a lawsuit involving Union Station, which stood closed for nearly a decade awaiting a new use. Second largest station in North America and listed on the National Historic Register, the deteriorated building was transferred to the newly formed Union Station Assistance Corp. (USAC). In January 1994, the Museum and USAC jointly announced the restoration of Kansas City's 1914 landmark with the creation of Science City at Union Station.

This project was made possible by unprecedented lead gifts from the Ewing Marion Kauffman Foundation ($25 million), Hall Family and Hallmark Corporate Foundations ($20 million), and Sprint Foundation ($9.5 million). In November 1996, voters in three counties in Missouri and one county in Kansas created the nation's first bi-State metropolitan culture district, along with a dedicated 1/8th cent sales tax generates $118 million towards the $250 million budget. Federal transportation grants and state tax credits are also key funding components, along with $100 million in private funds.

Models for Science Centers

Permanent exhibits are the primary means of a science center for increasing public understanding of science.[1] For purposes of comparison, it is helpful to review the two primary models that guide how exhibitions are presented, in one form or another, by most science centers today.

Science and Industry. In this approach, comprehensive exhibits of 500 to 5,000 sq ft present a wide range of subjects, such as the brain, petroleum, chemistry, and computers. These exhibits communicate through interactive devices, computers, audio-visuals, artifacts, and graphics the content that the planners would like visitors to learn. Overall, the institution's exhibits may be grouped into broad categories such as health, energy, and technology. Over time, the original organizational scheme may get diluted as new exhibits on different subjects replace earlier ones. Larger and older institutions typically use this model, which derives in part from world's fairs.

Exploratorium. Frank Oppenheimer, who founded the Exploratorium in San Francisco in 1969, created this model. It involves scientific "props": "apparatus which people can see and handle and which display phenomena which people can turn on and off and vary at will."[2] Here the science center becomes a series of free-standing exhibit units, whether table-top size or larger, which visitors manipulate to obtain direct, laboratory-type experiences. Each exhibit unit illustrates a phenomenon, such as angular momentum or diffraction. If organized, units are grouped by scientific area (which for these two examples would be Motion and Light, respectively). Many science centers around the world are based on this model, using replicas of Exploratorium exhibit units.

In planning Science City at Union Station, the Museum took up the challenge of moving beyond these models and their many variations. Although we wanted to approach the science center concept in a fresh way, our purpose was not simply to innovate. It was to develop an approach that would best carry out our mission--educating and motivating our visitors, especially younger ones, about science. To do so, we first had to bring visitors to our door, competing against other ways of spending limited school field trip budgets or precious family leisure time. Then we wished to make the visit memorable and have as great an educational impact as possible.

These goals led us to explore new ways to unify the typically diverse exhibits within a science center, making them more than the sum of their parts. We placed stress on offering unique educational experiences not easily duplicated at home or school. We also wanted to make science accessible and relevant to every visitor.

We also wished to engage visitors emotionally. The power of emotion became clear to me in 1987 when visiting Cités-Cinés, a temporary exhibition at La Grande Halle de La Villette in Paris. Wearing headphones that picked up sound tracks, I stood inside a bistro, garage, jail cell, and other evocative city settings watching movie clips that had been filmed in those places. Becoming a participant rather than a movie-goer greatly intensified the impact. I realized then the potential of emotional access to enhance the visitor experience at science centers.

Science City Approach

We developed the concept of Science City to meet these objectives.[3] Here the metaphor of a city serves as a rich, flexible organizing principle for the entire visit. Science City is a "stage set" that visitors actively explore during their visit. Although it draws from the region, Science City is unlike any metropolis the visitor has ever beheld. In contrast to the theme park, however, where

fantasy provides a context for its rides and shows, Science City is reality-based, with only occasional liberties taken. We have been very careful to try to maintain the suspension of disbelief once visitors have entered this special frame of reference.

To reinforce the immersion, all floor staff play roles in partial costume as characters who “live” or “work” in Science City. In this sense, they are similar to staff in Renaissance fairs and "living history" re-creations of towns from the past. These "interactors" personalize the visitor experience by engaging visitors one-on-one and in small groups. Their interaction is primarily improvisational, based on training in both acting skills and content.

Science City is divided into distinctive districts: Festival Plaza, Uptown, Downtown, Southside, and Old Town, in addition to the Theater District. Each district has its own character and contains within it a variety of “environments” that replicate the look and feel of selected city settings. Overall, Science City includes more than 50 such environments, ranging in “property lot” size from 200 to 3,000 sq ft. These environments may place visitors in settings that are normally inaccessible (“Secret City” beneath the street, High-rise under construction), that provide unusual vantage points (Tree House), or that offer a twist on “normal” settings (“science-based” Golf Course). Orientation begins at the Welcome Center, where visitors can pick up a map and suggested self-guided routes to "tour" Science City.

The use of environments such as these draws from the success of immersive exhibits in science museums. While working at Chicago's Museum of Science and Industry, I was struck by the impact of the Coal Mine and U-505 Submarine, each of which transported visitors to a special time and place. They made long-lasting impressions, particularly on children who would often vividly recall the experience many years later. The Kansas City Museum's "igloo" in its Eskimoland exhibit had the same effect on those who crawled through it some 40 years ago. In Science City, these environments are not exhibits, so all treatments must be “authentic” to the setting, rather than interpretive text and graphics.

Within each of these environments are the visitor “experiences,” which are the types of hands-on activities typically associated with science centers. In Science City, however, these activities are placed in context and are integral to their environment. Examples are the “blue screen” in the TV News Studio, the optical and auditory illusions in the Mr. E. ("mystery") Hotel, and the rocket testing in the R & D Lab. In many cases, these experiences are linked through “adventures,” which are series of goal-directed activities in which visitors play roles. For instance, in the Crime Lab, the visitors become “detective trainees” and pick up one of several case files containing evidence related to a “suspect.” Then, by performing appropriate tests and analysis, they determine whether this suspect was indeed the perpetrator of the Science City “crime.” Other adventures include becoming certified for flight at the Astronaut Training Center, assisting in a medical procedure in the Operating Room, and searching for fossils in the Dig Site.

Old Town, the City’s “historic district,” employs these same techniques based on history, rather than science, as the primary focus. Old Town evokes environments from Kansas City history, transitioning from the 1960s to the 1850s. Visitors can explore the trunks left behind at Grandma’s Boarding House, pump gas at Skelly’s, produce a show at the Radio Station, and

stock a Covered Wagon for the journey west. They also can get their own ticket at the Railroad Office and explore a real locomotive on the adjacent tracks just outside the Station.

In addition to the interactive experiences and adventures, many City environments contain the "personal effects" of those "science citizens" who work there, such as on the physician's desk in the Medical Center or in the paleontologist's tent at the Dig Site. Family photos, clippings, cartoons, and memorabilia create the "social history" of Science City, adding human interest and humor, creating an entirely distinct layer for exploring the City.

Science City contains a variety of "outdoor" parks that provide places for visitor to relax as well as to participate. In Music Park, for example, visitors will be able to "play" the trees, fence, trash cans, and path. Others are City Park created at a scale for toddlers and Art Park, where visitors can explore color and light. Art is also an important element in the City overall, incorporating murals, mosaics, sculptures, folk art, and other forms in a natural way. Storefront "mini-museums" will showcase traditional and popular culture, including the unexpected.

The Theater District combines four diverse venues: City Extreme Screen, a 450-seat Iwerks 2-D/3-D 15/70 giant-screen theater; City Stage, a 200-seat live performance theater; City Dome, and a 150-seat multimedia theater and planetarium (Spitz Electric Sky and starball). During the day, programming will enhance the Science City family or school group visit. In the evening, the Theater District will attract a young adult audience for "City Nights," which offers more entertainment-oriented programming along with dining at the restaurants in Union Station.

Public programming will take advantage of the city motif, offering holiday festivals, fairs and special events throughout the year. Our large Festival Plaza (formerly the North Waiting Room) lends itself to performances, both by Science City interactors and by local cultural groups.

For school groups, Science City has special environments that can be closed off to allow students to go beyond the normal visitor experience with the aid of an interactor. In the Test Kitchen, students perform chemistry experiments by cooking and baking, and at the Design Studio, students create a robotic device. Although pre- and post-visit materials foster resonance between Science City experiences and the curriculum at various grade-levels, these in-depth environments allow even more extensive connections to the classroom.

Change will be a natural part of Science City. Because of the improvisational nature of the interactors, visitor experiences will differ daily. Adventures will change on repeat visits through built-in variability of outcomes, as well as revisions over time. Seasonal change will be reflected programmatically and through the look of the City. Over longer periods, new environments will begin to replace the old, behind City construction barriers. "Zoning" helps ensure balance and design integrity, as well as address visitor service issues such as traffic control.

Rationale and Discussion

Science City extends the earlier models for museums and science centers by integrating key characteristics from theme parks, retail, and theater to create a new form of educational

attraction. From science centers, Science City takes its educational mission; its science and technology content; and the use of hands-on discovery. From museums, Science City adds the role of regional history and the use of collections. From theme parks, Science City borrows the use of immersive environments; the value of fun; and a strong visitor focus, with emphasis on customer service. From retail, Science City takes its customer-driven market focus; business decision-making; and the importance of change. From theater, Science City draws emotional engagement through interactors, role-playing, and adventures, as well as use of special effects and theatrical techniques, to create a new production for visitors every day.

Our product is recreational learning. Science City is designed to appeal broadly to audiences looking for a good time but who are interested in more than just entertainment. Although science is clearly the underlying theme, the approach is interdisciplinary, incorporating history, art and other fields. Visitors need not be predisposed towards any particular content area. Our "brand essence" is adventure, which derives from exploration of the City, leading to discovery and fun, regardless of the disciplinary source.

In creating Science City, we have placed primary emphasis on experiential learning. Unlike standard exhibit planning, we did not begin the process with content, such as specific scientific information for visitors to learn. Rather we started with extensive public meetings, surveys, focus groups, and other techniques for finding out what future visitors with broad demographics would like to experience in Science City. Based on this process, we determined the components of the City, basing the size of "neighborhoods" on degrees of public interest and dropping those that were weakest. Next, we tested individual experiences, and then experiences integrated within environments, before settling on the final conceptual design for Science City. Once we knew what visitors would intrinsically find appealing, we had the "hooks" for engaging them with the underlying science, which, of course, is present everywhere.

Our approach, which gives rise to emotional engagement through immersion, builds on what we consider the greatest strength of an informal learning experience. Although visitors do learn in cognitive terms, the most significant impact is attitudinal. As stated by Minda Borun (Franklin Institute Science Museum), "the strength of the museum experience lies not in its capacity to convey extensive amounts of information but in its power to generate enthusiasm for and interest in learning."[4] Furthermore, Borun states that emotional ties that relate a subject to the visitor's experience heighten multidimensional exhibit learning. Similarly, Howard Gardner (Harvard Graduate School of Education) makes the point that such experiences "legitimately animate and motivate students," in contrast to what happens in most schools.[5] This theme is echoed by Mihaly Csikszentmihalyi, who developed the psychological concept of "flow": "Learning involves an open process of interaction with the environment…When complex information is presented in a way that is enjoyable—intrinsically rewarding—the person will be motivated to pursue further learning."[6] As a result, if we are successful, visitors will leave with a greater interest in, or at least less intimidation by, science in general.

By placing the visitor in recognizable places as the starting points for exploration, Science City helps make science familiar, relevant, and accessible. It is our intent that the experiences in Science City never elicit a "so what?" response. Immediate relevance becomes motivational and

helps ensure that visitors comprehend the essential relationship of science and technology to their everyday lives. Through their experiences at Science City, visitors may thus gain new ways to view the world around them.

The environments provide meaningful context for leading visitors from appealing applications of science and technology to underlying scientific principles. This methodology follows the pedagogical progression of conveying abstractions by means of concrete examples. We think it will be especially valuable for nontraditional visitors who may lack the formal educational background to benefit from a more academic approach.

Recent research supports the value of these environments. Jeff Hayward (People, Places & Design Research) presents the case that "if you experience an environment--as a coherent, complex, richly stimulating, immersing whole--you will have an enhanced educational experience."[7] In addition, Stephen Bitgood (Jacksonville State University) notes that the overlapping of visitor space with exhibit space in "immersion" or "walk-through" exhibits both increases visitor attraction and prolongs attention.[8]

The Science City experience is reinforced by social interaction, which is a major component of the visitor experience.[9] The use of interactors and role-playing, as well as the design of the experiences themselves, will encourage those visiting together to interact not only with their environment but with each other.

Finally, the Science City concept lends itself to extension through collaboration. For external groups, the City can become a backdrop for a wide variety of programs, whether based in one location, such as health screenings at the Medical Center, or integrated throughout, such as programs promoting safety. We are just beginning to explore these opportunities.

We are excited by the prospects of Science City, but must keep in mind its limitations. This approach does not lend itself to every aspect of science and technology, such as areas that are too abstract or too far from visitors' lives. Although content can be layered within an environment, great depth is not possible. We must rely on visitors pursuing elsewhere interests piqued in Science City, and we provide suggestions (including web addresses that visitors can e-mail to their homes) via computerized City Guides and other means. Social and ethical issues cannot be dealt with as directly as with exhibits;[10] they can be addressed, however, through programs and the role-playing interactors. History of science and technology also is addressed only indirectly in Old Town and other parts of the City.

In a recent review of science centers,[11] Beetlestone and fellow authors at Techniquest (U.K.) ask "what lies beyond the clone?," referring to the many science centers modeled on the Exploratorium. Science City offers a new direction that could be adapted and modified by others, giving each such "City" its own unique character and composition based on the community in which it is located. After Science City at Union Station opens in November 1999, we will be refining the model to incorporate feedback from visitors to make continuous improvements.

[1]For example, Ucko, David A. (1985). "Science Literacy and Science Museum Exhibits." Curator, **28**(4):287-300.
[2]Oppenheimer, Frank. (1968). "A Rationale for a Science Museum." Curator, **11**(3):206-209.
[3]Ucko, David A. (1991). "Science City: A New Model for Science Centers." ASTC Newsletter, **19**(5):13-14.
[4]Borun, Minda. (1992). "The Exhibit as Educator: Assessing the Impact." Journal of Museum Education, **17**(3):14.
[5]Gardner, Howard. (1992). The Unschooled Mind. New York: Basic Books, p. 202.
[6] Csikszentmihalyi, Mihaly and Hermanson, Kim. (1995). "Intrinsic Motivation in Museums: Why Does One Want to Learn?" In Public Institutions for Personal Learning: Establishing a Research Agenda, John H. Falk and Lynn D. Dierking, ed., Washington, DC: American Assn. of Museums.
[7]Hayward, Jeff. (1992). "Exhibit Environments Enhance Educational Effectiveness." Journal of Museum Education, **17**(3):15.
[8]Bitgood, Stephen. (1992). "The Anatomy of an Exhibit." Visitor Behavior, **7**(4):9.
[9] Falk, John H. and Dierking, Lynn D. (1992). The Museum Experience. Washington, DC: Whalesback Books.
[10] Ucko, David A. (1983). "`Technology: Chance or Choice?,' A Museum Exhibit on the Impact of Technology." Science, Tech. & Human Values, **8**(3): 47-50.
[11] Beetlestone, John G., Johnson, Colin H., Quin, Melanie and White, Harry. (1998). "The Science Center Movement: context, practices, next challenges." Public Understand. Sci., 7(1):5-26.

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