

Hands-on Exhibitions

Managing interactive museums and
science centres

Tim Caulton



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The development of interactive displays has transformed the traditional museum world in the last decade. Visitors are no longer satisfied by simply gazing at worthy displays in glass cases – they expect to have hands-on experience of the objects and be actively involved with the exhibits, learning informally and being entertained simultaneously. Hands-on museums and science centres provide the most remarkable example of how museums are redefining their role in society – improving access to real objects and real phenomena, so that they can be enjoyed by more people.

In recent years museums have been thrust into intense competition for the public's time and money with all branches of the leisure industry, from commercial theme parks to retail shopping and home entertainment. This has upset the traditional stability of the museum world and necessitated an evaluation of the economic relationship between museums and their visitors. A hands-on approach encourages a broader visitor base, which in turn helps to bring in additional revenue at a time of declining public subsidy.

Tim Caulton investigates how to create and operate effective exhibitions which achieve their educational objectives through hands-on access. He concludes that the continuing success of hands-on museums and science centres hinges on attaining the very best practice in exhibition design and evaluation, and in all aspects of operations, marketing, financial and human resource management. *Hands-on Exhibitions* provides a practical guide to best practice which will be indispensable to all museum professionals and students of museum studies.

Tim Caulton has been involved in the development and management of museums for over fifteen years. He was a member of the team which developed Eureka! The Museum for Children in Halifax. He has subsequently helped develop a number of new museums, and lectures at the University of Sheffield.

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*Managing interactive museums and
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Preface

The growth of hands-on museums and science centres has been one of the most remarkable features of the leisure industry in the last decade, with almost every new exhibition proposal today incorporating an interactive element for visitors. As education officer at a working industrial museum throughout the 1980s, I continually wrestled with the problem of how to turn the highly popular, but labour-intensive, metal-shaping activities undertaken by thousands of school-children in the museum school-room into an interactive experience available for all visitors, every day and in a safe environment. There had to be a way of enabling visitors to participate in, and not just watch, all the activity in the museum. A trip to Test Bed at the Science Museum in 1984 provided further motivation, and the activities in the museum classroom became more prominent as formal talks were virtually abandoned in favour of hands-on learning. At that time I knew little of exhibit evaluation, and the possibility of turning museum attendants into explainers seemed as remote as the chance of getting funding for the scheme. In 1988, I was involved in bringing the Discovery Domes to Sheffield for their national launch, and in the following year gained funding from the Committee on the Public Understanding of Science (COPUS) to stage a temporary hands-on exhibition at the museum after the British Association annual meeting in Sheffield. Despite cutbacks in local government funding, the museum trustees were supportive, and a permanent hands-on exhibition at Kelham Island seemed a realistic proposition.

In 1990, I was fortunate to be appointed Head of Education and Interpretation at Eureka! The Museum for Children in Halifax, and was thrust for the first time to the forefront of the hands-on movement. For three years, Eureka! provided a challenging training ground, during which time I was responsible for developing the content of all the exhibits, and for the recruitment, training and management of the front of house enabling staff. By summer 1993, with half a million visitors through the turnstiles, it was time to move on, and the Eureka! experience opened numerous doors, enabling me to assist in the development of new hands-on museums throughout the UK and abroad. In short, I feel very privileged to have been involved with the hands-on movement for a decade, at a very wide variety of museums in the public and independent sectors, and at local and national levels.

As a university lecturer, I am now able to study the hands-on movement whilst continuing to work on selected new museums. This book is a critical analysis of the development of hands-on museums and science centres in the UK, within the context of parallel trends in the USA and Europe. It is aimed at a dual market of practitioners at museums and other visitor attractions contemplating the development of an interactive exhibition, and also at those studying the management of museum, heritage, leisure and tourist attractions. The book is not designed to teach basic management theory so much as to provide case study information on the specific management of hands-on exhibitions.

There is a broad range of hands-on museums and science centres in the UK, but inevitably the book draws heavily on personal knowledge and experience, on original research and primary evidence in the public domain, together with material from a range of secondary sources in the UK and USA.

One of the key findings of this study is that the hands-on movement contains a vast array of visitor attractions with differing objectives, and that there is no one 'right' way to develop and operate a hands-on museum. Nevertheless, it is clear that all hands-on museums and science centres face similar challenges. In particular, it may be difficult for hands-on museums and science centres to maintain their individual identity in the future as boundaries blur between different types of leisure attraction. If they are to survive cutbacks in revenue funding from public sources, maintain their visitor levels at a time of massive increase in the number of leisure attractions and withstand competition from attractions embracing new technologies, the hands-on museums will have to employ the very best of management techniques to finance, market, staff and operate the centres successfully. Furthermore, if the hands-on museums and science centres are to meet the educational objectives of hands-on learning, they will have to draw upon and contribute to the growing body of knowledge on how visitors behave and learn in an interactive environment.

In short, the aim of this book is to address management issues in the development and operation of hands-on museums as an increasing number of organisations strive to improve physical and intellectual access to real objects and real phenomena through hands-on learning.

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Abbreviations

ARC	Archaeological Resource Centre (York)
ASTC	Association of Science and Technology Centers (UK)
BIG	British Interactive Group
COPUS	Committee on the Public Understanding of Science
DNH	Department of National Heritage (UK)
DTI	Department of Trade and Industry
EC	European Community
ECSITE	European Collaborative for Science, Industry and Technology Exhibitions
INSET	In-service education for teachers
ISTP	Interactive Science and Technology Project
OPCS	Office of Population, Census and Surveys

Hands-on exhibitions

This chapter provides an overview of the development of hands-on exhibitions in the UK, USA and Europe within the context of changing provision in the museum, heritage and leisure industries.

Introduction

Visitors to museums are no longer satisfied simply gazing at worthy displays of exhibits in glass cases. They expect to be actively involved with the exhibits, to learn informally and to be entertained simultaneously. In the face of declining budgets from government sources, museums have been forced to identify and meet the needs of a discerning public, and they have been thrust into competition for the public's time and money with all other branches of the leisure industry, from commercial theme parks to retail shopping or home entertainment. In short, museums have become increasingly aware of the need to redefine their role in society, reaching a broad visitor market, not only to earn additional revenue, but also to justify any remaining public subsidy.

Museums throughout the world are looking at ways to improve access to their exhibitions so they can be enjoyed by more people. There are many ways of doing this: for example, the use of new technologies, visible storage or live interpretation are all perfectly valid ways of trying to demystify museums and help visitors make more sense of the collections. However, as the twentieth century draws to a close, many new exhibitions are designed exclusively with hands-on exhibits, whilst many more incorporate hands-on exhibits within traditional exhibitions or in galleries utilising a mixed range of interpretative media. In the UK, the hands-on approach has spread from the first science centres to museums, and subsequently to heritage and countryside interpretation centres. The design, management and operation of hands-on exhibitions is very different from that of traditional galleries, and requires different professional skills. This book aims to assist those contemplating the development of an interactive exhibition, drawing on experience in the UK, USA and Europe.

What is a hands-on exhibit?

Traditional forms of museum displays are either passive (glass showcases) or active (working models and machines), but both methods can be described as 'hands-off'. Visitors are encouraged to look, think, hear and sometimes smell, but they are discouraged from touching. Hands-on and interactive exhibits, on the other hand, encourage visitors to explore exhibits more directly. The terms 'hands-on' and 'interactive' have similar meanings and have become largely interchangeable. 'Hands-on' implies that visitors physically interact with an exhibit, whether this is simply pushing buttons, using a computer keyboard, or engaging in a more complex activity with a multiplicity of outcomes. However, a hands-on exhibit that simply involves pushing a button is not truly interactive, rather it is reactive, in that the exhibit simply follows a predetermined outcome.¹

When the term 'hands-on' is normally used there is an assumption that hands-on activities will also involve interaction and provide added educational value, that hands-on will lead to 'minds-on', although the term itself does not suggest this. On the other hand, an 'interactive' exhibit implies that visitors will engage in mental interaction, but this can clearly happen without any physical interaction taking place.² Definition is further complicated in that the term 'interactive' is often associated with computer games, where the only physical activity taking place is via a keyboard, joystick or virtual reality headset, and where entertainment and education are not necessarily joint objectives.

In short, whilst the terms 'hands-on' or 'interactive' have become largely interchangeable in both public and professional use, neither term in itself adequately defines an exhibit which involves physical interaction, which has clear learning objectives, and which has a multiplicity of outcomes dependent on the visitor's individual explorations. Without an adequate alternative term, this book does interchange the use of 'hands-on' and 'interactive', but in both cases there is an assumption that the terms do involve this broader definition:

A hands-on or interactive museum exhibit has clear educational objectives which encourage individuals or groups of people working together to understand real objects or real phenomena through physical exploration which involves choice and initiative.

A good interactive exhibit will work at a multiplicity of levels for visitors of different ages and abilities. Hands-on exhibits do not have to be high-tech to be interactive, and whilst they may not directly involve handling museum artefacts, exhibits are designed to help visitors explore real objects or real phenomena. As such, hands-on exhibits can involve the direct manipulation of museum objects or replicas, or they can help visitors understand an original object on display alongside the exhibit, or they can take place in galleries without any artefacts at all (for example, in a science centre where the emphasis is on encouraging the public to understand scientific phenomena).

The origins

The origins of modern hands-on museums and science centres lie within two parallel developments: the first children's museums in late nineteenth-century USA, and major traditional science museums in early twentieth-century Europe and North America.

Early science museums

The science centre strand is usually attributed to pioneering developments such as the operation of industrial engines at the Deutsches Museum in Munich from 1925 and the staging of chemical demonstrations at the Palais de la Découverte in Paris from 1937.³ There were parallel developments in the USA too: Chicago Museum of Science and Industry had a simulated coal mine into which visitors descended in 1933, whilst the Franklin Institute in Philadelphia has had a two-storey walk-through beating heart since 1935.⁴ These early science museums have a long and distinguished history of interpretation and explanation alongside their exhibitions, and the more recent trend towards hands-on exhibits is an obvious extension of this tradition. Indeed, the distinction between the old museums of science and modern science centres may be more related to their age than to any differences in mission.

The Children's Gallery at the Science Museum in London, which opened in 1931, also has a claim to be one of the first science centres. Resembling more of a 'technological amusement arcade'⁵ than a traditional museum with its buttons to push and handles to wind, it became a source of inspiration to generations of children who could later attribute a lifetime interest in science and technology to a childhood visit there. The Children's Gallery was originally designed for all visitors as an introduction to the museum, but with its working models and dioramas it was so popular with younger people that it became known as the Children's Gallery.⁶ It was the forerunner of today's hands-on science centres. Indeed, even contemporary criticism in the *Museums Journal* sounds familiar: 'We could not help fearing that all this may be going too far and not quite in the right direction.'⁷ Furthermore, exhibit development problems similar to those found in today's hands-on galleries were experienced:

Working models . . . would be found after a short time on exhibition unable to stand up to the strain of constant operation by visitors . . . a new class of exhibit, required to work under special conditions . . . had to be devised and effected before a satisfactory form of each model could be arrived at.⁸

The Children's Gallery and the Deutsches Museum inspired Frank Oppenheimer, but the Exploratorium that he founded in San Francisco in 1969 was the first of a completely new kind of institution with a truly hands-on approach, and this was followed by a wave of successful science centres throughout North America.⁹ The Exploratorium provided a catalyst to other organisations, and by making over 200 'recipes' for interactive exhibits available through its 'Cookbooks', ensured that other science centres were able to start with reliable

and proven exhibits – and also to ensure that clones of Exploratorium exhibits can be found in science centres throughout the world!¹⁰

In the same year that Oppenheimer founded the Exploratorium, the Ontario Science Centre opened in Toronto after receiving an investment of \$23 million from the Province of Ontario. In summer 1981, the Ontario Science Circus (an extension to the science centre) visited Birmingham and the Science Museum in London. Supported by the Science and Engineering Research Council, the eleven-day visit to the Science Museum was considered extremely successful and encouraging:

Visitors thoroughly enjoyed the experience, and there is no doubt that the participatory nature of the majority of the exhibits contributed greatly to that enjoyment . . . The results of the evaluation study vigorously support the development of the Science Centre concept in Britain. The next stage, building on the Science Circus experience, might be to set up some pilot exhibits in similar style.¹¹

The Science Museum experimented with its own modest Discovery Rooms in the summers of 1981 and 1982,¹² and in 1984 over 20,000 people visited its Test Bed. It was described at the time by the head of education at the Science Museum as ‘a quantum leap forward in the idea of museum participation.’¹³ Valuable research and development lessons were learned, and the experiment directly led to the opening of Launch Pad in 1986. Costing over £1 million, Launch Pad was an overwhelming success, with over 20,000 people visiting on its first day alone!¹⁴

If Launch Pad was the first hands-on centre within a UK museum (albeit in a gallery devoid of objects), the first stand-alone science centres were at Techniquest in Cardiff (1986) and the Exploratory at Bristol (1987). By this time the interactive movement was firmly taking shape in the UK, supported by the Sainsbury Foundation, the Leverhulme Trust, the Nuffield Foundation and the Department of Trade and Industry.¹⁵ The movement was moving equally rapidly throughout Europe, with new centres like the Inventorium at La Villette in Paris, which had been the subject of heavy investment by the French government when it opened in 1986.¹⁶ In the UK, by early 1989 there were twelve dedicated hands-on centres, including the nomadic Discovery Domes. Steve Pizzey, the Director of Science Projects (the operators of the Discovery Domes), widely advocated his dream of a science centre in every city in the UK.¹⁷

Children’s museums

In 1987, the Association of Science and Technology Centers in the USA undertook a survey of its members and published the findings in a number of reports. Although the science centres were characterised by their diversity, a number of significant trends did emerge. One of these was that, whereas most new centres founded in the 1960s concentrated on life and natural science, by the 1970s physical sciences predominated, and by the 1980s children and youth museums had emerged as the most popular.¹⁸ Indeed, children’s museums are

one of the fastest-growing sectors of the museums industry in the world.¹⁹ However, the concept is not new, and many children's museum have a much longer history than science centres. Brooklyn Children's Museum dates back to 1899, and Boston Children's Museum opened soon after. Initially, these long-established children's museums developed traditional museum collections which were considered to be of interest to children. A hands-on approach was adopted after experiments at Boston Children's Museum by the Director, Michael Spock (son of the well-known paediatrician), proved successful in 1964. Spock threw out the glass cases, and reorganised the exhibition programme to create environments in which children could learn. Thus, Boston Children's Museum pioneered the philosophy that the museum exists primarily for people rather than things, and this has governed children's museums throughout the world ever since.²⁰

Brooklyn Children's Museum followed suit, and whilst it had always followed a policy of enabling visitors to handle its collections, in 1977 the museum reopened in a dramatic new building.²¹ Indianapolis Children's Museum has a similar history – it is not only the fourth-oldest and largest children's museum in the world, but it maintains over 140,000 artefacts in excellent storage conditions. At Indianapolis, it is claimed that a children's museum differs from a traditional museum in essentially four ways:

- 1 Education justifies every object, activity and event. There is a purpose behind each display, a story to tell with each exhibit, an idea to unfold in each gallery.
- 2 Bright, vivid colours and dramatic lighting effects are used to capture attention. Labels are written in easily understood, contemporary language.
- 3 Exhibits are placed carefully to afford even the youngest a good look, and materials are presented in identifiable sequence. Whenever possible, exhibits are 'hands-on' or participatory in nature.
- 4 No matter how sophisticated the exhibit, human contact remains the most important source of learning.²²

Around eight children's museums existed in the 1970s, but the movement mushroomed rapidly, such that there were over 400 children's museums known to the Association of Youth Museums in the USA by the end of the 1980s, with over 350 in the USA alone. The phenomenal growth of children's museums in the USA in the 1970s and 1980s has been accounted for by the urge to try new forms of education after alternative experiments within traditional education had failed in the late 1960s. Many of the new museums were small-scale, naive in their goals and amateurish in their operation. However, the burgeoning of children's museums across the world reflects enthusiasm for an institution that seems to make sense to all cultures.

Whilst some children's museums (such as Brooklyn, Boston and Indianapolis) are firmly based on traditional museum collections and successfully integrate interactives and museum objects, other new children's museums (such as Denver) defy convention in the museum world and have no artefacts at all. Although this does lead to criticism and debate that a children's museum without a collection is not a museum at all, the American Association of

Museums fully accepts children's museums, defining them for the purposes of accreditation as:

An institution committed to serving the needs and interests of children by providing exhibits and programs that stimulate curiosity and motivate learning. Children's museums are organised and permanent non-profit institutions, essentially educational in purpose, with professional staff, which utilise objects, and are open to the public on some regular schedule.²³

It is significant that in this definition the needs and interests of children are placed before those of the collections. The accepted definition of a museum in the UK, on the other hand, places the emphasis on objects rather than people: 'An institution which collects, documents, preserves, exhibits and interprets material evidence and associated information for the public benefit'. Children's museums are challenging and redefining the boundaries of the traditional museum world. They are client-centred, emphasising the educational role of museums with contextual interactive exhibit strategies over the more traditional museum focus on preservation, research and glass-case presentations. Objects serve primarily as tools to motivate learning and address the developmental needs of children, and are therefore not necessarily collected for their intrinsic value.

Techniquet: a case study

Techniquet began with ambitious dreams but modest premises in 1986, but within a decade it had moved to its third site and grown organically to become the largest interactive science centre in the UK. Under the guidance of John Beetlestone, Professor of Science Education at the University of Wales in Cardiff, Techniquet was established as a company limited by guarantee with charitable status in July 1986. With an initial start-up grant of £83,000 from the Gatsby Foundation (a Sainsbury family trust), Techniquet opened in November 1986 in rent-free premises in the former British Gas Wales showrooms in central Cardiff, and received 45,000 visitors in six months.²⁴ These temporary premises provided a showroom not only to visitors, but also to potential sponsors and patrons. In 1987, the Gatsby Foundation approved a grant of £600,000 for Phase II of the development, and the new Cardiff Bay Development Corporation provided funds for a new basic industrial building on the waterfront at Cardiff Bay for five years. The first temporary exhibition had closed in August 1987, and the new Phase II Techniquet opened in September 1988. The total cost was around £1 million, providing eighty exhibits in 1000 square metres.²⁵

As is shown in Figure 1.1, Phase II of Techniquet attracted around 100,000 visitors in its first year, compared to only 39,000 people in 1990 at the Welsh Industrial and Maritime Museum on the adjacent site. These statistics illustrate the public appeal of hands-on centres compared with even recent traditional object-based exhibitions.²⁶ Techniquet's success in an isolated and run-down part of Cardiff owes much to the philosophy of John Beetlestone and his management team. Beetlestone considers himself to be an impresario – a 'retailer