

# Foreword

Four decades ago, a few visionaries — Frank Oppenheimer of the Exploratorium a leader among them — set out to transform how people learn about science and technology. They were convinced of the merit of transforming individual lives and thus transforming society by engaging a broad public with the ideas, methods and fruits of science and technology. With interactive exhibits as their most engaging tool, Oppenheimer and his colleagues ignited a dynamic, influential learning revolution.

Today the science center revolution is converging with the Internet revolution and virtual science centers are an increasing presence in cyberspace. *E-Learning and Virtual Science Centers* is the first book to document and explore this new phenomenon. It accesses the collective talent of leading scholars to take a snapshot of these converging revolutions, to probe the trends, assumptions and review the work to date. I'm excited about this book because its authors provide a structured platform for thinking as those of us in the profession take the next steps in evolving the virtual science center.

What is a virtual science center? In this rapidly evolving field we can best understand this by exploring the different examples cited throughout this book. At the most basic level the virtual science center is an Internet representation or reflection of an existing, physical institution. Over the Internet we are able to access some of the qualities and experiences offered by the physical institution. Billie Jones provides a number of good examples of this kind of virtual science center in "Establishing Identification in Virtual Science Museums: Creating Connections and Community." There are also excellent examples noted in other chapters.

A growing number of science centers exist only in cyberspace, a trend we can expect to continue. Jones draws our attention to the Leonardo: Interactive Virtual Science Museum, where the exhibits consist of a set of well-organized links to the best interactive science applets on the Internet. A very different, fully virtual example is [wonderville.ca](http://wonderville.ca), a highly animated site crafted by the Science Alberta Foundation to enhance science learning and career interest among students in grades 4-6.

The science center revolution has inspired vigorous research interest in learning. Because of science centers, the way we understand both formal and "free choice" learning is profoundly more sophisticated — a sophistication reflected in the chapters of this book. I am encouraged to see chapters like Goldman and Dierking's "Free-Choice Learning

Research and the Virtual Science Center: Establishing a Research Agenda”, which looks toward extending our quest for knowledge about learning to the virtual science center realm at this early stage of the field’s development.

There are other dimensions of knowledge to be brought to the creation of virtual science centers. In the chapter “From the Physical to the Virtual: Bringing Free-Choice Science Education Online”, Allison-Bunnell and Schaller point out that virtual science center work to date has sometimes been haphazard in that it is unguided by formal knowledge of information architecture and virtual reality design. I am pleased to note that *E-Learning and Virtual Science Centers* makes a tool kit of ideas and methods available to science center professionals to enable them to address the next stages in the development of the virtual science center in a more intentional manner.

There is also a convergence taking place of a variety of science publishers, filmmakers and media producers with the Internet. Filmmakers and media producers bring skill sets that will be of value to the development of virtual science centers. An example of a virtual science center that intensively uses these skills is [becominghuman.org](http://becominghuman.org), a site produced by the Institute for Human Origins that describes itself as an “interactive documentary experience”. The trend to bring other media and other professional skills, from outside the conventional science center professions, to creating virtual science centers is one to be monitored as we move into the future.

An important distinguishing characteristic of physical science centers is the significant trust the public places in them in two domains: (1) as tellers of scientific truth and (2) as creators of learning experiences that are understood to be important in people’s lives. The Internet environment, which is rife with inaccurate, misleading and biased information, provides virtual science centres with the opportunity to be valued and popular for their ethical stance and integrity, similar to the value placed in physical science centres. The same Internet provides an opportunity for education and information exchange in this vital area.

In *E-Learning and Virtual Science Centers*, I am appreciative that a number of the authors express how the ethical character and integrity of a virtual science center’s offerings is important. Billie Jones captures this especially well in drawing our attention to sites that demonstrate “good character, good sense, and goodwill” toward the user. I am pleased to see Spadaccini’s chapter, “Real Science: Making Connections to Research and Scientific Data”, because connecting our audiences to real science and scientists is fundamental to the perceived integrity of science centers.

Research about science centre learning, a topic touched on in many chapters, is a key underpinning of the ethics of science centres. This research is essential in keeping us true to our missions and true to our audience’s expectations. It distinguishes science centres from commercial attractions or commercial web sites. Although commercial attractions may do market research, which assists them in a business sense, they typically do not document and learn from the value they produce in people’s lives. Documenting our value in people’s lives gives science centers a significant strategic advantage.

What does the future hold for virtual science centers? Two major trends are clear. First an increasing fraction of humanity will continue to come online. With 13% of the world’s population already using the Internet and use exceeding 50% of the population in 22 countries, science center professionals must appreciate that a far larger fraction of

humanity already has access to virtual science center experiences than has access to the physical ones. Thus we can imagine an increasing emphasis on the development of virtual science centers.

The second trend is that broadband and wireless Internet connectivity will become almost universally available in many areas of Asia, Europe and North America over the next few years. Simultaneously, the speed and capacity of home and school computers will continue to increase. The obvious result of this is the potential to create increasingly sophisticated virtual experiences. The less obvious trend will be the parallel demand on virtual science center workers to comprehend the tools of the trade and fully master the methodologies of Internet learning and virtual interaction at a high level of professionalism.

What of real science centers? One way to think about what is evolving is to compare real science centers to live theatre and virtual science centers to film. Film and theatre are both strong and important attributes of modern civilization. Film and theatre have become distinct professions, though they share some common history and many common professional attributes. Similarly, it is not hard to imagine the real and virtual science center professions diverging, as have the theatre and film professions.

Likewise I have no doubt that both real and virtual science centers will exist in the same mutually supportive way that film and theatre exist together. Both real and virtual science centers have roles to play in enhancing how people learn, continuing the important work of transforming individual lives and thus strengthening society.

In concluding this foreword, I congratulate the editors, Leo Tan Wee Hin and R. Subramaniam, and the authors on a ground breaking book — the first on virtual science centers, a work that I'm confident will be a most important resource in this new field.

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