

Appendix C

Quantitative Tables of Interview Results

Following are the tabulated summaries of the results from the three dominant interview categories: museums, associations and experts, and independent exhibit design firms. While most of the museum tables presented here were integrated throughout the report, the summaries for the other two categories were not. Museum tables are presented here in the order in which they are presented in the text of this study, not necessarily the order in which they were asked during the interviews. In addition, some of the questions asked in the interviews were not tabulated for inclusion here, depending on their relevancy to the discussion in this report.

Museum Response Summaries

Number of in-house exhibit designers	Totals by museum type					
	art	hist	chld	sci	oth	ttl
3 - 5	2	4	1			7
1-2	1		1	4		6
0				1	2	3
9 - 10				1		1
n/a	2	1	3	1		7
Percent of responses by category	21%	21%	21%	29%	8%	24
Size of exhibition department*						
10 - 20		1	1	1		3
6	1					1
8	1					1
21 - 30			1			1
31 - 40				1		1
over 50		1				1
Percent of responses by category	25%	25%	25%	25%	0%	8

* This question was not formally asked of each participant; it is included here only when responses to the original question proved difficult to determine due to the multiplicity of exhibit design staff responsibilities. That is, in many cases individuals perform multiple functions, making it difficult to count "exhibit designers." This contributed to the "n/a" response in some instances.

Table 2
What Is Your Museum's Educational Philosophy?

Museum philosophy or mission	Totals by museum type					
	art	hist	chld	sci	oth	ttl
<i>To educate/answer questions/inform</i>	3	2	3	7	1	16
<i>To enhance curiosity/inspire interest to learn more</i>	1			5		6
<i>To provide greater understanding/exposure/enjoyment</i>	3	1				4
<i>To provide hands-on experience/experiential learning</i>			1	3		4
<i>To provide interactive learning experiences</i>			3			3
<i>To preserve & collect</i>	1		1		1	3
<i>To teach about/interpret history</i>		1		1	1	3
<i>To research</i>		1				1
<i>To test exhibits</i>		1				1
Percent of responses by category	20%	15%	20%	39%	7%	41

Note: No attempt was made to match the spontaneous responses to this question with the museums' published mission statements, since the aim of the question was to discover the interviewee's perception of the museum's goals.

Table 3
How Many Visitors Does Your Museum Have Annually?

Number of visitors per year	Totals by museum type					
	art	hist	chld	sci	oth	ttl
<i>1 - 4 million</i>	1	2		2	1	6
<i>500,000- 1 million</i>			1	1		2
<i>251,000-500,000</i>	1	1				2
<i>101,000-250,000</i>		1		1		2
<i>75,000 - 100,000</i>				1		1
<i>10,000 - 50,000</i>				2	1	3
<i>n/a</i>	3	1	4			8
Percent of responses by category	21%	21%	21%	29%	8%	24

Note: Many of the participants based their response to this question on opinions, not research data. Also, the numbers do not specify how many of the visitors recorded in any one year are repeat visitors.

Table 4
Do You Feel Your Visitors Match Your Target Audience?

	Totals by museum type					ttl
	art	hist	chld	sci	oth	
Do visitors match the target audience						
<i>Yes, would say so for the most part</i>	2	2	5	1	2	12
<i>No/not really</i>	1	2		2		5
<i>Don't know/not sure</i>		1		2		3
<i>n/a</i>	1		1	1		3
<i>Not sure, think so</i>				1		1
Percent of responses by category	20%	20%	24%	28%	8%	24
Additional comments						
<i>Would like to attract more economically disadvant/minorities</i>	2		1	2		5
<i>Would like to attract more people (of all kinds)</i>	1	1		2		4
<i>Have specific outreach programs/activities</i>		1		3		4
<i>The local community is under served</i>		1				1
<i>Doing a visitor study now to look at this</i>			1			1
Percent of responses by category	20%	20%	13%	47%	0%	15

Table 5
How Have the Various Segments of Your Audience Responded to the Interactive Technology-Based Exhibits?

	Totals by museum type					ttl
	art	hist	chld	sci	oth	
Audience reactions to interactives						
<i>All segments seem to respond well</i>	5	3	2	4	2	16
<i>Kids love/take to technology more readily than adults</i>	1	2	1			4
<i>Quite varied -depends on learning style not demographics</i>			1	2		3
<i>Children often teach /encourage adults to use technology</i>		2				2
<i>Adults tend to watch kids interacting</i>			1			1
<i>n/a</i>	1					1
Percent of responses by category	26%	26%	19%	22%	7%	27

Table 6
What Are the Key Success Factors for Interactive Exhibits?

Key success factors for interactive exhibits	Totals by museum type					ttl
	art	hist	chld	sci	oth	
<i>Total engagement through multi-sensory interaction</i>		1	2	3		6
<i>Meaningful/creative interaction that bullds connection</i>	1	3	1	1		6
<i>Physical environment should complement exhibit</i>	1		2	3		6
<i>Frequent Interaction</i>				3	1	4
<i>Appropriate use of the technology/capabilities</i>			1	2	1	4
<i>Multi-dimensional (aesthetic, kinesthetic, educational)</i>	1		3			4
<i>Attractive/exciting front end</i>				2	2	4
<i>Make it look simple (content & interface)</i>	1		2	1		4
<i>Understanding vlsitor needs</i>	1	1	1	1		4
<i>High quality graphics</i>				3		3
<i>Personalization - visitor can have unique affect</i>			1	2		3
<i>Color - bright or merely the use of</i>	1	1		1		3
<i>Designed so small groups can use</i>		1		2		3
<i>Do formative evaluation & testing</i>			1	2		3
<i>Never let user get lost/good navigation clues</i>	1			1	1	3
<i>Having an active role - control</i>	2			1		3
<i>Front end analysis of audience</i>		1		1		2
<i>Immediate feedback</i>				1	1	2
<i>Has to be fun</i>		1		1		2
<i>Variety of interaction types, also changing over time</i>		1	1			2
<i>Show relevance of topic to individual</i>			2			2
<i>Clearly defined objectives</i>		1		1		2
<i>Automatic reset to attract loop</i>	1			1		2
<i>Involve body movement whenever possible</i>		1		1		2
<i>Encourage cooperative learning</i>			1			1
Percent of responses by category	13%	15%	23%	43%	8%	80

Table 7
How Would You Rate the Following Elements in Terms of its Importance to the Success of a Technology-Based Exhibit?

Average rating of factors' importance to success of exhibit.

(1 = very important, 3 = somewhat important, 5 = not at all important)

	Art	Hist	Chld	Sci	Oth	W/avg*
<i>Extent visitor control</i>	1.7	1.9	1.8	1.3	1.5	1.6
<i>Extent topic made relevant</i>	1.5	1.3	1.6	2	3	1.8
<i>Exhibit environment</i>	1.7	2.9	1.6	2.5	2.5	2.3
<i>Range audience attracted</i>	2.7	2	2	2.8	3	2.5
<i>Depth of information</i>	1.7	2.5	2.5	2.8	3.3	2.5
<i>Percent audience attracted</i>	3.3	3.1	1.4	2.8	2.5	2.6
<i>Location in museum</i>	2	3	1.9	3.3	2.5	2.6
Average	2.1	2.4	1.8	2.5	2.6	

* Weighted Average based on 19 responses.

Success Elements: Extent of visitor control - refers to the level of user manipulability of the exhibit; the level of freedom and interaction opportunities. Extent topic made relevant - refers to the extent that the topic of the exhibit is made relevant to the visitor's existence or daily life; presentation of some commonality that would make the exhibit of interest to the visitor. Exhibit environment - refers to the exhibit setting characteristics and how important the areas surrounding the exhibit are to that exhibit's success. Range of audience attracted - refers to the breadth of visitors who interact with the exhibit, a high range being young and old, of various ethnicities, education levels, and so on. Depth of information - refers to the depth of information that is contained in the exhibit; the extent that visitors would have all/most of their questions about the topic answered through the exhibit. Percent of audience attracted - refers to the percent of visitors who interact with the exhibit. Location in museum - refers to the importance of the exhibit's location within the museum setting; whether there are advantages/disadvantages to certain locations (i.e., near the entrance).

Table 8
What Computer Platform Do You Use?

What computer platform do you use	Totals by museum type					
	art	hist	chld	sci	oth	ttl
<i>All Macs</i>	2		3	1		6
<i>Majority of MAC/tend to use/prefer MAC</i>	1	1	1	2		5
<i>Use a mix of platforms (Mac, DEC, DOS, Amiga, etc.)</i>			1	2		3
<i>Have a mix of Mac & DOS</i>				2	1	3
<i>Only DOS/compatibles</i>		1		1		2
<i>DEC</i>		1				1
<i>Don't know</i>	1					1
<i>n/a</i>	1	1				2
Percent of responses by category	21%	21%	21%	29%	8%	24

Table 9
Have You Discovered Anything About the Effectiveness
of User Interfaces?

Effectiveness of user interfaces	Totals by museum type					
	art	hist	chld	sci	oth	totl
<i>Use touch screens</i>	3	3	3	2	2	13
<i>Like/use track balls</i>	1	1	3	4		9
<i>Have used a variety of interfaces</i>				4		4
<i>Interface depends on the objectives of the exhibit</i>			2	1	1	4
<i>Use buttons</i>	1	1	1			3
<i>Use joysticks</i>			1	1		2
<i>Use mice</i>		1		1		2
<i>Use control/"black" box</i>				1		1
<i>Use keypads</i>			1			1
<i>n/a</i>	2	1	1			4
Reasons/Comments						
<i>Buttons are usually meaningless/ineffective</i>			1			1
<i>All interfaces can work well if presented well</i>				1		1
<i>Many people haven't experienced track balls or mice</i>				1		1
<i>Track balls are cheaper & low/no maintenance</i>		1		1		2
<i>Touch screens provide easy/intuitive/clean interaction</i>	2	1	2	3	1	9
<i>Maintenance has been</i>						
<i>can be an issue with touch screens</i>	2		1	1		4
<i>Touch screen works better with kids than adults</i>				2		2
<i>Maintenance has not been an issue with touch screens</i>		1			1	2
<i>Do not like touch screens</i>				1		1
<i>Layers of information are less clear with touch screens</i>		1				1
<i>Touch screens are prone to breaking down</i>				1		1
<i>Touch screens are much more expensive</i>				1		1
<i>Had problems with people stealing mice, so discontinued</i>		1				1
<i>Touch screens are very reliable these days</i>				1		1
Percent of responses by category	15%	17%	23%	38%	7%	71

Table 10
What Technology Have You Implemented Recently in Your Exhibits?

What technology have you implemented recently	Totals by museum type					
	art	hist	chld	sci	oth	ttl
<i>New interactive multimedia (not videodisc)</i>		1	3		1	5
<i>No specific plans in place recently</i>	1	1		1		3
<i>None</i>	2	1			1	4
<i>Videodisc</i>	2		1			3
<i>Touch screens</i>		1		1		2
<i>Bar code technology</i>				1		1
<i>Blue screen/artificial immersion environment</i>			1			1
<i>Atari driving simulator</i>				1		1
<i>Computer used to track visitor results</i>			1			1
<i>Amiga Computer projects</i>				1		1
<i>Digital audio</i>			1			1
<i>A/V programs</i>			1			1
<i>n/a</i>		1	1			2
Percent of responses by category	19%	19%	35%	19%	8%	26
Working on/about to implement						
<i>Videodisc</i>	3		1	3		7
<i>Virtual reality</i>				2		2
<i>Would like to use DVI or CD-I</i>	1			1		2
<i>CD-ROM</i>		1				1
<i>CD-I</i>				1		1
<i>Video for museum orientations</i>				1		1
<i>Digital video editing</i>				1		1
<i>Interactive multimedia</i>			1			1
<i>Networked computers</i>				1		1
<i>Would like to do more videodisc</i>				1		1
Percent of responses by category	22%	6%	11%	61%	0%	18

Table 11
What Authoring/Programming Software Do You Use?

Authoring or programming languages preferred/used	Totals by museum type					ttl
	art	hist	chld	sci	oth	
<i>HyperCard</i>	1	2	3			6
<i>MacroMind Director</i>	2	1	1	1		5
<i>Use quite a few off the shelf programs</i>			1	2		3
<i>Mostly custom programming</i>				2		2
<i>Use HyperCard the most/a lot</i>			1		1	2
<i>SuperCard</i>	1		1			2
<i>QuickTime</i>	1		1			2
<i>Don't know</i>	1		1			2
<i>Use HyperCard & Director the most</i>				1		1
<i>Authorware primarily</i>	1					1
<i>IBM Infowindow</i>				1		1
<i>AlmTech - IconAuthor</i>		1				1
<i>n/a</i>		3	2			5
Percent of responses by category	21%	15%	33%	27%	3%	33

Table 12
Who Created the Interactive Technology-Based Exhibits?

Who created these interactive exhibits	Totals by museum type					ttl
	art	hist	chld	sci	oth	
<i>All/Most done in-house</i>	3	2	4	5		14
<i>Outside contractors (idea & content in-house)</i>		1			2	3
<i>Combination in-house and outside contractors</i>	1	1		1		3
<i>Hope to do in-house</i>				1		1
<i>n/a</i>	1	1	1			3
Percent of responses by category	21%	21%	21%	29%	8%	24

Table 13
What Do You Consider to be the Main Reasons for Incorporating Interactive Technology in Exhibits?

Main reasons for incorporating interactive exhibits	Totals by museum type					ttl
	art	hist	chld	sci	oth	
<i>They are engaging/fun/have high attracting power</i>		3	1	3	1	8
<i>Topic/complexity requires capabilities of computers</i>	2	1	3		1	7
<i>Learn more by engaging in activities (helps interpret)</i>		2	1	2		5
<i>Multimedia can satisfy/appeal to several different learning styles</i>	1	1		3		5
<i>Provides self-paced discovery learning</i>			1	3		4
<i>To supplement traditional exhibits/ provide more information</i>	1	1	1	1		4
<i>Technology provides most flexible/ adaptable learning solution</i>	1		1	1		3
<i>It increases time spent, therefore, learning that occurs</i>		2				2
<i>Interactivity(with & w/o tech.)adds power to communication</i>		1			1	2
<i>n/a</i>				2		2
Percent of responses by category	12%	26%	19%	36%	7%	42

Table 14a
What is the History of Interactivity in Your Museum?

What is the history of interactivity in this museum	Totals by museum type					ttl
	art	hist	chld	sci	oth	
<i>Have always had computer interactives</i>		1		5	1	7
<i>Now have both computer & mechanical interactives</i>		1	3	2	1	7
<i>Don't have any/much of a history of interactivity</i>	3	2				5
<i>Have (almost) always had mechanical/physical interactives</i>		2	2			4
<i>Fairly recent</i>	2				1	3
<i>Have no computer interactives at this time</i>			1	1		2
<i>n/a</i>		1				1
Percent of responses by category	17%	24%	21%	28%	10%	29

Table 14b
Why Was Interactive Technology Incorporated Into Your Exhibits?

Why was interactive technology implemented?	Totals by museum type					
	art	hist	chld	sci	oth	ttl
<i>Have always had an interactive focus</i>			3	6		9
<i>Idea/champion(s) in museum wanted to use technology</i>	2	2		2	1	7
<i>Technology was the logical solution to exhibit problem</i>	1	2	1			4
<i>Received grant/funding/donation to do a technology exhibit</i>		1				3
<i>Technology appeals to the audience</i>		1			1	2
<i>Visitors wanted more information</i>		1			1	2
<i>n/a</i>	1	1	1	1		4
Percent of responses by category	19%	26%	16%	29%	10%	31

Table 15
How Many Exhibits Would You Describe as Educationally "Game-Like?"

How many are (educationally) game-like?	Totals by museum type					
	art	hist	chld	sci	oth	ttl
<i>Just a few (commonly 1-2)</i>	1	1	1	2	1	6
<i>Majority</i>			1	2	1	4
<i>Less than one third</i>			1	2		3
Total reporting at least some as game like						13
<i>Discovery/exploratory learning</i>	1	3	1	5	1	11
<i>Activities/problem solving</i>	1		2	6	1	10
<i>Simulations (includes recorded interviews)</i>	1	2	2	3		8
<i>Narratives/storybooks</i>	2	2				4
<i>Play acting/jimmersions</i>		2				2
<i>Instructional "how to"</i>			1		1	2
<i>Video games (non-educational)</i>					1	1
<i>n/a</i>	2					2
Percent of responses by category	15%	19%	17%	38%	11%	53

Table 16
Do You Have Any Multi-User Exhibits?

Any multi-user exhibits	Totals by museum type					ttl
	art	hist	chld	sci	oth	
<i>Yes, tech. &/or mechanical (e.g., group activities; Mandala)</i>		3	4	1	1	9
<i>Not tech-based but some become multi-user as others watch</i>	3	2	1			6
<i>Yes, computer networked multi-user</i>				4		4
<i>Yes, mechanical multi-user exhibits/group activities</i>	2				1	3
<i>Are considering technology-based multi-user exhibits</i>					1	1
<i>Plan to create more multi-user exhibits in future</i>				1		1
<i>n/a</i>	1			1		2
Percent of responses by category	23%	19%	19%	27%	12%	26

Table 17
**Do Visitors Spend More Time With the Interactive
Technology-Based Exhibits?**

Spend more time with interactives? How long?	Totals by museum type					ttl
	art	hist	chld	sci	oth	
<i>Very hard to track or conclude anything from time spent</i>	1	4	3	1	1	10
<i>Yes/think so</i>		2		3	1	6
<i>Don't know</i>	3			1		4
<i>Up to 1-3 hours</i>		1		1		2
<i>From 20 seconds to 1 hour</i>			2			2
<i>3-5 minutes is good goal</i>			1	1		2
<i>From 30 seconds to 15 minutes usually</i>				1		1
<i>Average of five minutes</i>				1		1
<i>n/a</i>	2		2	1		5
Percent of responses by category	18%	21%	24%	30%	6%	33

Table 18
Do You Think Visitors Retain More Information from the Interactive Technology-Based Exhibits?

Do visitors retain more information from interactives?	Totals by museum type					ttl
	art	hist	chld	sci	oth	
<i>No evidence/hard to say</i>	1	2	2	2	1	8
<i>No hard evidence, but believe so</i>	1	2		3		6
<i>Believe it enhances the curiosity to learn</i>	1	1	2			4
<i>Yes, know of research (external) that supports this</i>		1		1		2
<i>Believe it depends on the learning style, not presentation</i>			1			1
<i>Doing evaluations now</i>		1				1
<i>n/a</i>	2			2	1	5
Percent of responses by category	19%	26%	19%	30%	7%	27

Table 19a
What Are the Main Limiting Factors Against Incorporating Technology in Exhibits?

Limiting factors against using technology	Totals by museum type					ttl
	art	hist	chld	sci	oth	
<i>Money</i>	4	2	1	3		10
<i>Many museums lack internal design expertise/experience</i>	2	1	3	3		9
<i>Cost of development</i>			2	1	2	5
<i>Unfamiliarity w/technology or its capabilities</i>	2		2			4
<i>Maintenance is a problem for many</i>	1		1	1	1	4
<i>None for us</i>		1				1
<i>Security</i>					1	1
<i>Cost of hardware</i>				1		1
<i>Time to design and develop</i>				1		1
<i>For many, it's seeing bad design/use of technology</i>		1				1
<i>n/a</i>	1	1	1			3
Percent of responses by category	25%	15%	25%	25%	10%	40

Note: While respondents were asked to rate limiting factors for their museum, some also included factors that they felt were true for all museums.

Table 19b
How Would You Rate the Following Potentially Limiting Factors
Against Using Technology?

Average rating of factors limiting use of technology in exhibits

(1 = very limiting, 3 = somewhat limiting, 5 = not at all limiting)

	Art	Hist	Chld	Sci	Oth	W/Avg*
<i>Funding</i>	2.8	2.9	2	3	1	2.6
<i>Time to develop</i>	2.3	3.5	2	4.3	2	3.0
<i>Quality of products</i>	3.7	2.7	2.5	4	3	3.3
<i>Cost of hardware</i>	2.7	3.5	3	3.7	4	3.3
<i>Lack of Internal Expertise</i>	2.3	3.5	2.8	4	5	3.3
<i>Availability of products</i>	3.3	3.8	3.2	4	3	3.5
<i>Copyright issues</i>	2.8	3.8	4.2	5	2	3.8
<i>Hesitancy by Management</i>	4.3	4.5	4	4.3	4	4.3
<i>Space</i>	3	4.8	4.7	5	5	4.4
<i>Demand by audience</i>	5	4.3	4	5	5	4.6
Type Average	3.2	3.7	3.2	4.2	3.4	

* Weighted Averages are based on 14 participants, except for Quality of products (12); Copyright (13); Demand (12).

Note: Unlike the responses to the previous question, respondents were generally rating these factors based on their own museum experiences, and not for the museum community overall.

Categories: Funding - same as availability of money to fund interactive technology exhibit development. Time - questions whether the time it takes to design and produce an interactive system is a limiting factor against using technology. Quality of products available - refers to software and hardware used to create interactive multimedia exhibits, and whether they are adequate and reliable tools for design and development. Cost of hardware - self explanatory. Availability of internal technical expertise - questions whether internal staff do not have the technical or interactive multimedia experience to carry out an interactive multimedia exhibit design in-house. Availability of products - refers to software and hardware available to create interactive multimedia exhibits, and whether they are adequate tools. Legal issues with copyright - questions whether copyright problems have interfered with development of interactive exhibits. Hesitancy by management - asks whether curators or other decision makers have interfered with the introduction of technology. Space - questions whether lack of floor space is ever a problem in integrating a new technology-based exhibit. Demand by the audience - this was phrased so as to determine whether demand by visitors played a positive, negative or neutral role in introducing technology.

Table 20
How Would You Describe the Level of Success of Your First Interactive Technology-Based Exhibits?

Describe the level of success of the first Interactives	Totals by museum type					
	art	hist	chld	sci	oth	ttl
<i>Very successful</i>	4	4	1	5		14
<i>Extremely successful</i>		1			1	2
<i>Successful</i>			1		1	2
<i>Somewhat successful</i>				2		2
<i>Not sure of 1st ones, but as whole would describe as very n/a</i>	1	1	2			4
Percent of responses by category	20%	24%	20%	28%	8%	25
Why given that rating						
<i>Visitors love/enjoy interactives/interactives were popular</i>	1	5	3	5		14
<i>Comments from visitors/educators</i>	4	2			1	7
<i>Were the reasons for repeat visits to the museum</i>		1			1	2
<i>Earlier exhibits needed some modification/improvement</i>				1	1	2
<i>Visitors returning to same exhibit</i>			1			1
<i>Visitors examining artifact on which interactive was based</i>	1					1
<i>Earlier interactives had too much meaningless interaction</i>				1		1
Percent of responses by category	21%	29%	14%	25%	11%	28

Note: As only a few museums have ever done formal evaluations of exhibits, the majority based their response to this question on informal observations and visitor comments. All of them felt quite confident in doing so.

Table 21
What Are Your Current/Future Plans for Incorporating Interactive Technology in Your Exhibits?

Current/future plans for technology	Totals by museum type					
	art	hist	chld	sci	oth	ttl
<i>Plan more interaction w & w/o technology</i>		3	2	3	1	9
<i>Have specific plans to incorporate interactive technology</i>	2	2	2	3		9
<i>Plan to market/give our systems to schools, museums, etc</i>	3				1	4
<i>Plan to enhance existing exhibits w/technology</i>		2		1	1	4
<i>Will incorporate more interactive technology, no plans yet</i>	1			1	1	3
<i>Have plans for a mechanical interactive</i>		1	1	1		3
<i>Plan to use technology in new creative ways</i>			1			1
<i>No plans, it's too expensive</i>	1					1
Percent of responses by category	21%	24%	18%	26%	12%	34

Table 22a
What Do You See As the Future Role of Interactive Technology in Museums?

Future role of interactive technologies	Totals by museum type					
	art	hist	chld	sci	oth	ttl
<i>Think &/or hope it will expand dramatically</i>	3	3	2	6	2	16
<i>Think will expand along w/other interactive techniques</i>		1	3	1		5
<i>Even art & history will use technology more & more</i>	1			1	1	3
<i>As museum expertise improves, usage will grow</i>	1		1			2
<i>Will see more bad solutions until museums build expertise</i>		1				1
<i>Will grow slowly as price decreases & technology improves</i>	1					1
<i>n/a</i>		2	1			3
Percent of responses by category	19%	23%	23%	26%	10%	31

Table 22b
What Effect Do You Think the Long-Term Use of Interactive Technology Will Have On Traditional Exhibits?

Long term technology affect on traditional exhibits	Totals by museum type					
	art	hist	chld	sci	oth	ttl
<i>Will complement/enhance traditional-artifact exhibits</i>	2	2	1	2	1	8
<i>Both will always have an audience (exist separately)</i>	1		1	2	1	5
<i>Difficult question to answer</i>	1	2				3
<i>Think technology has had a negative effect</i>				1		1
<i>VR could change way museums operate, but not artifacts</i>			1			1
<i>n/a</i>	1	1	2	2		6
Percent of responses by category	21%	21%	21%	29%	8%	24

Table 23
Do You See Any Trends Toward Future Exhibit Designs?

Trends/expectations for future exhibit design	Totals by museum type					
	art	hist	chld	sci	oth	ttl
<i>VR, especially as technology improves, could become big</i>	1		1	3		5
<i>Participation/Immersion will increase</i>		1		2		3
<i>Group/multi-user activities and exhibits will increase</i>				2	1	3
<i>No trends, just expect new developments</i>		2				2
<i>More meaningful interaction</i>			1		1	2
<i>More multimedia as price drops & tools more reliable/easy</i>		1			1	2
<i>Networking exhibits and museums</i>	1					1
<i>Don't know</i>	1	1		1		3
<i>n/a</i>	3		2	1		6
Percent of responses by category	22%	19%	15%	33%	11%	27

Table 24
What Research Questions Regarding Interactive Technologies in Museums Would You Like Answered?

What research question would you like answered	Totals by museum type					
	art	hist	chld	sci	oth	ttl
<i>Whether technology really enhances learning</i>		1		2		3
<i>An interactive technology design rule book</i>	1		1	1		3
<i>How to use computers in new, more creative ways</i>		1		1		2
<i>A list of reputable exhibit designers</i>			1		1	2
<i>Visitor studies info (e.g., reactions to technologies)</i>	1	1				2
<i>How to integrate the different media into exhibits</i>				1		1
<i>When to use the different technologies (media selection)</i>			1			1
<i>How many institutions use technology</i>					1	1
<i>What interactive devices are other museums using</i>		1				1
<i>How other museums use interactivity & is it a success</i>		1				1
<i>What form will HDTV come in</i>	1					1
<i>Information about interface evaluations</i>				1		1
<i>What's the cost effectiveness of in-house vs. contract design</i>				1		1
<i>Do you need quizzes for it to be educationally successful</i>		1				1
<i>Information on successful mechanical interactives</i>					1	1
<i>How much feedback is appropriate for this environment</i>					1	1
<i>How to structure hypertext experiences</i>					1	1
<i>Can't think of any questions</i>	1			2		3
<i>n/a</i>	1	1	2	1		5
Percent of responses by category	16%	22%	16%	31%	16%	32

Associations and Experts Responses

The following response summaries are presented in the order in which they were asked in the interview, and therefore, do not necessarily reflect the order in which they were discussed in the body of this report. In addition, some of the questions asked in the interviews are not tabulated here. Reasons for this vary, but mostly have to do with the importance of the question to the study discussions.

What Do You See As the Key Trends in Exhibit Design?

Key trends in exhibit design	Ttl count
<i>Increased interactivity, not necessarily through technology</i>	4
<i>More collaboration on projects (e.G., Mec, ivsc)</i>	2
<i>Decreasing curatorial authority & more concern for institutional goals</i>	1
<i>Don't know if there are any trends, see so many different solutions</i>	1
<i>Higher level of information/content, & transference to education markets</i>	1
<i>Increased attention to the context of the information/artifact</i>	1
<i>Increased attention to public needs (physical accessibility, ergonomics, etc)</i>	1
<i>Less wall text</i>	1
<i>Looking at all types of interactive technologies (e.g., CD-I, DVI, Videodisc, etc.)</i>	1
<i>More attempts to attract underserved groups</i>	1
<i>More frequent exhibit changes</i>	1
<i>More use of audiovisuals</i>	1
<i>Much more FEA & testing of prototypes being done</i>	1
<i>Much more use of computer simulations</i>	1
<i>Much more use of videodisc</i>	1
<i>Much more visitor-focused</i>	1
<i>Support from industry in exchange for showcases of company technology</i>	1
<i>Technology is slowly becoming an exhibition/interpretation option for all museums</i>	1
<i>Use of educational satellite uplinks</i>	1
<i>Use of multimedia technology will increase as museums become better designers</i>	1

What Do Consider to be the Key Success Factors for Interactive Exhibits?

Key success factors in interactive exhibit design	Ttl count
<i>Ease of use/simple interface</i>	4
<i>Interesting/appealing content</i>	4
<i>Attention to environmental ("creating a "space") and ergonomic issues</i>	3
<i>Be able to attract immediately (within a "window of seconds")</i>	2
<i>Many workstations containing short chunks of information (vs. one with tons of info)</i>	2
<i>Always give the visitor an "out" of the program</i>	1
<i>Clear objectives</i>	1
<i>Engaging & attractive design</i>	1
<i>Frequent interaction opportunities</i>	1
<i>Intelligent signage</i>	1
<i>Limited didacticism</i>	1
<i>Offer meaningful interaction within a very short time of starting</i>	1
<i>Personally relevant content</i>	1
<i>Quick information delivery</i>	1

What Do You Think Are the Most Common Factors Limiting the Use of Technology in Exhibits?

Factors limiting the use of interactive technologies in museums	Ttl count
<i>Lack of interactive design experience/expertise</i>	4
<i>Fear of technological obsolescence/rapid technical change</i>	2
<i>Cost to design & develop</i>	2
<i>Clunky look of technology</i>	1
<i>Concern over image quality</i>	1
<i>Copyright issues for art museums</i>	1
<i>Cost of the technology (hardware)</i>	1
<i>Generalization from seeing bad examples of interactive exhibits</i>	1
<i>Lack of good ideas for interactive applications</i>	1
<i>Museum tendency to do everything by committee</i>	1
<i>The fact that technology distances the user & museums are about real things</i>	1
<i>Traffic through-put limitations with single user systems</i>	1

**What Research Questions Regarding the Use of Interactive Technology
in Exhibits Do You Think Most Museums Would Like Answered?**

Questions on the mind of museums	Ttl count
<i>What technologies are available and how to use them</i>	3
<i>How much does it cost</i>	2
<i>Cost/benefit data; what do you get educationally for the cost of technology</i>	1
<i>How can you finance interactive exhibits</i>	1
<i>How educationally successful are interactive technologies and why</i>	1
<i>How to begin</i>	1
<i>How to choose the best technology for the learning outcome desired</i>	1
<i>How to tell when interactive multimedia is appropriate/necessary</i>	1
<i>Recommendations for which independent interactive exhibit designers to use</i>	1

Independent Exhibit Designers Responses

The following response summaries are presented in the order in which they were asked in the interview, and therefore, do not necessarily reflect the order in which they were discussed in the body of this report. In addition, some of the questions asked in the interviews are not tabulated here. Reasons for this vary, but mostly have to do with the importance of the question to the study discussions.

What Percentage of Your Work is For Museums?	
% Museum Work	Ttl count
<i>100% science & history museums</i>	1
<i>80-100% museums, zoos, aquar., fairs</i>	2
<i>50-60% aquariums</i>	1
<i>30-60% specifically museums</i>	2
<i>Mostly indirect to museums</i>	1
Total	7

What Year Was Your Company Started?	
Year Started	ttl count
<i>1970-1975</i>	1
<i>1976-1980</i>	1
<i>1981-1985</i>	3
<i>1986-1990</i>	1
Total	6

Does Your Company Design Mecahnical & Electronic Interactives? What's the Approximate Breakdown of Exhibits by Type?	
Designed interactives w/o electronics?	ttl count
<i>Yes, do mechanical & electronic</i>	3
<i>No, only computer-based/electronic</i>	3
Total	6
Approx. breakdown by category	ttl count
<i>90-100% interactive using a computer</i>	2
<i>90% w/computer; 10% other electronic</i>	1
<i>80-90% interactive videodisc</i>	1
<i>30-50% interactive using computers</i>	1
<i>Difficult to say very wide multimedia variety</i>	2
Total	7

What Hardware/Software Do You Prefer to Use in Exhibits?

Hardware platforms used	Ttl count
<i>Primarily DOS/PC clones</i>	3
<i>Primarily Mac</i>	2
<i>65% Mac/45% DOS</i>	1
Total	6
Software/authoring languages used	ttl count
<i>Mostly own programming</i>	3
<i>Color & BW HyperCard</i>	1
<i>Director</i>	1
<i>FilmMaker</i>	1
<i>QuickTime</i>	1
<i>Subcontract out programming</i>	1
<i>SuperCard</i>	1
<i>Toolbook</i>	1
<i>Would like to start using Director & HC</i>	1
Total	11

Do You Track the Success of Your Exhibits (i.e., do you conduct summative evaluations)?

Track success of your exhibits?	ttl count
<i>Feedback through informal communication w/museum</i>	2
<i>Not much formal evaluation done, repeat biz is sign</i>	2
<i>More museums doing visitor studies & evaluations</i>	2
<i>Museums occasionally provide evaluations/studies</i>	1
<i>Intentionally follow up informally</i>	1
<i>Yes, get usage & maintenance reports from museum</i>	1
<i>Museums almost always hire evaluation consultants</i>	1
Total	10

What Do You Consider to be the Most Important Elements of Successful Exhibit Design?

Important elements of successful interactive design	tfl count
<i>Clearly defined goals/objectives</i>	3
<i>Present information quickly & in small chunks</i>	3
<i>Aesthetic/appealing design</i>	3
<i>Frequent Interaction</i>	3
<i>Ease of use/simple navigation</i>	2
<i>Narrative structure</i>	2
<i>Understanding target audience</i>	2
<i>Discovery-learning based approach</i>	2
<i>Solid instructional design</i>	2
<i>Use of multiple senses</i>	2
<i>Always do evaluations</i>	2
<i>Complete engagement of user</i>	1
<i>Variety across exhibits</i>	1
<i>Fosters social interaction & communication</i>	1
<i>Incorporating a map so users don't get lost</i>	1
<i>Consistent interface & method of interaction</i>	1
<i>Reliable technology</i>	1
<i>Awareness of time limitation with audience</i>	1
<i>Simple advanced organizers</i>	1
Total	34

Do You See Any Trends in Exhibit Design?

Trends in interactive exhibit design	Tfl count
<i>Increasing use of networked exhibits & museums (wider access)</i>	2
<i>More affordable/easy/quality tech.; museums designing in-house</i>	2
<i>Increasing complexity due to use of hypertext systems</i>	1
<i>Data analysis/feedback to visitors in form of printouts</i>	1
<i>Greater use of animation</i>	1
<i>Greater focus on technology as educational tool vs. gee wiz item</i>	1
<i>Greater awareness of technology in general</i>	1
<i>Pooling of resources (consortiums such as MEC, IVSC)</i>	1
<i>Not a trend, but still see lots of bad design</i>	1
Total	11

What Specific Technologies Have You Used in Your Interactive Exhibits? One to Four Times? Five or More Times?			
Specific technologies/hardware used	times used	1 to 4	Over 5
<i>Interactive videodisc</i>		1	5
<i>Linear video</i>		1	4
<i>CD-ROM</i>		0	2
<i>DVI</i>		1	0
<i>CD-I</i>		0	0
<i>CDTV</i>		0	0
<i>Touchscreen</i>		0	5
<i>Joystick</i>		1	1
<i>Mouse</i>		1	1
<i>Trackball</i>		1	1
<i>Voice controlled interface</i>		0	0
<i>Artificial reality</i>			
<i>Other interfaces: buttons, proximity detectors, levers, tec.</i>		0	2

What Are the Most Common Limiting Factors Against Using Technology in Exhibits?	
Most common limiting factors against using technology	Ttl count
<i>Cost of design/money/lack of funding</i>	6
<i>Uncertainty about the need for technology</i>	3
<i>Problem of museum design by committee</i>	2
<i>Time it takes to develop</i>	1
<i>Idiosyncrasies of museum curators</i>	1
<i>Generalization of bad design to all interactive technologies</i>	1
<i>Lack of design/technical expertise &/or experience</i>	1
<i>Varying levels of reliability of the technology</i>	1
<i>Limited traffic flow-through issues</i>	1
Total	17

What is Your Forecast For the Field of Independent Exhibit Designers?

Forecast for the field of independent exhibit designers	Ttl count
<i>Look to related fields: leisure, education, public info, merchandising, etc.</i>	3
<i>Will become a job category/production industry</i>	2
<i>Designers will have plenty of work as multimedia consultants</i>	1
<i>Will become increasingly competitive & will need market niches</i>	1
<i>Will need a broad range of(or access to) skills to remain successful</i>	1
<i>Have lots of overseas opportunities</i>	1
<i>Demand will increase as society/museums use more technology</i>	1
<i>New technologies will provide the field new opportunities</i>	1
Total	11

Are There Any Questions That You Would Like Answered Regarding the Use of Interactive Technology in Museums?

Questions about technology in museums	Ttl count
<i>More & more detailed information on exhibits being implemented</i>	1
<i>More formalized academic testing of multimedia paradigms</i>	1
<i>What technologies are coming down the pike</i>	1
<i>What are the most important services that museums are looking for</i>	1
<i>How much maintenance is required for the technology exhibits</i>	1
Total	5