Pixels and Pigment:
Designing Museum Web Sites That Support Art Education

by

Robert L. Marchessault

A thesis submitted in conformity with the requirements
for the degree of Master of Arts
Graduate Department of Education
University of Toronto

© Copyright by Robert L. Marchessault 1997
The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.

L’auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.

The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author’s permission.

L’auteur conserve la propriété du droit d’auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

0-612-29163-4
Abstract

Museum Web sites are undergoing a period of rapid and ambitious expansion coupled with experiments in design. In the last several years a new body of literature and theory has been published bearing insight on many Web site design issues. This thesis asks whether a group of recommendations may be proposed, based upon the literature, and an analysis of several current museum Web sites, which can help to inform decisions faced by museum Web site designers. The result of this research proposes practical recommendations which focus on assisting in the design of Web sites that support the needs of art education. Discipline-Based Art Education (DBAE) is used in this thesis as the model through which learning in the arts is considered.

Robert Marchessault

*Pixels and Pigment: Designing Museum Web Sites That Support Art Education*

Dept. of Curriculum, Teaching and Learning

University of Toronto

Master of Arts

1997
Acknowledgments

I wish to thank Suzanne Stiegelbauer, who’s graduate course *The Visual Arts as a Thinking and Learning Strategy* set forth a background of ideas that helped me to focus this thesis. Her ability to look beyond the narrow issues and see larger pictures from multiple perspectives brought to my attention many valuable insights. Lynn Davie, as a second reader, encouraged me to “use my own authority” and helped me to recognize the value of my personal experiences and artistic skills. His graduate courses about computer mediated communications and distance learning were of great importance to me. Max Anderson, director of the Art Gallery of Ontario, and Brian Boigon also at the AGO, were generous with their time and provided timely advice and useful insights.

Without the love, help, and support of my wife Teresa Cullen, who deserves more thanks than can be imagined,

I would never have dared to follow new paths.
Preface

**Bitslag:** The useless dross one has to cul1 through on the Internet to get to a useful “ore” of information. (*Wired*, December 1995, p.60)

As an artist and instructional designer interested in art education, the years since 1993, when the World Wide Web became available to me, have been full of expectation, excitement and disappointment. Within a month of learning HTML 1.0 I began the construction of an online gallery showing images of my own paintings. It was a labor of love, and a voyage of discovery. After several versions of the gallery were posted to the Web, I began to realize that I had more questions than answers when it came to issues of page and site design. Over the next years I watched as museums and galleries went online, I was looking for the best ways to honor artists and their work and at the same time to engage those who were interested in a dialogue about art.

From a trickle at the beginning, the wealth of art-related information on the Internet has become such a huge resource that trying to use it is as Diane Zorich (1997) says, like “trying to drink water from a firehose” (p.171). She explains that even with the new tools available to help us navigate the Web’s operational paradigm, the main problem will remain because it is sociological not technological. We are drowning in an ocean of information without context, and information delivered in this manner is very difficult to assimilate. With my concerns for learning about art I realized that this state of affairs was likely to produce vast data yields, but not much knowledge. I began to think carefully about how designers might use their skills to overcome this.

This thesis is part of my exploration. The results of which, I hope, will be of use not just to me, but to others who will take part in developing Web sites that enhance art education. I have studied what museum Web site designers are experimenting with right now, and I have researched the literature on design issues related to museums as they move from atoms to bits on the Internet. In the following chapters I try to create a context for my observations and place my understandings in it. I do this by asking whether it is possible to corral much of the existing
information about many aspects of this subject and to prepare a series of recommendations that museum Web site designers might apply to their particular endeavors.

I suggest that it will be the creativity and skills of museum Web site designers that will be required to help solve the main issue facing online museums today. The problem now is that these museums continue to follow a standalone model. This is not the best way to exist, and it is not an efficient way to help learners understand art. The reason is that learning about art requires a great deal of focused attention. If a student is to use the Internet as part of their learning environment they will find that information “consumes the attention of its recipient. Hence a wealth of information creates a poverty of attention, and a need to allocate that attention efficiently among an overabundance of information sources that might consume it” (Herbert Simon, In Varian, 1995, p. 200). Certainly, “browsing” or “surfing” the Internet are not particularly good ways of learning in an “information-rich but organizationally poor environment” (Zorich, 1997, p. 175).

Currently the majority of online museums tend to catalogue their information much like their paper publications. Many of them present visitors with online “tours” through a set of particular artworks from their collection. But for a learner who needs to know more about a specific artist, artwork, stylistic period, culture, etc. the problem of how to access this information in order to experience it so that knowledge emerges is a problem.

The answer is clear, over the next years the time consuming, redundant, and distracting practice of using search engines to find “hits” and then investigating them one at a time, will have to give way. The new paradigm will be to go from linked to integrated resources. Zorich explains that what is needed is an Internet application that can harvest information from many locations and present that information as integrated online resources. Today, museum Web site designers struggle to build sites that provide visually rich experiences for visitors. The issues are about clarity and the way a visitor flows through the site’s content. Much of this thesis deals with these design concerns. But soon designers will have to consider how to present information to learners who will not see museums as individual “places on the Web” but may perceive the Web itself as
the place from which integrated information emerges. Designers will have to cooperate with their colleagues at other museums on conceptual issues surrounding the "package design" for information from their particular institution so that it makes sense when "chunked together" by an application that will present it to a learner.

Today, we must still rummage through the bitslag. I hope this thesis will provide some suggestions for interim solutions to help address a rapidly moving design target.

Bob Marchessault, May 15, 1997
Table Of Contents

Title Page i
Abstract ii
Acknowledgments iii
Preface iv
Table of Figures ix

Chapter 1
Setting The Context: Museums, The Web, and Art Education 2
Why museum Web sites are important. 2
A brief look at the purpose of museums. 3
Museums support art education via the Internet. 7
Museums create virtual aspects of themselves. 10
Education in the arts. 12
Art education and technology 14
The arts require complex symbol creation and usage, like language or mathematics. 18
Discipline-Based Art Education as a valid model for instruction and learning in art. 18
The four DBAE disciplines offers clues to help design museum web sites that support art education. 19
DBAE is not based on a strategy of specific learning outcomes. 21
DBAE leans towards a specific alternative curriculum structure. 22
DBAE requires resource support. 23
Some problems when using this context. 24
Methodology 24

Chapter 2
Design Issues and Recommendations for Museum Web Sites
Supporting Art Education. 27
Databases are the virtual treasure houses, build connectivity. 27
Make information user-friendly. 27
Organize a solid development process. 28
Follow rules of good web design. 33
Encourage dialogue and watch out for the “Unassailable Voice”. 35
Create an educators’ guide. 37
Assist K-12 art educators with recommended lesson plans and materials. 38
Consider ways of supporting college-level learning. 39
Create links to other web sites that support art education. 40
Consider developing guided discovery environments which actively engage the learner. 41
Question the levels of user control. 42
Consider gender, ethnicity, and cultural assumptions when evaluating subcontracted design work. Plan carefully before beginning any design work. Think about colour and colour display issues. Consider how to implement multimedia elements. Page layout must be clear and logical. Technology will rapidly change the way Web sites are designed. Develop a team approach to design and development. Consider a strategy to define site traffic statistics. Consider how you label artworks. Avoid shovelware. Create a search tool. Consider whether visitors will experience the Web site alone or in groups. People learn by doing. Seek advise from art or museum educators. Break boundaries. Content is king. Ensure that management works to support the design effort. Being object-centric does not necessarily support learning needs. Permit users to play with process and authorship.

Chapter 3

Analysis and Critique of Three Museum Web Sites


Chapter 4

Conclusions

Discussion. Suggestions for Further Research. Conclusion.

Bibliography: 143
Glossary: 153
### Table of Figures

The URLs of all figures were checked and found to be active and displaying as illustrated on May 12, 1997. Please note that the Web changes constantly, these URLs may not longer be active shortly after this thesis is printed. These figures may be the only way to view the illustrated museum Web pages described in the text.

<table>
<thead>
<tr>
<th>Figures:</th>
<th>Page:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fig. 1: <a href="http://www.ago.on.ca/">http://www.ago.on.ca/</a></td>
<td>64</td>
</tr>
<tr>
<td>Fig. 2: <a href="http://www.ago.on.ca/Default/">http://www.ago.on.ca/Default/</a></td>
<td>65</td>
</tr>
<tr>
<td>Fig. 3: <a href="http://www.ago.net/AGOhtml/help3.htm">http://www.ago.net/AGOhtml/help3.htm</a></td>
<td>67</td>
</tr>
<tr>
<td>Fig. 4: <a href="http://www.ago.net/AGOhtml/help3.htm">http://www.ago.net/AGOhtml/help3.htm</a></td>
<td>68</td>
</tr>
<tr>
<td>Fig. 5: <a href="http://www.ago.net/AGOhtml/help3.htm">http://www.ago.net/AGOhtml/help3.htm</a></td>
<td>70</td>
</tr>
<tr>
<td>Fig. 6: <a href="http://www.ago.net/AGOhtml/AGOhome5.htm">http://www.ago.net/AGOhtml/AGOhome5.htm</a></td>
<td>73</td>
</tr>
<tr>
<td>Fig. 7: <a href="http://www.ago.net/AGOhtml/AGOhome5.htm">http://www.ago.net/AGOhtml/AGOhome5.htm</a></td>
<td>74</td>
</tr>
<tr>
<td>Fig. 8: <a href="http://www.ago.net/AGOhtml/AGOhome5.htm">http://www.ago.net/AGOhtml/AGOhome5.htm</a></td>
<td>76</td>
</tr>
<tr>
<td>Fig. 9: <a href="http://www.ago.net/AGOhtml/AGOhome5.htm">http://www.ago.net/AGOhtml/AGOhome5.htm</a></td>
<td>78</td>
</tr>
<tr>
<td>Fig. 10: <a href="http://www.ago.net/AGOhtml/AGOhome5.htm">http://www.ago.net/AGOhtml/AGOhome5.htm</a></td>
<td>79</td>
</tr>
<tr>
<td>Fig. 11: <a href="http://www.ago.net/AGOhtml/AGOhome5.htm">http://www.ago.net/AGOhtml/AGOhome5.htm</a></td>
<td>82</td>
</tr>
<tr>
<td>Fig. 12: <a href="http://www.ago.net/AGOhtml/AGOhome5.htm">http://www.ago.net/AGOhtml/AGOhome5.htm</a></td>
<td>83</td>
</tr>
<tr>
<td>Fig. 13: <a href="http://www.amn.org/Default/AMNDefault1.htm">http://www.amn.org/Default/AMNDefault1.htm</a></td>
<td>86</td>
</tr>
<tr>
<td>Fig. 14: <a href="http://www.amn.org/Default/AMNDefault1.htm">http://www.amn.org/Default/AMNDefault1.htm</a></td>
<td>88</td>
</tr>
<tr>
<td>Fig. 15: <a href="http://www.amn.org/Default/AMNDefault1.htm">http://www.amn.org/Default/AMNDefault1.htm</a></td>
<td>89</td>
</tr>
<tr>
<td>Fig. 16: <a href="http://www.diacenter.org">http://www.diacenter.org</a></td>
<td>91</td>
</tr>
<tr>
<td>Fig. 17: <a href="http://www.diacenter.org/exhibs/exhibs.html">http://www.diacenter.org/exhibs/exhibs.html</a></td>
<td>93</td>
</tr>
<tr>
<td>Fig. 18: <a href="http://www.diacenter.org/lproj/lprojec.html">http://www.diacenter.org/lproj/lprojec.html</a></td>
<td>95</td>
</tr>
<tr>
<td>Fig. 19: <a href="http://www.diacenter.org/Architext/search.html">http://www.diacenter.org/Architext/search.html</a></td>
<td>96</td>
</tr>
<tr>
<td>Fig. 20: <a href="http://www.diacenter.org/lproj/warholmu/warholmu.html">http://www.diacenter.org/lproj/warholmu/warholmu.html</a></td>
<td>98</td>
</tr>
<tr>
<td>Fig. 21: <a href="http://www.diacenter.org/permcoll/warhol/warhol.html">http://www.diacenter.org/permcoll/warhol/warhol.html</a></td>
<td>100</td>
</tr>
<tr>
<td>Fig. 22: <a href="http://www.diacenter.org/exhibs/warholls/warholls.html">http://www.diacenter.org/exhibs/warholls/warholls.html</a></td>
<td>101</td>
</tr>
<tr>
<td>Fig. 23: <a href="http://www.clemusart.com/">http://www.clemusart.com/</a></td>
<td>103</td>
</tr>
<tr>
<td>Fig. 24: <a href="http://www.clemusart.com/educa7n/index.html">http://www.clemusart.com/educa7n/index.html</a></td>
<td>104</td>
</tr>
<tr>
<td>Fig. 25: <a href="http://www.clemusart.com/exhibit/faberge/kids/index.html">http://www.clemusart.com/exhibit/faberge/kids/index.html</a></td>
<td>105</td>
</tr>
<tr>
<td>Fig. 26: <a href="http://www.clemusart.com/exhibit/faberge/kids/index.html">http://www.clemusart.com/exhibit/faberge/kids/index.html</a></td>
<td>107</td>
</tr>
<tr>
<td>Fig. 27: <a href="http://www.clemusart.com/exhibit/faberge/pieces/beetle.html">http://www.clemusart.com/exhibit/faberge/pieces/beetle.html</a></td>
<td>108</td>
</tr>
<tr>
<td>Fig. 28: <a href="http://www.clemusart.com/exhibit/faberge/pieces/beetle.html">http://www.clemusart.com/exhibit/faberge/pieces/beetle.html</a></td>
<td>109</td>
</tr>
<tr>
<td>Fig. 29: <a href="http://www.clemusart.com/exhibit/faberge/kids/color.html">http://www.clemusart.com/exhibit/faberge/kids/color.html</a></td>
<td>111</td>
</tr>
<tr>
<td>Fig. 30: <a href="http://www.clemusart.com/exhibit/faberge/kids/color.html">http://www.clemusart.com/exhibit/faberge/kids/color.html</a></td>
<td>112</td>
</tr>
<tr>
<td>Fig. 31: <a href="http://www.clemusart.com/exhibit/faberge/kids/egg2draw.html">http://www.clemusart.com/exhibit/faberge/kids/egg2draw.html</a></td>
<td>113</td>
</tr>
<tr>
<td>Fig. 32: <a href="http://www.clemusart.com/archive/pharaoh/rosetta/index.html">http://www.clemusart.com/archive/pharaoh/rosetta/index.html</a></td>
<td>114</td>
</tr>
<tr>
<td>Fig. 33: <a href="http://www.clemusart.com/archive/pharaoh/rosetta/rose10.html">http://www.clemusart.com/archive/pharaoh/rosetta/rose10.html</a></td>
<td>116</td>
</tr>
<tr>
<td>Fig. 34: <a href="http://www.clemusart.com/archive/pharaoh/rosetta/rosettas.html#mummies">http://www.clemusart.com/archive/pharaoh/rosetta/rosettas.html#mummies</a></td>
<td>117</td>
</tr>
<tr>
<td>Fig. 35: <a href="http://www.clemusart.com/archive/pharaoh/rosetta/rosetta3d.html">http://www.clemusart.com/archive/pharaoh/rosetta/rosetta3d.html</a></td>
<td>119</td>
</tr>
<tr>
<td>Fig. 36: <a href="http://www.clemusart.com/museum/collect/egypt/index.html">http://www.clemusart.com/museum/collect/egypt/index.html</a></td>
<td>120</td>
</tr>
</tbody>
</table>
I have gloomy visions of a future museum in which the contents of Aladdin’s cave will have been removed to the storeroom, and all that will be left will be an authentic lamp from the period of the Arabian Nights with a large diagram beside it, explaining how oil lamps worked, where the wick was inserted and what was the average burning time.

- E.H. Gombrich (1977)
Chapter 1

Setting The Context: Museums, The Web, and Art Education

In this chapter I will layout the conceptual and contextual groundwork to support my thesis. I begin by examining the traditional role of museums and then their conceptual re-configuration for the World Wide Web (WWW). I describe education in the arts, art education and technology, and discuss Discipline-Based Art Education (DBAE) which is a widely supported model for learning in the arts.

Why museum Web sites are important
I remember the first time, just a few short years ago, when I encountered the World Wide Web. What impressed me was how easy it was to import images via the simple-to-use browser I had just installed on my desktop PC. Having a background in the fine arts, the first thing that struck me was how wonderful it would be to access images from the great art collections housed in museums around the world. It wasn’t long before the first museum Web sites began to hit the net, and in the subsequent years it seems there are very few museums that do not have some sort of Web presence.

Those first attempts at designing museum Web sites were often just to prove it could be done. Soon it became obvious that with the huge amounts of visual and textual information contained in the typical museum, some serious conceptualizing had to be done in order to address needs and then design a successful museum Web site. The last few years have been full of experimentation, and we see a blossoming of various design strategies. Conferences are being held (e.g. Museums and the Web, hosted at the Getty in 1997) which are bringing together administrators, thinkers and builders to deliver papers and exchange information about this amazing phenomenon. As well, the Arts Museum Network has been established to help organize the construction efforts and direct traffic to many of North America’s largest virtual online museums. Journals such as SPECTRA, Art Education, and others devoted to museology or education in the arts are devoting
more and more articles to this topic.

Museum Web sites are important in the field of art education for many reasons. Previously, learners had to access information about the arts via more traditional sources: books, magazines, and field trips to museums. While these sources will continue to be valuable, the introduction of instant access to images and information from the collections housed in the world’s great museums is very significant. Both art educators and students now have a wonderful new tool to employ. The better the design of this tool, the more likely it is to improve the quality of the learning process. This is why museum Web sites are important, and why the thinking behind their designs must be clear.

**A brief look at the purpose of museums**

The invention and distribution of various kinds of symbolic products - books, speeches, pictures, illustrations, models, musical compositions, scientific theories, games, religious rituals, etc. - is a way that societies transmit knowledge of their culture from generation to generation. Museums are an essential part of this process in our western culture, doing so by collecting and displaying works of art. Beyond this they serve as the principle intermediaries between art and the public, trying to make the experience of art more comprehensible and emotionally gratifying. Often this is achieved through narrative processes with curators serving as story-tellers. Banfield (1984) says, one of the great difficulties that museums struggle with is ensuring maintenance and growth while balancing organizational concerns and aesthetic mission.

Karsten Harries suggests that the precursor of today’s museums was the church in Europe. The churches often had a cabinet of curiosities which was much like a museum collection. Though its contents were not recognized as art, it contained both precious artifacts and strange objects such as the horns of unicorns. Harries says that these kinds of collections provided people with the ability to step out of the ordinary world into a different sense of time and place. He feels that contemporary people need places where they can discover the extraordinary, and he sees museums as serving this function.
Emerson (1854) rhapsodized that art was beauty and truth combined, and its function was to make men better. The nineteenth century was a period of growth in which many of the concepts about museum’s roles, that we now accept, were established. At the time, western intellectuals in the vanguard of a new emerging cultural system felt the “truth” could be presented differently. Their mission was to replace the authority of the church with universities which would provide intellectual and moral leadership for the masses. Museums, as an adjunct, were “to impose upon society an ethic of respect for quality, an ethic of deference to the best” (Hall, 1976).

It was not long after the museums were established in the previous light that new ideas rose to cast a shadow over them. These newer ideas about the nature of art challenged those of people like Ruskin who said that beauty, truth, and goodness were all one. This was questioned by romantics like Walter Pater who cried that art “existed for its own sake” and had nothing to do with truth or morality. Pater declared in 1871 that art was not the “servant” of morality and religion but their “noble ally,” whose beauty served to “stimulate the soul, awaken its highest faculties to life, and thus lead it through the finite to the Infinite” (Perkins, 1871). Through such thinking, museums’ roles were to shift away from attempting to moralize society and strengthen social bonds. No longer would copies (plaster casts, etc.) serve as a way of cultivating the public’s taste and educating morals, museums were to become the treasure vaults for storing and displaying rare and expensive objects. To do so cost money, and soon the very wealthy social elite were to step in and provide the needed resources.

J.P. Morgan symbolizes an era of great industrial robber barons who looted European aristocracies of their masterworks and provided museums with boatloads of rare and priceless art. The moralistically education-minded museum managements of the previous generation were dumped along with their plaster casts and a new regime established a new guiding principle: “Joy, not knowledge” (Whitehead, 1970). Having become “a depository of grandeur, the museum required a building of appropriate size and style” (Banfield, p. 97).
These buildings were to house not just the rare and beautiful objects of fine art, but following the principle of "joy, not knowledge" began to collect and exhibit decorative and industrial arts as well, because, as Banfield tells us, "they were the accessories of wealth and power" (p.98).

Museums seemed to function as a house of aesthetic experience. Even the idea that museums were really "art" museums was open to question. Concepts and modes of aesthetic experience were centered in the intellect as much as being sensual. Thus with two distinct modes of experience, the ideational and sensual, museums tended to show objects that appealed to the eye along side those that appealed to the mind.

A twentieth century issue developed when the likes of George Santayana wrote in 1922 that "museums are mausoleums, only dead art is there" (Bellows, 1967). The problem that Santayana was referring to had to do with objects which were no longer in context. That is, they were no longer in association with what they had been created for, their purpose. Thus objects removed from their original milieu and placed behind glass can not be responded to as the artist originally intended. While museums have responded by creating period rooms and the like, most of these efforts have failed to overcome the context issue. Even so, collections have continued to expand to include decorative arts of the past and from all world cultures. Francis Henry Taylor (1945), the director of the Metropolitan, wrote "possibly we should think of it [the museum] as a visual reference collection of cultural history".

An alliance was formed between collectors and curators trained as art historians who encouraged massive accumulation. Not always were these expanding museum collections based upon gathering good art, often there was a need to fill the gaps in various incomplete collections. This resulted in displays that belonged together for historical reasons but often hid masterpieces where they were hard to find or experience as art. There was also an extreme emphasis on collecting original works of art certified to be by the hand of a master, as opposed those that were of uncertain origin, regardless of their expressive qualities.
Gradually museums fell under the wing of public governance. With this shift came the need to justify annual budgets. In order to make the claim that museums were public-service institutions, and so that elected officials (politicians) would maintain state support, museums rarely charged admission and often grossly inflated their attendance figures. Banfield (1984) explains that the greatest argument museums could make for continued state support was education. The idea to make itself an adjunct to public schools, or to even supplement them, is a strategy which today's museums have continued to employ. The use of docents to give informative tours and talks became popular in the 1930s around the same time that museums were developing Departments of Education. The art historian-curators, who viewed the museum as a place of advanced scholarship, found the activities of the Education Departments a nuisance which had to be tolerated, and often complained that the noisy intrusions interfered with the real purpose of the museum.

Theodore L. Low (1942) reported in a study made for the Committee on Education of the American Association of Museums that “in many cases public education has been placed in a moral quarantine by the rest of the staff”. This setting off of the educational departments as a “necessary, but isolated evil” tended to reinforce the ivory tower perception of curators who looked down on the teaching staff with ill-deserved contempt. Taylor (1945) explained that this was throwing away an opportunity to make art museums of interest to a public that seemed less than interested. He felt that instead of trying to interpret their collections to the average person, museums had ignored the public and hidden behind the shield of scholarship.

The 1960s brought the pressure of the urban crisis to museums. Governments began to tie funding grants for museums to their ability to reach out to the changing demographics of urban centers. Institutions were encouraged to carefully do more for the poor, members of minority groups, and other under-served groups. The new motto was to “take the museum out to the people”, generally through outreach-type programs. These included tours and visits from community center groups, seniors groups, youth groups, special classes, lectures delivered in minority languages, workshops, community & ethnic minority “relevant” exhibits, etc. These outreach
efforts saw the evolution of circulating exhibits whose purpose was often to offset the alienating effects of urban poverty or racial intolerance. Museum education departments became an important element in these initiatives.

During the 1970's and 80's museums discovered commercialism as a new driving force when the market prices for acquiring masterpieces soared into the millions of dollars, thereby gathering a great deal of attention from the mass media. Attendance figures jumped enormously because people wanted to see what all the fuss was about. With lineups forming around the block, museums could not ignore the market potential. The formula was simple: large crowd = lots of customers whose opinions mattered. Making money by selling goods and services became more and more important given the deficit-cutting aims of governments that no longer had the financial will to grant generously to museums. In order to attract even larger crowds, museums began to design blockbuster shows like the Barnes Exhibit or the King Tut Exhibition. Large crowds meant big corporate sponsors were willing to pay much more for the privilege of being seen as associated with the shows. By upping their profile in the culturally minded urban communities, museums began to see profit in many new things they could sell to customers: lectures, courses, museum-sponsored trips abroad, restaurant meals, space for private parties, and a vast array of goods from the museum shop and catalogue. Needless to say, much criticism has been directed towards museum management because of these commercial practices; however, in the mid 1990's retail business continues as one of the financial engines that support museums.

This brings us to the present and most recent phenomenon to influence the evolution of museums, the Internet and museum Web sites. Let us now examine how museums envision the educational purpose of their Web sites.

**Museums support art education via the Internet**

Guralnick (1995) calls museum Web sites “a great way to do public outreach and educate... Web sites should be part of an arsenal that a museum employs to teach about our cultural/biological/artistic heritage... the holistic museum experience” (p. 23). McKenzie (1996)
sees virtual museum Web sites as capable of creating powerful, student-centered, constructivist learning. These sites permit museums to be freed from their "inherent localism" (Bearman, 1995). Art museums are an important educational resource and many have education departments housing extensive knowledge and experience which should be taken advantage of (Durrant, 1996). Sutherland (1995) explains how important museum material can be for education by helping learners "to understand the development and functioning of the world of which they are a part". He says the new medium of the Web will provide "dramatic benefits" by improving access to museum data (p. 15). The Web is a multimedia form of delivery and Economou (1996) advises that we must never underestimate its power. Gibson (1996) discusses the San Diego Natural History Museum’s Web planning document which has as one of its main objectives to "Enhance the Museum’s presence in the educational community... and to provide a platform for information sharing" (p. 14). Bandelli and James (1996) define a model for museum-developed Web based ‘educational activities’ as targeted projects that are focused at schools, usually about specific subjects, with the students having a role in carrying them out.

Dickenson (1996) writes about re-thinking a museum’s role in “managing knowledge resources”. She explores the notion of “holdings” - an archival term suggesting a collection of various items connected by a common theme. The Web will allow learners to link images with text, as well as sounds, and eventually video. This makes for scholarship that enjoys “the kind of rich relational databases that are the foundation of research” (p.31).

Blake and Rice (1996) explain that one of the challenges facing museum educators is determining how to fit education into museum Web sites’ already busy menus of programs and activities. Museum professionals agonize over “the question of whether electronic field trips and computer-based interactive and distance learning projects will be a substitute for, or altogether replace, real physical interaction with objects” (p. 78). However, they report that, so far, the opposite seems to be true. “After seeing the museum’s collections on the computer, ... [s]chool students have expressed a desire to see the real thing. They understand that the computer is a tool” (p.78).
The Art Gallery of Ontario (AGO) is a leader when it comes to developing museum Web sites. It not only has developed a strong Web presence, but is also managing the development of the Art Museum Network (AMN) Web site. The quote below gives an idea of the AMN’s expansive and ambitious view of the future.

As bandwidth expands, we anticipate broadcasting live-to-disk with tours by directors and curators, as well as artists, offering interactive live feeds from galleries, storerooms, conservation laboratories, and conferences, exponentially growing archives of information about our collections, three-dimensional imaging of the contexts of artworks from studios to museums, and broad access to our expertise as the custodians of cultural heritage across the North American continent. (AMN, 1997, http://www.amn.org)

The AMN Web site says that it will soon provide Educational Services (Curriculum-based learning tools) which will become available via museum Web sites. It’s vision statement says, “[The] AMN is designed to attract visitors to museums and to promote online learning about art and museums from multiple perspectives”. Created by the Association of Art Museum Directors this clearing house style Web site will also “offer a variety of online services, ranging from educational software to a multi-relational, searchable image bank of thousands of artworks” (AMN, 1997, http://www.amn.org). They have stated their goals for education and scholars who will access the site as follows:

As museum libraries go online, the AMN will be updated and news bulletins on resources will be available over the Internet. AMICO, the Art Museum Image Consortium, will provide thousands of networked images through a searchable database, useful for research and for assignments. It will provide users with networked access to museum stores, enabling them to search out hard-to-find titles, including exhibition catalogues, monographs, and collection catalogues. Online publishing is just beginning, and ArtMuZine will provide a searchable forum for recent scholarship on art museum collections throughout North America. AMN will introduce its offerings in phases over its
first year, beginning with online information and moving onto online services and an image bank within one year of its launch. Information about collections and exhibitions will be available at all times and at no cost. Certain services will be offered at minimal cost, including ticket purchases for exhibitions and purchases of merchandise at select museum stores. Other services will be offered on a subscription basis, including the online publication AMZ (ArtMuZine), which will bundle content from dozens of museums weekly, as well as everything from packing and framing services to curriculum-based learning modules for schools and universities. Within one year, AMN will provide licensed access to components of the network involving copyright restrictions, so as to allow schools, universities and libraries unlimited use of outstanding educational tools. (AMN, 1997, http://www.amn.org)

**Museums create virtual aspects of themselves**

There really isn’t a question as to whether museums should present themselves on the WWW. The issue is how the virtual museum is conceived. There are basically two strategies; create a virtual replica of a museum’s physical structure, or re-conceptualize a virtual model that bears no resemblance to the physical museum, only to the museum’s collection.

The first instance is a logical extension of the museum in cyberspace. Here the aim is to prepare potential visitors for an actual trip to the museum by initiating them to the layout and contents of the buildings via a Web site. Even if the Web visitor never gets to the museum, the sense of the museum that the visitor will create in his/her mind will somewhat resemble one which an actual visitor might have. Many museums are acutely aware of the importance of their physical structures to the planning efforts of their curators. Many exhibits rely heavily on room layout, and other facilities when assembling shows. Meanings are often contextually implied by physical arrangements of objects with their surroundings. When this is the case, Web design issues revolve around how the virtual representation can most effectively produce the same curatorial intent as the real location.
The evolution of the WWW has presented museums with an opportunity to completely rethink their role vis-a-vis their collection and the public. Yamamoto Ikuo (1996) writes about how these museums might work in his article *A Post-Museum Vision*.

Museums and galleries should be places of images - in other words, places of diverse audio-visual information - and they should provide an environment where any curious person can informally encounter and learn about this information. We believe that new types of multimedia and interactive media can be an extremely effective way to provide this kind of environment, and we will begin to see the technology used in many different ways. (p. 8)

Ikuo sees future museums as being "beyond acquisition-oriented" (p. 8). The new vision will reverse the traditional role that museums have followed and erase some of the clear boundaries between museums and libraries. On the Web, visitors might become active participants in the work of art museums. When a collection is converted into digital formats, which are no longer the 'real thing', objects become represented as information. This means that every kind of museum-related information (exhibits, catalogues, workshops, guides, etc.) becomes digital data which can be transferred, exchanged, and re-purposed instantly and with no concern for boundaries or national borders.

When you think of museums in the middle of this transformation, you realize that we may be entering a situation where the word 'museum' itself becomes unusable. We may need to find a different term, rather than forcing the word 'museum' onto places that are centers for creation and communication using different kinds of media and networks. (p. 8)

A major implication when museums re-conceptualize themselves for the Web is the blurring of the meaning of artist, artwork, object, and exhibition. With interactivity "all elements of the system are becoming equal" (p. 9). Once art becomes digital and is housed in cyberspace the museum's
role as a place for holding art where curators are employed to study and care for it changes. Suddenly, information is not an acquired artifact needing temperature-controlled storage, but is something that is always available on the Web, and everyone has access to it. Perhaps a more appropriate name for the new museums might be ‘centres’. The Pompidou Centre in Paris is an example; and the Mito Art Tower in Japan recently changed the name of its contemporary art space from ‘gallery’ to “centre”. This confers the notion of the museum as fundamentally an information resource.

[The museum of the future] will ultimately be a place - or information space - where each individual can use his or her imagination freely and fully and discover things for themselves. It will be a place where information related to art and science will be accumulated and stored multi dimensionally, and anyone can freely navigate that sea or forest of information; it will be a place to find road signs that lead to a new age and a new world. That will be the foundation of the museum of the future (p. 9).

This vision sets out a remarkable challenge for museums. It demands that they experiment with new ways of presenting themselves via the Web. It demands that they do not exist in isolation, but link themselves and their vast arrays of art information to a networked community of similar institutions and the public at large. In chapter 3 I will look at examples of museum Web sites that are trying to do just this.

Education in the arts
There has been a long history of relegating art education to the bottom of the barrel where it has been seen as unimportant or non-essential. There are many reasons why this is wrong and why empirical evidence shows that education in art is a fundamentally valid approach to learning.

In A Cognitive View of the Arts, Howard Gardner (1983) describes empirical research supporting the concept that art training linking visual and spacial phenomena to the cognitive processes emphasizes problem-solving skills which are seen as an important
outcome of an education in art. Harvard’s Project Zero has published empirical studies which support these views. Commentators like Nelson Goodman, Ernst Gombrich, Rudolf Arnheim, Leonard Meyer, and I.A. Richards have stressed the cognitive strategies and mental activities required of artistry. In brief, these writers have said that emotions are an essential part of the creative activity, but go hand in hand with mental strategies to convert them to art forms. Dr. Suzanne Stiegelbauer has argued in her class, *The Visual Arts as a Thinking and Learning Process*, that the brain processes information through an image language and that the arts are an essential vocabulary building process to higher order skills.

In his book, *The Idea of Multiple Intelligences*, Gardner (1993) says human beings have capacities for higher order thinking in at least seven semi-autonomous intellectual realms which can be developed as competencies at a high level: 1) language, 2) music, 3) logic and mathematics, 4) visual-spatial conceptualization, 5) bodily-kinesthetic skills, 6) knowledge of others persons, 7) knowledge of ourselves. All of these cognitive capacities may be expressed as art forms.

Museums that are committed to some role in art education will find discipline-based art education (DBAE) a relevant approach as it is theoretically compatible with three current topics in general education: 1) it deals with the range of learning styles within any student group, 2) it embraces multicultural education, 3) it supports a holistic or integrated curriculum. Item 3 can be understood as reflecting the thinking behind the philosophies of constructivist education, teaching across the curriculum, whole language curriculum, and interdisciplinary or cross-disciplinary teaching.
Art Education and technology

*Technology is the knack of so arranging the world that we do not experience it.*

Max Frish (In Postman, 1995, p. 10)

Gregory (1996) maintains that in order to avoid Frish’s dire point of view, art education’s overall goals need to be set before technology can be embraced. She notes some of them as proposed by Mary Tapia (p. 52):

- greater emphasis placed on the design and creation of learning environments toward a more personalized learning approach,
- active engagement on the part of the student in the use of knowledge rather than the collection of disconnected facts,
- creating a culture within the learning environment which involves a population of learners and experts engaged in the development, identification and pursuit of understanding real life problems,
- collaboration between students, teachers and professionals from our global and local communities,
- assistance to students in functioning at high levels of self-direction with intrinsic motivation for learning.

There is no doubt that art education is being redefined not just by technology but new intellectual frameworks such as postmodernism, constructivism, feminist art criticism, and multiculturalism. However, with regards to technology, and particularly the advent of the WWW, suddenly Postman’s (1992) statement that “technological change is neither additive nor subtractive. It is ecological... One significant change generates total change” (p. 18) bears strong consideration.

Stankiwicz (1996) adds that new media redefine the form and the content of art, and that computer-based technologies will not act as new vehicles for old content but will bring new content/images “to become part of our imagic store” (p. 4).
One of the most defining aspects of the new learning technologies, like the Web, is that they encourage non-linear encounters with both experience and knowledge. Dunn (1996) feels that this shift is important because it encourages “active versus passive participation in the learning process” (p. 7). Speed too is a new change brought by communication technology, it alters the work roles in all kinds of organizations, including schools (Pritchett, 1994). Theorists like Howard Gardner (1993) tell us that technology will improve learning because children are comfortable with it, having grown up surrounded by it and having learned early on how to manipulate it.

Dunn (1996) explains that technology can be used as a research tool, a curriculum development tool, and as an assessment tool. His view sees the teacher’s role as increasingly shifting towards that of facilitator, one who can point students towards information that will lead to knowledge. This constructivist approach is much better than an Aristotelian philosophy, here technology shifts away from lecture mode towards discussion mode. Technology permits the discussions to be visual (student online art galleries, etc.) or textual (listserves, etc.). Web technology provides no-cost access to huge amounts of material that normally contained in expensive textbooks, posters, videos, slides, etc. Teachers can access not just visual material, but jointly prepared lesson plans, or work with distant colleagues to develop shared curricula. Students can use Web technology as a way to house and update their folios, and share their contents as a way of encouraging peer critiques.

Web technology means that art education can blend multicultural, muti-age, gender-inclusive educational reform into its curriculum by pulling together visual resources and contextual information from a host of cultures (Heise & Grandgenett, 1996). Electronic field trips allow “visits” to virtual museums for schools with low budgets and little opportunity. However, teachers who lack technological or Web skills find progress frustrating and difficult, so an issue is how should training and support be provided (Swartz, 1994; Heise, 1995). Some objections to the use of electronic media argue that form is placed over content resulting in a loss of the spirituality associated with art. But in many cases electronic media encourage real encounters
with art. Heise and Grandgenett (1996) argue that the Internet provides students with the opportunity for "active discovery learning and can open up new avenues of creativity and expression" (p. 14). They insist that it should be curriculum that drives the technology. For instance, as a research tool in art education the Web can help learners to simulate the roles of the artist, art historian, or art critic.

McMahon & Duffy (1993) report that successful implementation of technology depends on positive attitudes among teachers and administrators. Pina & Harris (1993) report that this positive attitude results when teachers are confident in their use of computers, and that it is the teacher who plays the central role in determining the use of technology in the classroom. Interestingly, it is not the type of technology training that teachers receive, though it is a variable, instead it is the teachers' sense of their ability to implement technology which is a strong predictor of the amount of technology that will be found in their classroom (Henry, 1993). Thus, easy access to resources that facilitate understanding and competence with technology is important and might be something museum Web sites should point visitor's towards. Museums should be funded so that on-site short term consultancies aiding implementation can occur.

In discussing an approach to teaching art criticism using the Web, Karen Keifer-Boyd (1996) sees a transformation from singular, linear, and formalist approaches to postmodern concerns of plurality, nonlinearity, and context. The technology of the Internet can be used to create strategies that can aid student learning about "(a) how context affects meaning, (b) ways to interface disparate interpretations using hypermedia, and (c) how and why to re-present art in a virtual museum" (p. 33-34). There are several major art criticism models that may be learned, each with its particular type of interpretation. These models often occlude aspects generated by other models. Students using hypermedia can design interpretations that can be "interfaced in a nonlinear, nonhierarchical way" (p. 38). Connectivity may result from specific common themes or from disagreements about a work of art. The essential idea is that technology is capable of connecting "things [that] can potentially be joined together to increase their meaning... Each connection broadens [the] understanding of ourselves in relation to the world" (Siler, 1995, p.27).
Corrin (1993 & 1994) looks at the issue of context which can effect how art is interpreted. The way in which museums display art can have a strong influence upon our perception and interpretation of works by artists. Students who employ technology as part of their art education can address this issue by re-creating installations that have been assembled in virtual museums to challenge the "politics of representation" (Parker & Pollock, 1981).

Web technology is making large strides in linking up databases via SQL connectivity between the Internet and the databases. Museum databases contain vast arrays of detailed information about their collections. For art education this is an invaluable resource. Allison (1996) describes a "research culture" using a "professional attitude to research" which builds upon projects developed in "overt recognition" of the context of previous research (p. 45). Web accessible databases permit familiarity with previous research and its relevant strategies for indexing and coding. Accessible databases also support the responsibility that researchers have to make their data and outcomes available.

The Web not only is a storage place for images common or rare, but it can be used to create art (Koos & Smith-Shank, 1996). Technically, the complex hyperlinked world of the Web may be considered as a tool for making artistic works. This brings up many concerns, among which are the issues of reproduction and copyright. Many people forget that they are viewing reproductions of art when visiting virtual museums, this is a concern since an image on a 14 inch monitor rarely gives a sense of scale to any work. There is the likelihood that when learners download an image of a work of art from the Web they will add to the misrepresentation of the work by further skewing the context. Making slides of the artworks is technically easy but copyright should be respected. Below is an example of a copyright warning from the World Art Treasures Homepage:

The World Art Treasures project is pleased to offer the digital images on this server for educational and personal purposes. They may be used in classroom projects, for term papers, personal art projects, etc. Under no circumstances may images be resold or
redistributed for compensation of any kind without prior written permission from the Jacques-Edouard BERGER Foundation. (p. 22)

**The arts require complex symbol creation and usage, like language or mathematics**

DBAE recognizes that the arts use “systems of symbols” (Gardner 1983) and learners must obtain a competence and literacy with them. This provides a relationship between artistic and other forms of knowledge.

In my view, the “Intelligences” are not, either separately or jointly, preordained to be involved in the arts, the sciences, or any particular specific cultural area. Instead they are raw computational mechanisms, which can be marshaled [to create] artistic symbols or for artistic ends, if that seems appropriate, or, equally, for other kinds of symbols, and other kinds of ends, when that seems indicated. (Gardner, 1983)

One of the roles that museums can play in art education is to help learners understand the meanings and languages that artistic symbols produce. Eisner (1988) points out that DBAE does not wait for learners to learn simply by providing art materials for manipulation, it focuses on supportive and encouraging instruction that guides learning.

**Discipline-Based Art Education as a valid model for instruction and learning in art**

This thesis will not attempt to provide detailed information about DBAE, though the interested reader may find out more through the writings of Greer (1984), Clark, Day & Greer (1987), Dobbs (1992), and Eisner (1988). I have chosen DBAE, which is generally used in K-12, because it also resembles, in many ways, the learning approaches which can be found in colleges and university undergraduate art programs. It is a mature and logical way to approach learning in the arts which recognizes levels of human development, provides curricular tasks that are intrinsically meaningful, and suggests many ideas which may be considered when designing museum Web sites that will be useful to art education.
DBAE theory explains that the study of art is an essential part of a complete education. It encompasses a comprehensive approach to art education constituting its content from the disciplines of aesthetics, art criticism, art history, and art making. DBAE provides learners with the opportunity to develop multiple skills and abilities for making, responding to, interpreting and judging both their own work and the art of recognized artists from various cultures and eras. Art forms which are studied include fine arts, folk arts, and applied arts. Learning activities include making art, viewing and studying original artworks and reproductions, developing responses to and discussing art, speculating on the meaning and value of art, and reading and writing about the art and artists from world cultures. There is an emphasis on the way in which learners might integrate the arts they are studying with other elements of their school curriculum. For instance, in which ways does art influence culture, and how might culture impact upon artists’ creative efforts. By focusing on how they respond to the art of others, they become aware of how their own art making is effected.

DBAE is not new. Distinguished art educators have, for the last 25 years or so, insisted that art education should pull together the ideas, skills, knowledge and creative activity drawn from the four art disciplines and that it should be presented in written, sequential curricula (Day, 1995). Smith (1987) sees this approach as relating to a broad discipline-based tradition in the field of general curriculum. The discipline-based approach may be applied to any subject that places value on academic discipline and recognizes communities of scholars as contributors to the advancement of knowledge and who partake in discussion and debate within their respective areas of specialty.

The four DBAE disciplines offers clues to help design museum Web sites that support art education

In order to provide a ground for recommendations in chapter 2 and the analysis of several current museum Web sites in chapter 3, it is necessary to propose a context in which art education occurs. The four DBAE disciplines define major areas in which learning activities may be created and in which learning may occur. By familiarizing themselves with the four disciplines (below) readers...
will be able to correlate the design recommendations in chapter 2 to the concepts informing DBAE.

1) **Studio Art or Production**: provides the opportunity to convert a medium into a vehicle for conveying ideas, images, feelings, and meaning. It requires a conceptualization in some way of the image that is needed. It presents the problem of shaping the medium to express what has been conceptualized. It requires the development and knowledge of specific skills and techniques needed to manipulate the various media. It requires the ability to organize the components that have been created. It requires that learners set standards for judging whether their creation works while recognizing that there are no formulas which can be used to determine this. This judgement becomes refined as the learner understands that his/her sensibility is critical and that this sensibility grows with experience. Dewey (1934) pointed out the essential requirement of “first-hand perception” which is always more important than knowledge gained through abstract theory (p.298).

2) **Art Criticism**: provides the opportunity to learn by seeing, exploring, and describing the visual elements of our world from a particular perspective. Criticism “expands our perceptual habits and teaches us how to look so that we may see more” (Eisner, 1988, p. 17). It helps establish the skills and attitudes that are essential when analyzing, interpreting, and describing the expressive qualities of visual form. This skill is transferable to the greater environment that surrounds the learner. Eisner suggests that “Our imaginative capacities depend upon the content that an intellectually acute sensory system can provide” (p. 20).

3) **Art History and Culture**: provides a perspective that helps the learner understand that art does not come out of nowhere. All cultures produce art, and art forms an essential part of every culture. It is the influence of cultures that help to shape the art forms produced by artists. In order to understand a culture the learner must study its manifestations through the various expressions and contents of its arts. Learners will discover that art cuts both ways within a culture, being modified by it, and also by modifying it. DBAE has, as a major focus, the desire to
assist learners in their ability to understand the relationship between art and culture by studying the interaction between the two over time.

4) *Aesthetics*: provides the learner with a way to judge art beyond a simple preferential statement of pleasure or displeasure. Artistic excellence requires judgment that goes further than likes or dislikes. Aesthetics provides the tools to help learners develop a reflective unbiased judgement concerning the quality of a work of art and the visual world surrounding it. Learners join in the dialogue about nature and the meaning of art in life by study the writings of aestheticians which “address complex questions having to do with the nature of art, whether visual art provides knowledge, and the appropriate criteria for appraising quality in art” (Eisner, 1988, p. 20). Aesthetics provides a base for criticism in art.

**DBAE is not based on a strategy of specific learning outcomes**

Today, curriculum development is a process where aims are translated into goals and then into statements of educational objectives. Being able to describe what a learner will be able to do after following a specific curriculum makes sense when we discuss subjects like mathematics or spelling, etc. However, DBAE is not designed to reduce its educational aims to a specifically definable set of objectives. The important issue is that teachers and learners understand and strive to understand the underlying educational points of the activities that DBAE will engage them in. In DBAE teachers and learners will often shift objectives in process so as to be able to take advantage of unpredictable or unexpected learning opportunities. The reason for this departure from a traditional learning outcomes perspective is that in the arts, particularly in the area of studio production, what is considered of value is often a form of lateral thinking that sees things in novel ways and finds unique solutions to visual problems. Therefore it may be seen as unproductive if outcomes must match uniform and predetermined expectations. I would argue that the kind of thinking required to discover artistic solutions is often extremely useful in all cognitive processes.
DBAE leans towards a specific alternative curriculum structure

This structure could be of interest when considering how a museum Web site might be accessed by DBAE students. School lessons may be organized by subject and allocated specific times or days in which the learners engage in their content. This is described as a structure with a collection-type curriculum that provides strong boundaries between subjects. An alternative is an integrated-type curriculum structure where boundaries are softened and many subjects are taught with overlap. In this fused state it is difficult to set rigid time allocations for each subject. Another structure uses physical space in classroom settings to define areas which relate to specific subject areas. These work centres are important and the amount of time and instruction devoted to the projects undertaken within each setting can vary. Yet another structure is a combination of the first three described.

DBAE has a clear preference for the first approach because experience shows that when the arts are integrated into other subject areas within a curriculum structure their distinctive contributions are often neglected or under emphasized. “Acquisition of skills and understanding in art is a complex, not a simple affair” (Eisner, 1988, p. 24). Complex learning needs the time required for a routine of practice and extended concentrated exposure. When learners encounter art in an episodic and discrete way, as would be the case with some integrated structures, art becomes nothing more than isolated events which the learner will find nearly impossible to compound into a sophisticated and intimate understanding of art.

Most learners in elementary grades, up to about grade six, will find themselves in self-contained classrooms with a single teacher in charge. At grade six things shift towards departmentalization and specialization as the way to organize learners, their teachers and subjects. With the introduction of trained art teachers at the middle and secondary school levels it is possible to provide high quality DBAE. However, even among trained art teachers it is rare to find any who have developed a complete range of pedagogical skills to deal with all aspect of art education. This is where assistance becomes important. This assistance may be either material or human. Museums potentially become important players at this stage.
It should be noted that in describing the four disciplines that make up DBAE it is possible to convey the misconception that each one should be taught separately. Of course, this should not be the case. For example, it is likely that in the early elementary school grades that art learning will draw in varying amounts from all four areas, perhaps with an emphasis on making visual images over linking the forms to historical periods. Eisner says that there is no ideal ratio to describe how much emphasis should be placed on each discipline at any given grade level.

What is prescriptive is the need to attend not to one area of artistic learning or to another, but to all four. We fully expect that the curricular forms through which the aims of DBAE are realized will be as varied as art itself (p. 27).

**DBAE requires resource support**

This support is either a human resource or a material resource. Current writing about DBAE provides detailed descriptions of these resources which encompass curriculum guides, slides, reproductions, audio and video tapes, games, and other instructional devices which help teachers to articulate the aims of DBAE within the context of specific areas of study. “Curriculum materials should provide teachers with a challenging array of sequentially organized, goal-directed activities that capture students’ interest and help them learn substantive content” (p. 29). Museums have traditionally been seen as an asset and as part of what may be termed curriculum resources.

But museums are more than the sum of their collections, they are animated by a body of highly qualified specialists and personnel. Arts learning cannot be confined within the school walls, it must become transparent. The museum community, with its population of curators, artists, crafts people, and retirees, is seen as part of the cache of human resources that DBAE can draw on. While these human resources are essential, they must not be seen as supplying episodic short-term excursions to entertaining sites, integration of these elements into the curriculum for specific curriculum goals is important. Museums’ human resources can provide expertise and consultation in art education.
Some problems when using this context

While DBAE is the general model I am using for art education students, museums must anticipate visits from learners who range from DBAE teachers and students, to higher art college students, to the interested general public. As well, learners will vary in their levels of sophistication and prior knowledge making the tone that a Web site provides important to consider. This broad band of potential learners with their diverse backgrounds, needs, and ways of processing information presents a challenge to museum Web site design.

Museum education departments vary in their concepts and approaches to working with visitors and learners. Often they present generalized and shallow information, which may be appropriate to some circumstances, but not necessarily for art education.

Though I am approaching Web site design issues from a specific art education perspective, it is possible to effectively argue for quite different approaches to the matter. Museums might appoint art education specialists to major roles in developing many aspects of their online museum sites, and it is possible that these specialists will not operate from a point of view that is informed by DBAE.

Issues of cost may also arise. A DBAE focus may be more expensive to develop than some simpler approaches. DBAE requires careful hyper-linking design that might entail larger, more complex site designs. The number of Web pages does influence the overall costs of development and maintenance.

If DBAE structures used by museum Web site designers do not link closely to those being employed by schools, there will be some irregularities and possibly confusion.

Methodology

In order to examine, analyze, and critique actual museum Web sites (chapter 3) I have reviewed the most current research and literature relating to the subject. Chapter 2 consists of selected
information from pertinent academic journals and related publications. I chose items from published papers that provide answers to the main question posed in this thesis. Chapter 2 presents the findings in the form of suggested approaches to issues that influence good museum Web site design. The examination and analysis of existing museum Web sites in chapter 3, and my critiques along with questions and suggestions for improvement, stem from the perspectives laid out in chapters 1 and 2.

In Chapter 3, four museum Web sites have been selected from hundreds available online. They have been chosen to represent several current approaches to contemporary museum Web site development. Three of the four are members of the Art Museum Network (AMN), which I also examine, and are Web accessible from the AMN Web site maintained by the New Media Centre of the Art Gallery of Ontario. The AMN is recognized as being an important vehicle for the advancement of issues concerning concepts and design surrounding the development of online presences by many of the largest North American museums.

The four museum Web sites selected for analysis were chosen because they demonstrate a range of approaches that provide opportunities for observation and reflection on the many potential ways that museum Web sites communicate with the public. The analysis will use as its governing criteria the way each site presents its design in support of art education, and how well the design enables visitors, who wish to learn about art, to access information that will help them to construct knowledge.

I analyze the Web site designs through a detailed description (a "tour") of my experience as a first-time visitor interested in learning about art. It was important to record my first impressions in order to report on the way that learners or teachers might encounter the site. By not knowing my way around these Web sites in advance, or how they have been designed, I have been able to make criticisms and recommendations that are from an informed, but fresh perspective. I wanted to see how well these sites supported, or failed to support, art educational needs. I have based my reporting comments and criticism upon the following:
1) how the sites relate to the perspectives and recommendations laid out in chapters 1 and 2,  
2) how they fit in with recently published (1995-97) Web graphics design theories, and  
3) my own expertise as an instructor of art, an experienced Web site designer and a professional visual artist/designer with a twenty year public fine arts career in Canada and abroad.

Chapter 2 provides readers with the current theories from the literature, and chapter 3 gives readers my analyses and criticisms in the form of four “tours” to real museum Web sites. Both chapters 2 and 3 should be viewed as an providing insights, recommendations, and concerns that museum Web site designers may use to support a museum’s online role in art education. Conclusions, discussion and suggestions for further research are made in chapter 4.
Chapter 2

Design Issues and Recommendations for Museum Web Sites Supporting Art Education

This chapter will discuss and propose a number of relevant design issues facing museum Web site designers today. Readers will find a glossary at the end of this thesis defining technical terms which might be unfamiliar to them.

Databases are the virtual treasure houses, build connectivity

Eyre (1997) recommends the development of a database server with architecture that can manage standard queries and distribute them to various museum databases networked to the WWW. The database server, or "broker", knows about locally held museum databases and how to connect to them. He suggests that this will permit users to find relevant information on multiple museum databases from any museum Web site's search function interface; an example:

The user enters the search term 'Dickens' and applies it to the Access Point 'Creator'. These options are fed back to the server in standard HTML Forms structure. The server uses the CGI link to pass the search terms to the Database Server. This server can handle multiple database models, including proprietary systems as well as standard protocols such as Z39.50 and ODBC. The terms are packaged appropriately and sent to the various databases. Returns are received by the server, from each of the databases. Some will have no hits, some will have hits and report the fact but return no content and others will return a number of brief records. It is for the Database Server to manage these different types of responses and present a consistent view back to the user screen.

(http://www.archimuse.com/mw97/speak/eyre.htm)

Make information user-friendly

McLaughlin (1996) complains that the ability to understand works of art on the Web is, for the present time, confined mostly to the same intellectual elite that has the ability to produce and
distribute them. She recommends that we consider acting upon the criticisms found in the writing of museum scholar Vera Zolberg, in her essay *An Elite Experience for Everyone*, which offers some food for thought:

Because art museums have come to stand for the idea of excellence in a highly valued form of culture, to the extent that they fail to distribute their cultural capital in an understandable way to visitors who lack the habits of the regular public, they help perpetuate the status quo (Zolberg, 1994, p. 56).

**Organize a solid development process**

The success of museum Web sites that want to support art education depends on fulfillment of all steps in a formal development process which designers and educators must agree on. Much of this can be adapted from standard instructional design theory available in texts like Dick and Carey's (1996) *The Systematic Design of Instruction*.

Proceeding from conception to implementation and evaluation, instructional design offers a comprehensive learning design approach used to develop classroom and computer-based training. It is not likely that most museum Web sites will need to engage in learning design at this level, but it is possible to sift out some of the main principles as needed.

1) **Learner needs analysis**

Determine what the learner needs to accomplish or discover. Are there explicit learning outcomes of the Web project? Will the Web site provide individual instruction or address general categories of learners? Will it replace or supplement existing art education at schools or colleges? How might learners integrate their discoveries into a larger knowledge system? (Responsibility at this stage: project manager, museum educators.)
2) Learner analysis
What exactly does the learner need to know to augment their art education? Should the information provided at the Web site focus on skills, knowledge, and/or attitudes? What components of the Web site should be linked so that the learner has maximum lateral movement through information? What are the range of existing computer skills and educational levels of the learners? (Responsibility at this stage: project manager, subject matter experts, museum educators.)

3) Technical analysis
Establish the baseline technical capabilities; what kind of browser/computer and connection-type will the learner access the Web site with. Can the Web site use streamed multimedia to take advantage of the increased network speeds, or is access via slower 14.4 modems? Define a list of technologies that can be successfully employed. The museum Web site designer can then design the site to take advantage of technological capabilities in an instructionally sound way. (Responsibility at this stage: project manager, systems analysts.)

4) Interface design
This is a critical phases of the development process. Provide all the features required by learners to navigate the site as intuitively and transparently as possible. User-centred design provides features that allow the learner to control the learning process. Art education specialists might suggest additional features that should be considered during this phase. Bad designs often have 'feature creep' where the user features shift from page to page or gradually over time. In the learner analysis, a definition is established to determine the range of learner computer experience so that the interface designer should be able to choose design elements most appropriate for the target visitors. Good designers should understand the complex, non-linear way learners will use the product. Interface designers should work with site designers and art educators to define metaphors and the interface to support those metaphors and, if necessary, mesh with established
museum design standards. The result of the interface design process is a dynamic prototype interface ready for testing. (Responsibility at this stage: learner interface designers, Web site designers.)

5) *Usability testing*

Before making a museum Web site available the art education elements should be tested on real learners. Carefully observe, and analyze from a subjective point of view, the effectiveness of the interface, site design, and whether these produce learning. This is generally an iterative process requiring testing, adjusting the site, re-testing, and so on. Once a successful interface is developed it may be used as a template for a standard design. (Responsibility at this stage: usability engineers, human factors experts, or cognitive psychologists.)

6) **Standards definition and design document**

Prepare a design document as a reference source. Members of the museum Web site development team should be responsible for preparing documents placed into a technical standards section of this file. Items to include consist of bandwidth limitations, software settings, development software, file naming conventions, technical details, etc. It should be the responsibility of the Web project manager to set standards for site maintenance and security. The museum’s Webmaster should be in charge of procedures and standards which must be followed for server compatibility, external security, and user access control. At this stage, art education experts, SMEs (subject matter experts), and museum educators should be checking that development is remaining consistent with prior analyses, and objectives. (Responsibility at this stage: education experts, SMEs, museum educators, Webmaster, and systems analysts.)

7) **Template design**

The museum’s Web site technical team should prepare a template based on the tested interface design. Blank pages with pre-positioned and coded navigational controls and repeating screen elements form the basis of the templates. They may also include a library of models of interactive screen designs. This permits the components of the template to be duplicated and expanded later.
on. (Responsibility at this stage: systems analysts, programmers.)

8) *Art education design features*

In order to meet the learners' needs it is best to bring in an art educator to help develop features and strategies that will most likely lead to a rich learning environment. The art educator will be someone who knows both the subject matter and, with the aid perhaps of a curator, can suggest ways to organize and present the materials so that learning goals can be met. A good way to organize material is often via 'chunking' the information, this is accomplished by distilling essential information out of a larger volume, and presenting it in discrete informational units. Tools that are very helpful here are story-boards and flowcharts which can be used to help instruct the designers. (Responsibility at this stage: art educators with input from SMEs, and curators.)

9) *Media creation*

Using the storyboards, Web media designers create the content that will make up the various pages of the Web site. They produce text, still graphics, movies, animations, music, narrations, databases, Shockwave content, etc. There must be a conformity maintained between the media standards specified in the design document and these must be fully compatible with the interface. (Responsibility at this stage: media designers, graphic designers, videographers, sound designers, programmers.)

10) *HTML document processing*

Site content is formatted into an HTML document at this stage. Elements may be placed in a template page copy using an HTML editor. There are many new software products coming onto the market which now can automate the document construction process. Higher level programmers are not usually required at this stage because this process is relatively easy. (Responsibility at this stage: Web site designers, HTML programmers.)
11) **CGI scripting**
Creating dynamic documents, tracking visitors, record keeping, and security measures are now basic ways of building and maintaining a museum Web site. Documents that include dynamic information offer rich, and learner specific information. Logging visits and tracking learner input into dialogue databases requires the talents of a programmer who can write common gateway interface (CGI) scripts that perform these and other tasks. (Responsibility at this stage: programmers.)

12) **Java coding**
Designers may call for sophisticated interactions, graphic simulations or self-contained applications ("applets") to be embedded in the Web pages. Here programmers will develop Java coding. However, Java is a full featured computer language, and in many cases JavaScript or some other scripting technology which embeds its code in the HTML document will be sufficient. Using object oriented programming such as Macromedia’s Authorware or Director, can produce content that can use Shockwave for streamed delivery. This can often suffice or be faster to create. (Responsibility at this stage: programmers.)

13) **Site maintenance**
In order to prevent the museum Web site’s project documents and supporting files from becoming unmanageable, a project site manager should be placed in control early in any project. Responsibilities would include establishing procedures for supplying and maintaining project files. Often this position will require the use of management software tools such as Allen Communications’ *Designer’s Edge*. (Responsibility at this stage: programmers, system administrator.)

14) **Web server administration**
This person is responsible for configuring the server for content types which are used, monitoring system performance and usage, maintaining user accounts/privileges, maintaining supporting
databases, and monitoring and updating external hyperlinks. (Responsibility at this stage: system administrator, Webmaster.)

15) Evaluation and updating
This final stage looks at all the learner needs and outcomes analyses and then determines if they have been achieved. Usually, a program of ongoing evaluation is set up to catch problems as they come up. The redesign of specific pages or segments may be required as newer or more complete information becomes available on specific topics. If new features or content are added it becomes necessary to maintain the evaluation procedures. (Responsibility at this stage: all project positions, as appropriate.)

Follow rules of good Web design
There are many publications on design theory for the Web: *Elements of Web Design*, by Darcy DiNucci (1997), and *Deconstructing Web Graphics*, by Lynda Weinman (1996), are examples of recent publications which can be highly recommended for covering the gamut of design issues that Web developers face. Kirby (1996), offers rules for Web design with regards to learning. I have selected and paraphrased some of Kirby's points below:

1) The development process that is used should be formalized so that it meets established needs for supporting art education. Quality outcomes depend on complete process fulfillment.

2) Learning objectives should determine the choice of media. Choosing a technology because it is impressive can be self defeating. Make sure your choices are inclusive. For example, if a museum Web site presents itself by using a Macromedia Shockwave plug-in, offer users the choice of a non-shocked page as an alternative. Be rational in determining media.

3) Always try to integrate user interactivity with information so that learners must play
with some idea in their minds. This can be just as effective as requiring a physical response like a mouse-click or keystroke. However, interactive hot spots, buttons, form elements, Java and Shockwave programming components do offer ways to engage the learner too. The guiding rule is that the design should offer interaction with the information, not the screen elements. When programmed interactivity is used, it should test informational skills and cognition, or it should pull together additional information that the learner can integrate into his/her growing knowledge of the subject.

4) Design intelligent responses to the learner's input. Try to find a way to determine if the learner is having difficulty understanding a concept, then offer remediation through links to additional information or reinforcement presented in alternative formats. Feedback must be meaningful for the learner.

5) Design for multiple learning styles. Visual learners prefer graphics and illustrations in order to create meaning. Verbal learners prefer text or narration.

6) Avoid linear design unless defining a process. Highly structured, top down instructional designs do not fulfill the needs and learning preferences of most learners. It is best when the learner can decide how to accomplish their learning goals. It is fine to suggest a learning path, but forcing the learner down a single choice is not good. Let the learner begin in the middle and end at the beginning. In other words, the learner should have the choice to start anywhere.

7) Good museum Web sites will respect the learner and consider prevailing educational norms. Content or feedback that could be annoying, or insignificant, or inequitable must be avoided. Never create a situation where you plan on letting the learner fail in order to teach them a lesson. Use supportive language in feedback messages. Remember that learners may read at different rates, so do not time information to disappear after X number of seconds. Keep download times as short as possible, even if this means
sacrificing great effects.

8) Always test the Web page design on real end users. This is particularly true with instructional sequences. User interfaces can often seem straightforward and comprehensible to the designer, but confusing to a new visitor. Avoid a bad design which might create feelings of resentment or a barrier to learning, by consulting with a usability engineer, human factors expert, or cognitive psychologist.

Encourage dialogue and watch out for the “Unassailable Voice”

Many museum Web sites have guest books that visitors may sign and use to leave comments. This is a good feature. The idea can be taken further by creating a comments section for various artworks or exhibits. Visitors can read what others have to say and respond. For temporary shows the comments would be saved along with the data from the exhibit for archival purposes, permitting future researchers to gain a sense of the way people responded at various times.

Peter Walsh, (1997) comments on the way visitors to museums experience what he describes as the “Unassailable Voice”. This voice of authority that museums present is a fiction he says:

The typical interpretive art museum label, for example, is the work of a committee of educators, editors, scholars, and administrators who not infrequently disagree. Even the simple line "attributed to" can, in a museum label, conceal fierce behind-the-scenes debates over the nature of the art object it purports to describe.
(http://www.archimuse.com/mw97/speak/walsh.htm)

The “Unassailable Voice” that Walsh is referring to has been part of the museum experience for a long time. He describes it as having an “institutional tone and attitude that pervades museum labels, brochures, exhibitions, catalogues, audio-visual presentations, and now Web sites.” Walsh suggests it hides some of the most interesting and compelling parts of how a museum works.
But this voice is now vulnerable because it is impossible to verify as authoritative and factual in a
domain like the Web where anyone can publish their views as facts. For example the first Louvre
Museum on the Web wasn't created by the Louvre at all, but by a Parisian art lover with a desire
to extend his love for this museum onto the Web. Who can say if all the “facts” were true?

Walsh suggests three principles to guide the design of a museum Web site in order to avoid the
veracity issues surrounding the “Unassailable Voice” when it moves onto the Internet. The Web
site should be developed to do what other media cannot do, he recommends dispensing from
duplicating what has been done in print.

Build sites, Walsh suggests, knowing that change is a constant, and that the Web itself is
ceaselessly changing and evolving. Because the Web site can be easily updated, changes to
information and facts about presented collections can be accommodated. Thus museum Web sites
can become more about process.

By changing the nature of truth from the fixed state of the Unassailable Voice to a process
over time, which is far closer to what really happens with the development of knowledge,
the Web can build a process of self-validation. If the steps in the process of building
information are logical and hang together, they will tend to be self-validating. They will
also teach a far more powerful lesson on the nature of information: that it is subject to a
constant process of challenge and checking against other information.
(http://www.archimuse.com/mw97/speak/walsh.htm)

Perhaps the best way to destroy Walsh’s “Unassailable Voice” is for museums to engage in a
dialogue with their public. Designers will have to consider how to accomplish this in a way that
moves beyond a simple HTML mailto function. Because museum experts might find this dialogue
intrusive on their daily schedule of tasks, this concept needs to be resolved through an agreement
as to how it may successfully be engaged. For example, public queries might be hooked into an
FAQ database that could automate much of the job, providing instant feedback, and leaving the experts to handle only the unusual or difficult questions.

Create an educators' guide

Lutz, Fey, & Smith, (1997) report that the development of the education component of the University of Arizona's Centre for Creative Photography Web site (www.ccp.arizona.edu/ccp.html), an educator's resource, appears to have contributed to a significant increase in visitors, especially educators. They say that feedback from this component of the site has "substantiated that this outreach tool can lead to new, highly motivated and involved audiences. [They] believe that this tool will continue to help [them] achieve [their] goal of expanding audiences for art and museums, now and for the future." (March 30, 1997 http://www.archimuse.com/mw97/speak/lutz.htm)

Arizona's guide is designed to train teachers through a systematically developed Educator-as-Docent program. It is prepared and posted for each exhibition during the school year. By giving teachers the tools and training they need to schedule and lead their own school and group tours of the Centre's exhibitions, the museum Web site has become a focal point for developing expertise among art educators.

While initially aimed at K-12 educators, the Educator's Guide on the Web and in hard copy has proven to be useful beyond our expectations. University and other community faculty have responded in large numbers to its appearance. Composition, poetry, and creative writing faculty and their classes surprisingly have responded in the greatest numbers to our educational support, proving that we are connecting across curriculum lines with audiences outside the field of art --and specifically photography -- with our outreach. In addition, ElderHostel and University of Arizona Extended University instructors are among the unanticipated audiences that have been using the guide and visiting the Centre without request or need for docent assistance in the galleries. On an
average, ten to twenty classes per week now visit the Centre's galleries, most of these without assistance of staff or student docents.

(http://www.archimuse.com/mw97/speak/lutz.htm)

**Assist K-12 art educators with recommended lesson plans and materials**

Borland & Wongse-Sanit (1997), employed by the Getty Education Institute, recommend that museum Web sites wishing to serve K-12 teachers provide the following:

1) Curriculum materials to go with the images of the museum's holdings.

Most museum sites provide images of parts of their collection along with some small amount of historical data about each. If a good search facility is provided such databases might be of some use to advanced students doing research. But for the majority of K-12 teachers and students this is not enough to be useful. You must provide materials that show teachers how to use your Web site in the classroom - the more detailed the better. Experienced teachers can much more easily transform your lesson unit into something that works for them than start building lesson units from scratch around your materials. Museum education departments generally have very extensive experience with school groups and teachers and may well be able to transform existing materials they have already developed for use on their museums' Web sites. (March 29, 1997, http://www.archimuse.com/mw97/speak/borland.htm)

2) As museum Web site designers develop curriculum materials they should try to incorporate multiple teaching approaches.

From multiple sources we have heard that teachers using the Internet appear to move away from delivering straight lectures and toward increasing student interactivity. Teachers move to more inquiry-based teaching using both teacher led discussions and student research projects that incorporate searching traditional and Internet resources.
However, teachers vary widely in their approach. Ideally Web sites will present curriculum materials developed to fit various teaching approaches. (March 29, 1997, http://www.archimuse.com/mw97/speak/borland.htm)

Consider ways of supporting college-level learning

Obviously, college-level learners will be accessing museum Web sites with a different set of needs than K-12 students. While many of the DBAE issues remain with regards to the four disciplines, the scope will be shifted towards a much more academic approach. College students are likely to be engaged in studio, art history, criticism, and aesthetics, with a career orientation in mind. Therefore, their concerns will be focused on deeper issues requiring a higher degree of detailed and specific information. If we briefly look at each discipline it is possible to mention some of their potential needs.

Studio learners will be actively engaged in developing specialized and advanced skills in many of the traditional and newer media. Their concerns might range from the recipe for oil glazes, to the mechanics of etching, to methods of preservation, to the way an interactive artwork uses a computer program. This means that, at the very least, information should be provided about how artworks are created and preserved from a technical perspective. Links could be made to artists' or educational sites that deal with technical issues. Some collections may contain works that are representative of unique or rare processes in the construction of a piece. In these instances it might be the museum's duty to link detailed construction information to such art.

Art history students at a college-level would certainly benefit from writings produced by curatorial staff. Efforts should be made to develop an internal system such as an intranet, where written material prepared by curators could be posted and used, where appropriate, by Web site designers as links to pertinent areas. Museums have extensive inventories of exhibition catalogues, etc. that could be organized, digitized and put online, with access provided via some form of dynamic database that could offer Web documents, built on-the-fly, from structured queries.
Students studying art criticism might benefit from a similar database. Another approach might be to link artworks to critical writings stored as static Web pages. Since most magazine and newspapers are, or soon will be on the Web, it might be possible to associate artworks by specific artists or groups to related criticism held at those sites. For example, the AGO has been actively collecting the works of Canadian painter, Paterson Ewen. There has been a large amount of critical writing about his work for many years, much of it by critics employed by newspapers and art magazines. The ability to create links to samples of these writings online would be of great benefit.

Issues of aesthetics could be dealt with similarly, but really adventurous designers might try to program some interactive elements into a Web page permitting learners to experiment by modifying elements of an artwork in order to consider the aesthetics. Ideally, there would be a way to save the manipulations and comments so that a dialogue might develop with many learners contributing both their own versions of an artwork and comments about it or others’ attempts.

Create links to other Web sites that support art education

It is clear that museum Web sites should link to ArtsEdNet which is hosted by the Getty Education Institute and located on the Web at: http://artsednet.getty.edu/. By using the information distribution and interactive capabilities of the Internet, the Getty Institute hopes to accomplish several primary goals:

1) Provide teachers with ready access to a large number of high quality arts education classroom resources (lesson units, curriculum ideas, online images) that they can easily incorporate into their curricula.
2) Provide an online discussion forum for arts educators so they can connect and communicate with their colleagues. This is a particularly important service for arts educators who are usually very thinly spread and do not often have opportunities to talk with their colleagues in the “real” world.
3) Develop the ability to provide over the Internet beginning, intermediate, and advanced professional development to teachers who use the arts in their curricula.

ArtsEdNet was launched in September 1995. Eighteen months after its inception, the ArtsEdNet Web site contains over 1,200 text pages and 800 graphics files. Much of the site embodies a wide array of curriculum resources built around images of artworks provided by several museums, artists, and cultural organizations around the world. In addition, ArtsEdNet provides teachers with excerpts of articles and books on the theory and practice of art education, advocacy materials to help teachers win support for art education in the schools, links to other art and education related Web sites on the Internet, and other arts education related materials. ArtsEdNet Talk has become a large and very active e-mail discussion group which focuses on topics of interest to K-12 arts educators.

In order to begin learning how to provide professional development over the Internet, the Getty Education Institute has also created a number of special programs for ArtsEdNet on topics of interest to our target audience. These generally include a special ArtsEdNet Web site exhibition on a topic and related discussions via e-mail among arts education experts, artists, and practitioners. (Borland & Wongse-Sanit, April 2, 1997, http://www.archimuse.com/mw97/speak/borland.htm)

Consider developing guided discovery environments which actively engage the learner

Bob Filipczak (1996) is the staff editor at Training Magazine, in his article, Engaged: The Nature of Computer Interactivity, he reports that experts see “guided discovery” as a preferred model for learning via interactive multimedia. By giving the learners the “opportunity to talk, interrupt, and control the learning”, the designer can introduce the element of “risk” (p. 54). Filipczak sees risk as critical for separating electronic page-turning from constructivist learning:

I look to see if the user is put at any risk... When there is no risk of consequences for the learner... the mind runs on idle (p. 54).
Filipcazk suggests that risk should be designed as a motivating factor for learning. This is an intellectual risk that he is speaking of, which can be built into the design of any learning program. He gives examples like keeping score, even if it's only against oneself, or competing against the clock as very engaging. "The risk of losing is sufficiently compelling to encourage them to learn" (p. 55).

Feedback, Filipcazk says, is good, but often is "too protective of the presumed sensibilities of the learner" (p. 55). He prefers the approach taken by Robert Zielinski, co-founder of The Human Element, a consulting firm that develops interactive multimedia training. His approach uses computer interactivity to give the learner a problem to solve then drops them into an environment where they can find answers. This permits feedback to be corrective rather than judgmental. Too much coddling of the learner implies that the student is faultless, thus putting the responsibility for learning on the shoulders of the designer. He says:

An information-rich environment [might be] available, but students [might not] learn anything because there [is] no direction, no problem to solve, and no learning goals to strive for (p. 57).

**Question the levels of user control**

Filipcazk questions how much control over navigation the learner should have. The conventional wisdom is to give as much as possible. However, this could lead to problems if learners jump all over the place, hypertexting from topic to topic, when the actual subject requires a linear sequence for comprehension and understanding. This is particularly important when explaining a process. He recommends letting learners control which modules to investigate and possibly in what order, but once into one, they should follow a linear order. Obviously, there must be some kind of perpetual navigation icon system which tells users where they've been, how far they are into something, and lets them jump to the home page. He encourages sites that use bookmarking.

42
“...more media don’t necessarily equal more interactivity, just as more interactivity doesn’t always result in more learning”, says Filipcazk (p. 57). He feels the problem is that media can be seductive for designers. They should remember that their goal in supporting art education via a museum Web site is to assist in the discovery of knowledge. Learning is not a function of media, rather it is one of instructional methodologies. As far as interactivity is concerned, Filipcazk quotes from David Kline and Daniel Burstein’s book, *Road Warriors: Dreams and Nightmares Along the Information Highway* (1995). “[People] do not want technology nor do they want interactivity per se. They want an immersive, emotionally compelling or truly informative experience” (p. 58).

Filipcazk’s article contains several additional recommendations that may be used to develop good interaction at a museum Web site: 1) limiting the amount of video and other similar screen candy, unless it is particularly riveting and essential for the learner, 2) require visitors to do things, and 3) carefully beta-test a site by observing users.

**Consider gender, ethnicity, and cultural assumptions when evaluating sub-contracted design work**

Museums are likely purchase educationally oriented Web pages from 2nd party developers as the capacity to create in house is reached, or if the specific pedagogic talent is not available. In a paper to the 1997 Museums and the Web conference, Brenda Matthis (1997) argues that it is essential to consider the authorship of multimedia learning materials. Special attention should be paid, since often these materials are sold under a corporate brand name with little indication about who did the research, writing, etc. Typically published reviews of available multimedia will fail to consider gender, ethnicity, and cultural assumptions of logic criteria. In order to properly evaluate the educational aspects of museum Web sites, designers should have an understanding of the narrative that is developed by the multimedia author. The risk is that a museum Web site might fail in the area of art education because of inherent biases which could be a barrier to learning.
Plan carefully before beginning any design

Museum authorities should decide on the kind of audience they want to reach out to or attract before the museum Web site’s mood and design can be implemented accordingly. Hsin Hsin (1997) recommends that museums with more than one facility consider how they will implement coverage of them at their museum Web site. Added facilities might increase complexity, Hsin Hsin suggests “the objective is to increase visiting pleasure and not loading pressure”.

Prior to beginning the design phase of any museum Web site it is important for the site architect to know the size of the site measured by the number of Web pages. This permits correct estimates for time and resources required.

Think about colour and colour display issues

An essential concern of every museum Web site is the choice of colour scheme. While it is sometimes advisable to choose different backgrounds for different Web pages, the designer should consider maintaining the same look and feel throughout the site, keeping in mind that the objective of an art museum is to display art with the background of a Web page being analogous to a museum wall. It is best to keep it as subdued as necessary to support but not overwhelm the image of each artwork. Brian Boigon, the chief of the New Media Centre at the AGO and responsible for it’s Web site has said, “Colour is an event. It is active. It is a verb” (Lindsay, 1997, p.2). Given this perspective an exciting possibility might be to offer visitors the chance to change the background colour in order to encourage active learning about how the art image is changed through it’s relationship to surrounding colour.

Rob Berry, manager of communications at the AGO describes how the physical museum often changes its wall colours when hanging new exhibitions. This give the curators a chance to experiment and see the art from fresh perspectives. Changing the wall colours is appreciated by visitors who find things look slightly different and new each time they visit. Boigon does not accept the traditional notion that art is foreground and a wall is background. He believes the two must work together as partners. Therefore the effect of colour surrounding an artwork must be
seen in terms of push and pull. He recommends experimenting with colour and not being afraid to use its capabilities. “At the gallery we are also very aware of visual memory, or after image, and we use it” (Lindsay, 1997, p.2). By carefully considering colour schemes a Web designer can impart a holistic sense of an exhibit through the memory of the after colour a visitor takes away. Typically, heightened impact can be achieved for artworks containing vivid colour by using subdued colours as backgrounds, while usually the reverse is true for art with a subdued palette.

Chief among the tasks of a museum Web site designer is the correct colour representation of the art works. When scanning images for the Web attention must be given to the scanner's colour calibration thus ensuring the correct level of RGB is set. Depending on the quality of the input: photos, slides or transparencies, scanned result can vary in quality. Even if the quality of the original transparency or slide is excellent, it is possible to end up with poor scanned quality. Hsin Hsin (1997) recommends that a careful comparison be made between the way the scanned image appears on the computer monitor and the original art work. If necessary a skilled PhotoShop expert should carefully modify the digital file to match it as closely as possible.

At this point in time the number of personal computers downloading images from the Web that use graphic display devices which permit thousands of colours is still in the minority. A majority of visitors to a museum Web site will likely have their IBM compatible PC displays set at a resolution of 640 x 480 pixels and a 256 colour palette. In addition, most designers create Web sites using Macintosh computers which have a slightly different colour palette than IBM compatible PCs. This resolution problem can be responsible for some harsh pixelization which will effect the way a viewer might interpret an art work. The museum Web site designer should make some attempt to explain this issue to visitors, along with recommendations on how to improve poor reproduction.

The traditional viewing space that a real world museum sets up between a visitor and the art works no longer exists on a 2D Web site. This means that the designer might conceive of the spacial relationship more in terms of the spaces found between viewer and art work using books
and magazines as a model. In these conditions text becomes an important influencing factor.

Text forms an integral part of a Web page and should be considered as carefully as colour. There is a need to adopt a font type that relates to the art collections and exhibits within the museum Web site. Though the font size may vary within a page, and from page to page, font colour must be chosen to match and mix with the background and images. While text should be coded as an ISO 8859-1 (Latin-1) character, it can be also be created as a graphic file to reflect the meaning of the word, enhancing and complimenting the typeset text, however good designers will use this sparingly to avoid long downloads. The designer should decide if captions and tags ought to be available in multiple languages. Hsin Hsin (1997) recommends that text annotation should be kept “only as an accompaniment to images on a Web page, with the option of opening up press releases, bibliography, artists' biographies and essays that are stored and linked in separate files”.

Hertzberg (1997) reports that at the World Wide Web Developers conference in Santa Clara, CA, designers were told that red not blue should be the colour to indicate links that have not been explored. “Red links are hot links, blue links are cold. The human visual system is designed to recognize red as an alert. This is biological” (p. 31).

Consider how to implement multimedia elements

More advanced multimedia elements such as Java, JavaScript, Active X, CGI, etc. must be considered carefully. While these technologies and programming languages permit exciting effects they can each have drawbacks for the visitor and the designer. For example Java aplettes, at this time, can take a long while to download and be slow to execute. While features like “mouse over” are interesting, they may not be worth the wait or the expense of programming and testing. However, it is likely that as bandwidth increases over the years, these elements will come to play an increasingly important role in the design of educational interactivity because they can present much more sophisticated and thoughtful interactivity.
**Page layout must be clear and logical**

The layout of each museum Web page should start with a considered title to reflect the museum name and annotate the contents of the page. Meta tags should be added which contain additional information about the page that is helpful to search engines trying to recognize its theme. Web page designers, like all artists will have their own approach to layout style. Whether they decide on a multi-column display, a frame-based Web page, or text-wrap, or a conservative centralized text-image display style, they should begin by adopting an overall layout concept for the site. Most visitors will be accessing the museum Web site only one page at a time (though it is possible to have multiple browsers running simultaneously). The designer may choose to create different layout formats for different pages, but whatever the chosen layout format, s/he must avoid image congestion and too many font types. Positioning of the page elements should be visually pleasing, but above all they must add up to a compressible whole.

Navigation of the museum Web site must be simple, clearly understandable, and its design easily conceptualized within a very short time frame (10 seconds or less). Pages should avoid too many hyperlinks, this can present an overwhelming choice overload. Links should be strategically placed to invite continuous exploration. The total number of links in a museum Web site is not governed by any firm rule, it is dependent upon curators and designers working together. Often the criteria for setting up links include: associating by artist, exhibition theme, medium, period, collection, year, room, collectors/collections, etc. Imagemaps are useful alternatives to forward and backward linking. Imagemaps are effective ways to conceptualize large amounts of information at a glance. The good designer will constantly check that navigation links remain “live” so that visitors do not run into “404 file not found” errors. We are close to the time when it will be common for museum Web site designers to place “cookies” in a client browser’s cookie file in order to track visitors, thus permitting a database to be created based upon the visitors’ interests. This means that advanced CGI scripts may be used to generate information on-the-fly tailored to each visitor’s needs.
Technology will rapidly change the way Web sites are designed

The scope of this thesis can not cover the host of interesting new technologies, however, the implication is that rapid change will compel most museum Web sites to undergo radical re-design and conceptualization within 3-5 years or less.

New approaches to delivering information via the Web will include “Push” media which will permit subscribers to museum Web sites to have predefined content pushed onto their desktops as it is created. Push media will demand new metaphors as the technology advances.

Just dealing with the vast amounts of information that will accumulate on a PC hard drive will require new designs for organizing that data. Research is currently underway at many universities to envision better ways of taking advantage of the mind’s abilities to make connections between disparate pieces of information when learning (Young, 1997). For example, Dr. E.T. Freeman at Yale has designed the “Lifestreams” metaphor for organizing data. In this model, information is not differentiated by divisions among document types, but is ordered by “when” people do things on their computers. This digital diary sees events in which information is saved or created as part of a personal-information stream. New entries are not identified by name, but by date and time. The visual metaphor is one of an infinitely stacked deck of cards, slightly offset so that an one may be selected for view. Users can also depend upon a powerful search tool to sort through the stack. This approach takes as its core belief, the notion that people remember when something happened.

Jonathan Meyer at New York University has developed a “pan and zoom” metaphor which taps into people’s complex ability to remember things based upon spatial location. Humans, with their vast spacial memories, find it easy to use visual clues to remember where on their computer they placed a specific piece of information. Pan and zoom lets users “fly” over data and zoom down to retrieve desired objects of information. The data is presented in visual metaphors of colour, shape, and dimensionality. Web designers might find it particularly useful to present navigation tools where learners could move from Web page to Web page while leaving a visual map of
where they have been behind them to help describe their experiences while flowing through the information.

By 1999 consumers will begin replacing their aging analog television sets with new High Definition Television (HDTV). Within as little as 9 years it will become impossible to view television programming without these new digital televisions (DTVs) or an adaptor (Harris, 1997). The fact is that these new devices are essentially computers, and they will be used to access the Internet. The future design implications will focus on three issues, the newer aspect ratio of the screens (16 by 9, as opposed to 3 by 4), the film-like quality of the image, and the remote control which will change from a traditional mouse/keyboard combo for interacting with the soon to be more distant and larger screen.

**Develop a team approach to design and development**

Helfrich (1997) explains that museums wanting to develop Web sites must recognize that this is not a task for a single individual. He recommends a team approach, composed of the following members:

1) Information Systems Specialist (system administrator).
2) Online Resource Developer. (role has many permutations, a synthesis of the exhibit researcher/developer, text/label writer, teacher/trainer, and curricula developer newly metamorphosed into an online resource developer, must have excellent writing skills, classroom teaching experience is a must if this person will be designing resources for art education.)
3) Multimedia Designer. (recommended background in video production/computers)
4) Computer Graphic Designer. (recommended background in graphic design/computers)
5) Project Leader. (person needs to be equal parts psychologist, computer expert, pedagogue, Internet savant, and project manager. A new breed, this person works with all of the other team members to insure that all resource development fulfills the project's or
museum's goals and is delivered on time and on budget. This role can be filled by someone with either a strong classroom teaching, exhibit development, or public programs background. The skills required will be tailored to match the specific application or project goals.) (http://www.archimuse.com/mw97/speak/helfrich.htm)

Helfrich, suggests that to add value to the information marketplace and provide valuable online resources, museum Web sites need to organize their resources according to an approach described as “hands-on inquiry learning”. By not focusing on providing answers initially, but guiding the process of discovery using a variety of inquiry-based strategies, museum Web sites can differentiate themselves from a host of info-sites on the Internet.

**Consider how to define site traffic statistics**

Designers often use a Web counter to get a sense of user interest in a specific page or suite of pages. Helfrich says that this is not a good practice, and can produce misleading results. Web server statistics can be confusing due to the number of "hits" (HTTP requests) that a single user can generate. This means is that a server might send 50 to 60 individual files out to a single user -- not 50 or 60 users. What is required is a scaling factor which can divide all of those server hits to make them useful in measuring the number of online visitors browsing an online museum. For instance, a more accurate picture of user interest might be developed if the number of visitors who arrived via URLs from other sites was counted.

Feedback mechanisms can sometimes be considered as a way of determining site value. Though these mechanisms are critical if a museum Web site wants to encourage a dialogue, there is no clear consensus on how to solicit and interpret the feedback. There is the possibility, as well, of finding it difficult to manage the volume of feedback that some sites might produce. Forms and multiple choice questions might be a simple way to automate the feedback process by grouping the responses to gain an overall picture. But David Siegel reported to the World Wide Web Developers conference in 1997 that he was skeptical of individual e-mail feedback. It was his
experience that most of the people writing to give feedback "are the same people on hold on the radio call-in shows at 10:30 a.m." (Hertzberg, 1997, p.31).

Consider how you label artworks
Oberlander, Mellish, O'Donnell, Knott, & Cox (1997) report that they are developing ILEX: The Intelligent Labeling Explorer. This automatic text generation system is able to take into account the viewer's level of expertise about a subject and produce descriptive, explanatory, or argumentative texts to accomplish various different communicative tasks. The system is now under development as part of an EPSRC funded project, which started in October 1995 and is slated to continue until 2000.

ILEX will take into account the discourse history (the objects which the viewer has already encountered) so that the descriptions of the current object can make use of comparisons, contrasts and so on. In order for the design to permit a good degree of freedom for the user, the sequencing of the visited objects must be flexible. Labels generated 'on the fly' require the necessary background information on the user which must be associated with any given object, rather than being presented at the beginning of a predetermined sequence of objects. System design goals incorporate opportunistic strategies that a teacher or a tour guide might use. An example might be when a visitor, who has been identified by the system as a young learner, finishes studying a Pueblo pot from the early 20th century, and is now looking at an Anasazi pot from the 13th century. The system might determine this to be a suitable moment to point out some general similarities between vases from these two related cultures, or how the two cultures are historically related.

Avoid shovelware
Besser (1997) reports that the Web will soon be used to link collection management information systems to interactive exhibitions. This will be accomplished by "overlaying the narrative structure of exhibitions onto the item-based rich collection of information found in collection management systems." Many museums are developing their Web sites simply by taking existing
multimedia exhibition packages and re-purposing them for the Web (shovelware). New applications being developed right now are likely to eventually lead to the break-up of this way of doing things.

Two features that museums are beginning to use are database queries and collection-level views over individual items. Linking Web pages to a database is a powerful way to permit the user to shift their approach to an interaction and to solicit more detailed information about a particular art work. In general, as of this writing, museums have not yet used their collection management information systems as a database with hooks from the Web pages of an online exhibit. However, Besser reports that a number museums have started in that direction by “putting item-level detailed object information into a database and linking that into a Web-based query, (for example, the Perseus Project [www.perseus.tufts.edu], the US Holocaust Museum [www.ushmm.org], and the Jepson Herbarium [http://ucjeps.herb.berkeley.edu/smasch.html]).”

A serious concern for museum Web site developers considering this approach is security: how to make available object-level records without providing access to information that the museum may not want to make public. Museums that excerpt records from their collection management systems and put them into some publicly-accessible space run the risk of letting users have access to certain fields that should be excluded (including donor information, insurance and valuation). Other problem areas concern information that is for internal use being publicly accessible. Besser gives an example of where gallery staff or curators might annotate a field record with information which might be ‘true enough’ for themselves or their work, but that might be misinterpreted by a visitor as official museum data about the art work.

Create a search tool
Museum Web sites need to design configurations that permit search engines to query multiple information sources drawn from diverse formats within museum information systems. Blackaby & Sandore, (1997) point out that there are advantages and drawbacks when creating a system that enables users to retrieve information across various existing systems and data formats. On the
positive side many museum departments can merge data in a meaningful way permitting user access from any point. On the negative side, data in different formats results in the access control being hierarchically diluted when the data is merged.

For example, a search in a hierarchically organized collections database for all objects created by a particular artist retrieves a result that will only change if the museum adds another work created by that artist to the database. However, the same search across a combined file of objects, manuscripts, photographs, and library materials for materials by or about a particular artist might produce a very different, less predictable result, depending on the search engine, the way in which the merged data is structured and indexed, and the way in which the query is executed across the existing data. (http://images.grainger.uiuc.edu/papers/mweb215.htm)

Though these collections of information are useful for visitors with art education needs, even conscientious indexers, curators, and catalogers can get misleading results using different search engines. A number of studies have indicated that professional indexers, expert searchers, and new users rarely choose the same words to describe the same information. Search engines with different approaches to culling information can affect the ultimate results of a query.

Museum Web sites might consider including a help section on searching strategies which would include a standardize lexicon of search terms. Ultimately, this should be developed with the cooperation of a cross-institution panel of museum index experts.

Consider whether visitors will experience the Web site alone or in groups
When designing the museum experience for a visitor, museum Web site developers should consider grappling with a definition of the potential user. With art education in mind, a list of learner variables should be drawn up including whether they are single users or part of a class. Bannon & Ferstrom (1997), say that visiting a museum Web site is often a solitary experience, they argue that this should be changed to a group experience. Group experience is more likely to
be interesting for learners and make it easier to appreciate art works and to understand different contexts. Visitors interested in a specific art related subject will naturally seek a Web museum for that particular interest, since there is a likelihood that others of similar interest will also access the museum site, there should be a mechanism to enable virtual visitors to find out who else is online or accessing specific pages. This would have to respect the desire for anonymity while permitting those who so desire to establish chat-style communications with one another. It should also be possible to leave records in some kind of information space that can be saved, shared and perhaps made visible for others with similar interests. The design of this kind of technology will likely be complex, perhaps purchased from an outside vendor, but one overall factor should be that it is user-friendly, and a participatory design approach should be taken with all stakeholders involved. An iterative process of designing the visitor experience is likely to get the best results.

**People learn by doing**

Glasser (1997) discusses how the Virginia Museum's Web site has designed a way to build upon its educational philosophy. Their site focuses on a participatory approach to learning which recognizes that learners remember best when they do things. Thus they attempt to make their educational programs as experiential as possible.

> We believe the most effective educational experience allows visitors to apply the information they receive during their visit to interests and experiences they already possess; it is through this self-selecting process that people expand their knowledge in a personally meaningful way (http://www.archimuse.com/mw97/speak/glasser.htm).

"You're the Expert" is an interactive Web site which allows visitors to pursue the types of information they wish to explore through a sequence they determine for themselves. The site integrates experiential learning by providing them with the ability to apply the information immediately to a specific, concrete problem.

[The Virginia Museum has] learned that one of the first things new members, interns,
volunteers, and museum studies students are interested in doing is discovering what the museum is like behind-the-scenes. "You're the Expert" lets visitors 'sneak a peek' behind the scenes while it exposes them to the myriad skills and expertise that go into operating a museum (http://www.archimuse.com/mw97/speak/glasser.htm).

Seek advise from art or museum educators

Lewis (1997) describes how her team conceived and created an educational museum-like Web site using the advice of a museum educator. This expert's recommendations resulted in the following decisions:

1) follow the chronology of the exhibit but focus the Web site on the narrative,
2) create three levels of complexity as a way of organizing the content and activities by grades--level one: grades 3 - 5, level two: grades 6 - 8, and level three: grades 9 -12,
3) make the Web site as teacher friendly as possible by creating a "teacher resources" icon where teachers could go for lesson plans and other teacher specific materials.
(http://www.archimuse.com/mw97/speak/lewis.htm)

Break boundaries

Witcomb (1997) has discussed ideas which bear some consideration for museum Web site designers. She argues that the "status of objects within museums, and hence their authority to 'speak' within this hegemonic system of representation, is being questioned by the inclusion in exhibitions of non-objects - particularly mock-ups, audio-visual technologies and interactive computer information points". Museums are now continuous with the media, particularly when they migrate some aspect of themselves onto the Web. Roger Miles (1993) writes that:

[The] modern multimedia exhibitions reflect not the international world of museums as repositories, but the external world in which museums now find themselves. This is the world of our post-industrial society - dominated by technology, with pervasive media and advertising industries, and instantaneous electronic communications; a society with a
pluralistic culture in which the boundaries between high art and mass culture have broken down (p. 27).

Given this perspective, Witcomb argues that an opening up of virtual space for museums “frees them of their necessary association with the nation-state and with hierarchical forms of power. It does this because the notion of information and its association with electronic technology sets up a space which cannot be understood as hierarchical, as setting up a distance between a centre of power and its periphery”. Electronic media have, Witcomb says, “enabled a questioning of the status of objects in museums, with a consequent freeing up of the kinds of narratives museums use in the interpretation of their collections, this electronic, virtual world has at the same time, ensured the continued relevance of the material world” (Http://www.archimuse.com/mw97 speak/witcomb.htm). Museum Web site developers now have the opportunity to design sites in which these ideas may be played with and, in the process, they may just expand the definition of what a museum is.

Content is king

Alsford (1997), who is Special Projects Officer in the Directorate of the Canadian Museum of Civilization (CMC), has presented a paper in which he explores just why the Canadian Museum of Civilization’s Web site has been so successful. He says the visitors appreciate its depth of useful, educational content more than anything else. The number one guiding principle underlying CMCWeb design is that “content is king”.

Starting from the perspective (or bias, if you will) that museums are content-rich institutions with a fundamentally educational mission, my vision of CMCWeb has always been that its primary task is to help make more widely available the museum’s knowledge resources. This is not to deny the value of design (graphic or educational), interactivity, or the various cool or fun elements that adjunct applications allow to be incorporated into Web pages. There is no “right” model for museum Web sites, nor is it desirable that we try to fit them into a standard mold; diversity is the spice of life. But, given that limited human
and financial resources make choices necessary, my main focus is on building an extensive site covering a wide range of subjects (http://www.archimuse.com/mw97/speak/alsford.htm).

**Ensure that management works to support the design effort**

Alsford respects the museum metaphor and explores how it might be expressed in an online environment. His challenge is to develop content of sufficient depth which will encourage return visits. Some of his recommendations regarding the design of museum Web sites revolve around issues of management:

1) Try not to get bogged down in studies, surveys, considerations of cost and policy issues; many Web projects have been long delayed or even canceled after an inordinate amount of management hand-wringing.

2) The key individual to spearhead the design and development of a museum Web site may not necessarily be the most obvious, such as a computer technician; it may instead be, a librarian, an archaeologist, a collections manager, or one of the museum's volunteers. [Museums should] try to identify such individuals within their organizations, foster their enthusiasm, loosen the leash a little, provide whatever support they can.

3) A spearheading individual may not be with an organization indefinitely. What happens to the Web site then? This is one argument for turning over the site, at least once the trial period is over, to a particular section of the organization as a continuing responsibility, or even for creating a new organizational unit to take charge of the site.

4) Web content creators [should have the] following set of qualifications:

   (A) post-secondary education in a field related to [the museum’s domain of interest],

   (B) experience in network-based delivery of information, electronic publishing or computer programming, (C) computer-aided graphic design skills, (D) working knowledge of the World Wide Web and related applications, and experience using HTML,

   (E) skill in written communications in [relevant languages].

5) A museum may have to find this skill-set (item 4), along with project management
abilities, through a committee or team approach similar to that which many institutions use for exhibition development. However, at least one of the team should be doing the actual page creation.

6) There [should be] concrete commitment to specific Web projects within specific time frames; departments [should] plan and undertake those projects using their own resources.

7) Museums must be prepared to bear the costs not only of equipping in-house content creators with adequate hardware and software, but also of training and re-training, or at least for the time allocation for self-training. They must also accept the learning curve period, which will vary depending on the existing skills and abilities of the staff member.

8) At the risk of an unfair over generalization, I would say that [Web team members] specializing in multimedia technology are more likely to create Web page designs that are appealing or cool, but that [team members with a] museology [background] may be able to cope with organizing the subject-content better (http://www.archimuse.com/mw97/speak/alsford.htm).

Being object-centric does not necessarily support learning needs

Donovan (1997) argues that Web based museums should not be object-centric, he proposes a new metaphor for organizing on-line content which he believes is more likely to meet learning needs. He says that museum collections contain many objects which do not give up the richness of their history, context, and meaning easily. Museums need to assist their public by providing meaning. Interpretation through narrative methods can assist in developing meaning for learners and is the way to add value to the data.

Simply providing the public with access to data is insufficient to satisfy the goal of public education. To achieve on-line Public Learning ... museums need to offer enriched, value-added content that supplements label copy and object records with well-told stories that captivate and enlighten. ... it is more efficient to deliver browser-based on-line Public Learning via database-driven sources, museum information systems must evolve from object-centric collection management systems to context capable content management...
systems. These content management systems will require enterprise-wide, browser-based implementations so that content creators can contribute their content to the management system. By committing this value-added information to content management systems museums will be able to publish compelling on-line Public Learning programming via distribution systems like the Internet, and preserve the valuable intellectual assets of the institution (http://www.archimuse.com/mw97/speak/donovan.htm).

**Permit users to play with process and authorship**

Worden (1997) describes the Virtual Curator [in development] as the result of a collaborative project with the Centre for Computers and Creative Work, at the University of Brighton. This software has implications for museum Web site designers because it may point towards a new approach that art educators will use for developing interaction between their learners and virtual museums.

The Virtual Curator is a purpose built application which runs on Apple Macintosh computers. The name was chosen to signify the active, creative role to be played by the user. When using the Virtual Curator students work within the metaphor of curating an exhibition but they are not constrained by the physical setting, or limitations of rarity and preservation. In the virtual world, the fact that 'objects' can be endlessly reproduced and circulated without loss of quality is something to celebrate and use, rather than control with out-dated structures of intellectual and physical access. The power structures of the museum as institution need no longer be replicated (http://www.adh.bton.ac.uk/ctiad/saw/conf/TITLE.HTM).

Students using this software place images and text in a 'store', a database with a plain blue background. The images are imported from anywhere including museum Web sites. Texts and images can be visually arranged against the background and hyperlinked in any conceivable way. New screens may be created to represent annexes which are iconically represented on the original
Thus art students become curators, researchers and exhibition designers. There are a number of issues that learners using the Virtual Curator address, as summarized below:

1. museum as metaphor
2. the power structures inherent in the museum (challenging authority and deconstructing received standard forms of knowledge)
3. primary and secondary sources (the way we differentiate and prioritize image, text, sound or animation)
4. the languages of visual representation: collage (creating the visual equivalent of a narrative that is interrupted and broken, and that shows the 'constructed-ness' of an exhibition)
5. collaborative development
6. the relationship between theory and practice (investigate the kind of issues being highlighted by debates about the postmodern and the idea that to use technology and its underlying structures is part of the very essence of postmodernity)

Students and art educators using the Virtual Curator find it possible to investigate a few of the issues surrounding the connections between museum and the Web. When presenting information via a Web interface new spaces are offered: a work space, a learning space and a community space. The Virtual Curator focuses learners on a work space which creates a virtual community that “examines and presents multiple viewpoints on historical heritage and situates ideas and objects in a cultural context... [which] on the basis of the underlying theory attempts to interrogate and open up within an educational context” (http://www.adh.bton.ac.uk/ctiad/saw/conf/TITLE.HTM). For the learners discovering new ways of presenting knowledge becomes a foundation for critical inquiry. The technology encourages them to focus on process, and authorship.
Chapter 3

Analysis and Critique of Four Museum Web Sites

Philosophy and parameters for the analysis and critique
The Web is very young and is evolving at a very fast rate. It was only Spring 1993 when the first Mosaic browser became available for PC users. Now just four years later the Web scripting language has gone from HTML 1.0 to HTML 3.2 (as of April 1997) with far more capabilities than anyone dreamed of. These advances are continuing and it is hard to predict what the years ahead will bring. That means that in a short while some issues and aspects I will describe here may no longer be of much concern. This thesis will become of interest, perhaps, as a historical record of how information designers worked at the dawn of the Web era. Nonetheless, some concerns about art education and museum Web sites will transcend the evolving technology to remain as guidelines for the foreseeable future.

Today designers are forced to wear all kinds of hats, as programmers, graphic artists, writers, and information design specialists. With the advent of the Web revolution separate disciplines have become merged into one integrated communications medium (Weinman, 1996). It is natural for developers to feel overwhelmed by the rapid changes and new, sometimes insufficient, rules.

The information in chapter 2 and the analyses and critiques that follow in this chapter are intended to help designers think about issues influencing how a museum Web site might integrate art education into its structure. I will not discuss, in any depth, programming concepts that are part of HTML, Java, JavaScript, CGI, etc., but will consider what they can do as part of the design supporting a museum Web site. My concern is on how the sites work, and how a new visitor will experience them, particularly from the perspective of art education. It is not my intent to denigrate the hard working designers who are blazing trails for museums on the Web; hopefully, my observations will be understood as contributing to the dialogue surrounding Web design issues
Those seeking technical "how-to" information related to Web site construction will find many books on the subject available commercially.

Though the Web sites I examine are unique, there are common issues that I will address. Below is an unordered list of relevant concerns that will inform my analyses and critiques during the four "tours":

- How is the information architecture arranged with concern for art education?
- Does the site support learner interaction?
- Is the site structured with pyramid-like or laterally connected pages?
- What is the home page philosophy? (Spare with few links or detailed with many links?)
- How does the interface relate to site structure?
- Interface design features: obvious hyperlinks, confusing controls, cursor changes, interface mood, location of visitor, interactivity provided by Java, JavaScript, Shockwave.
- How quickly is rich/detailed content presented?
- Do the sites change over time? And how will a visitor know this?
- What is the graphical identity, is it consistent, and can it permit specific content changes?
- What metaphors are employed? (encyclopedia, book, magazine, brochure, etc.)
- Are the structures logical? Do they represent views of the site's information that are easily understood re. purpose and content?
- Does the site pass the "3 click" test?
- Do the individual pages present logical modules of information?
- What are the multimedia elements, do they support or interfere?
- What navigation strategy is employed? (Site specific controls, site wide plan, home links, navigation bar, search functions, frames, etc.)
- Consistency, can the user trust the interface?
- Cues and feedback to visitors.
- Can the site function in graphics-off mode?
- Is there advertising, and what influence does it create?
The Art Gallery of Ontario's Homepage (Fig. 1) is against a black background with the image of the AGO building done in line drawing format. There is a "Welcome" link and an "AGO" logo link, both set into the drawing of the building. An animation sequence of a Franz Halls portrait circles the top of the building's tower. Beneath are links to the Shockwave FLASH Player, and RealAudio plug-ins. Links to download sites for copies of Netscape 3.0 and Internet Explorer 3.01. In the form of a billboard on top of one of the museum's wings is a link to the Art Museum Network. Visitors also may choose a link to a Non-FLASH version of the site, and to the New Media Centre. For those accessing the site without the plug-ins, a page is displayed with the following message: "You will need the Shockwave FLASH plug-in and the RealAudio plug-in to fully appreciate this site. Download here or use the AGO's non-FLASH site (not nearly as flashy). Once you have the plugins, return to the site."

Layout is nicely proportioned, fairly spare, easy to read, handsome graphics (though some colours displayed poorly on my monitor due to close contrast). The animated painting adds to opening page excitement without being annoyingly large or visually aggressive. There is some confusion as to which link is the real entrance to the online museum: the "AGO" logo, or the "Welcome" link? The "New Media Centre" looks like a link, but is actually a mailto. Mailto links should be identified as such.

The Non-Flash version (Fig.2) is designed for those whose browser does not support the required plug-ins. It is composed of two frames, one with links, the other with a large AGO logo and a
second graphic. This is a less pleasing design which bears no resemblance to the Homepage. This is a fault, it would be easy to use the same graphics as still, non-animated images, thus ensuring that visitors get the same Homepage look no matter which version they choose.

The non-FLASH version does provide a better sense of the site layout through the menu in the frame on the left. The layout has a "24 hour" graphic image above the left frame which does not complement the weighting of the page structure, nor is it clear what it's purpose is. The graphic would go better in the main frame, or not at all.

Returning to the Homepage, I have a sense of the site's importance, but no sense of the site's structure. To discover this I try clicking on the "Welcome" link. This brings up what might be described as a frame-aholic designer's ode to frames (Fig.3). As if the five frames cluttering the browser window were not enough, the designer has thrown a floating browser window on top of everything. This is terrible clutter, note the tiny unlinked AGO.net frame in the lower left corner, there is no need for it. I find the images in the two top frames interesting but am not sure how they support what the "Welcome" page is supposed to do.

When I click on any of the links in the top frame, for instance the "restaurant" link, the floating mini-browser window diminishes out of sight (and out of mind).

I decide that the "Programs" link in the top frame might give me some sense of what is going on at the AGO. By clicking it, I discover that the frame-aholic designer just couldn't resist the temptation to toss in three more frames. This means that, if we include the diminished floater, there are now eight frames going at once!

Finally, I begin to see links to my area of interest. One of the three new frames contains links to "Education Programs", and something called "Gallery School" (Fig.4). I also notice in the frame on the left (it looks like an escalator), a link for "Curriculum".
Figure 3
Figure 4
Clicking on either the “Curriculum” link in the escalator frame on the left, or on the “Education Programs” link in the centre frame pulls up the same page devoted to education programs. I get a sense that the targeted audience will have something to do with K-12 because the frame in the upper left hand corner has dumped the graffiti image and replaced it with a blue tinted photo of happy school children. (Fig.5)

At this point, I now feel that though I have had to grope blindly to get here, I am now at a place in the site that is devoted to art education. There is a teacher's guide, which I know is active because the text changes from white to red on mouse-over, a link to the Saturday Morning Lecture Series on Edvard Munch, and a link titled "A stimulating program for high school students". Beneath that under the title "Education Programs" is a menu of many items that might relate to art education, items included are: “Programs for Teachers, Self-Guided Programs, Video and Media Kits, How to Book, Planning a Visit, Adult ESL Learners, OAC History Students, Visual Art/History Students, Art/Media Literacy Students, and Visual Art Students”, etc.

It seems that this must be the gateway for learners, no matter what their age or discipline or background. I begin my exploration of how the AGO supports art education by choosing the link to the "Teacher's Guide".

The guide, seems well conceived, and follows the suggestion that less text is better when learning via a computer interface. The essential information is there, but presented compactly. The four disciplines of DBEA are covered, historical, critical, aesthetic, and studio (in the form of a suggested studio exercise).

The “Saturday Lecture” link turns out to be simply an announcement of this week's topic and who the lecturer will be, and ticket prices. Clicking on "A Stimulating Program..." brings me to a description of a program for actual visitors to the gallery. The description suggests that learners should be "Students of Art, English, and History, grades 10 to OAC". There really isn't anything here for online visitors to do.
Figure 5
Moving down to the menu of items under the heading "Education Programs" I begin with "Programs for Teachers", only to learn that these require me to actually visit the gallery. At this point I begin to suspect that I'm looking at an online brochure, and that this electronic page turning is only going to inform me of things I can do if I actually go to the AGO. What I really am looking for is what I can learn and do via my virtual visit.

"Self-guided Programs" does not turn out to be a way for me to tour the virtual museum, but is a "kit includ[ing] pre-visit materials, gallery worksheets for students, curriculum outcomes and visual resources. Ideal for cross-curricular use in Transition Years." This is something that would be mailed to me.

I click on "How to Book", hoping for a lesson on art techniques and realize that I was thinking of how-to, not how to book a group for a program next time they visit the museum.

It is clear that everything in this menu is here to inform me about programs that the gallery education department offers to real visitors. For the virtual visitor, there is little here. I either must travel to the AGO with my class, or search the site a little more to see what there is that can be used to support art education.

I back track to "Programs" (Fig.5) and try the link to "Gallery School". This connects to a page of information about the art courses taught at the gallery. While, the courses look interesting, there is nothing here to help a learner seeking information or an art teacher looking to devise curriculum. I also realize that there is no scroll bar in the frame about gallery school courses, and yet there appears to be additional text. The designer, seems to have forgotten to include the HTML tag for a scrolling frame. This doesn't surprise me, because the site is very complex, and testing of all the components is hard to do. I decide to e-mail the designer and let him know about the problem.
In the small frame on the left I scroll down to a link titled "Email". This opens up a whole new set of frames called "Talk to us". As well as a link to the AGO staff email directory, there is a link to the "Edvard Munch discussion forum". Here is something that might be of interest to art education. But before I look into it, I decide that I had better let the Web designers know about the missing scroll bar. I realize that I did not make note of the page URL, and wanting to be helpful, I try to get back to the page of "Gallery School" courses.

Oh-oh, I'm using the back button, but it's not going to where I want or think it should go. It's jumping through the frames in a way I can't predict. After three clicks, I'm nowhere near the desired page, and I seem to be lost! I've hit the "three click" conundrum! This is a rule that says if you can't get to where you need to be in three clicks, you're probably going to get lost.

Continued clicking gets me hopelessly confused. This is like a puzzle, I try clicking on an item called "Entrance", thinking it will take me back to the Homepage, but it doesn't. It takes me to a page that looks like it could be the Homepage (Fig.6), except that it isn't the first one I encountered when I arrived at the AGO site (Fig.1). This page is structured somewhat like the Non-FLASH version of the site (Fig.2) except that it has some nice mouse-over light-up effects when I put the cursor over sections of the image-map.

I give up on the idea of e-mailing the Web designers, and return to my pursuit of pages that might be supportive of art education's needs.

Going back to the Edvard Munch discussion forum, I encounter a page that presents a number of questions which will act as focus points for explorations of two major themes in Munch's work: relationships, and death & loss (Fig.7). There is some wonderful JavaScripting wizardry at play on this page, it is entertaining to see how the designers have used a mouse-over each of the question numbers (1-5) to present the actual question as a string of text which follows a Bezier curve.
I choose a question and find myself with a new interaction-type page (Fig. 8). I find the black text hard to read against the dark blue background, but decide to join the discussion. Before I engage in it, I notice a link to something called "Cool Gifts" and wonder what that has to do with a discussion about death & loss?

Because I am familiar with threaded messages in a computer mediated communications (CMC) forum, I recognize what is meant by the items "Inline depth: 1, 2, 3, ALL" and "Outline depth: 1, 2, 3, 9, ALL". I am convinced that most learners would not have any idea that these set the message threading levels, or even what this means. They would have to use the "Help" button, which is an embossed Windows-style button that seems stylistically out of place on this page. I try the “Help” button.

But before I can click it I get another error message. I'm using Internet Explorer 3.0, but continue to get Jscript errors. Employing embedded scripting in HTML documents is risky.

The help page seems fine with all the info I'll need to use the threaded discussion feature. The text is still black against dark blue and I find it very hard to read. And there is plenty to read; for a new user, I doubt there would be the time or desire to go through it all. Thus s/he likely would either try to use the feature blindly, or would not join the discussion.

I choose to add a message. Again I struggle with the hard to read black text against a dark blue background. I can just make out the following sentence: "If you are a frequent contributor to this forum you should become a member." The word "member" is highlighted; I wonder, should I join? Will I be coming back again? Membership implies belonging to something. I worry that I may not be qualified. Maybe this is some kind of elite art intelligentsia group who would frown on any input from me. What if I was only 13 years old; would I be intimidated?

I compose a comment about the question for discussion. I can use a feature called smart text which permits me to embed HTML tags in my text if I wish to create links or pull in graphics, etc.
Figure 8

Discussion
I can also associate my message with an icon that represents my intent (i.e. a happy face, a question mark, etc.). I realize I've worked with this CMC software before, it is called HyperNews. I attended an online class at the Ontario Institute for Studies in Education (OISE) where we used it as our course discussion vehicle. There were some serious problems with it in 1996.

After composing a comment, I click on the preview message button. I wait. After a minute I get a timed-out message. Oh-oh, better try again. Second time it works, but I've got a typo. I use the back button to correct it, and go through the steps to post my message again. Now I remember why everyone at OISE hated HyperNews, it was terribly slow to respond. This put a big damper on course discussions. I check the other AGO discussions and realize that there are very few postings. I know why.

By this point I've been exploring the AGO Web site for over an hour. I decide to go back to the "Entrance" page and take the "Director's Tour". This is nicknamed the "D Tour", I smile because of the amusing association, but then wonder whether there's other interpretations? This page (Fig.9) has a photograph of a smiling man in the upper left corner. I think it is the AGO director, and since my cursor changes to a pointing hand when it passes over the image, I click to find out his name and anything else about him. Oops, nothing happens, even after repeated clicks. I'll just have to guess that this is the AGO's director. Complex sites can be hard to maintain.

An animated scrolling text bar, suggests that I click on the landscape painting. Which is what I do. The tour begins (Fig.10) with a painting by Giovanni del Biondo, which is labeled in both official languages, but the accompanying text is only in English. The text is informative, I feel that here is some information about actual art that I might be able to use as either a learner or a teacher. But it has taken a while for me to find it.

I also notice that there is now a link in the bottom frame to something called "Director's Background", "Renaissance", etc. Sure enough, the first one tells me about the AGO's director,
Giovanni del Biondo
ca. 1350-70

Among the earliest works in our collection, this panel from an altarpiece gives us insight into the origins of the Renaissance in Florence. St. Benedict looks upward, shielding his eyes from a powerful vision of how small the world is in an immense, gilded universe. The hauntingly human landscape.

Figure 10
Dr. Anderson, and the second, presents four clickable thumbnail images in the centre frame of paintings by masters of Renaissance painting. Clicking on each brings up a larger (though still compacted in its smallish centre frame) reproduction with accompanying text in the frame next to it. The text is informative but not long-winded.

I am able to scroll through the bottom frame to access links to an number of interesting points including: “Collection Highlights”, the “Baroque”, “Rococo”, “19th Century”, “Modern”, and “Contemporary” eras. Each of these follows a similar pattern of four or five artists, a reproduction of the painting in the AGO collection, and commentary from the director. The information is introductory in nature, and serves to whet the appetite for more. Unfortunately, there are no links to further information about any of the artists or their works. No links to exhibition catalogues, or curators notes. There is a link to FAQs, which when clicked explains how the tour works, though it seems redundant to read about this now that I've completed the tour. Buried at the bottom of the FAQs list is: "May I ask questions?"

Ah-ha! This might be an ideal way for learners to interact with museum experts, but the link is not obvious and is only found by digging. The link is actually a mailto which sends email to the New Media Centre, and from there, I assume, one’s message is forwarded to Dr. Anderson (who, because of his busy schedule, most likely delegates the task of replying to someone else). The reply might take a while.

I'm a little uncertain about where it might lead, but there is also a link to the "AGO Online Catalogue". By clicking it I am surprised to learn that "If you're a member of the Gallery, you'll have access to over 500 images in our collection and accompanying maps, text, voice and video links." The word "member" is clickable, and leads to a membership recruitment page. So much for learners being able to access much of the collection and information about it for free. I wonder if those 500 images are available online somewhere else?
Finally, since the big exhibition on at this time is showing the works of Edvard Munch, I return to the main menu (Fig.6) and click on the image map for the Munch link. Here the Web designer's artistry is evident via a number of nice touches. First, there is a mouse-over effect that changes the drop shadow behind the title "Edvard Munch" to a shadow of his distinct signature. The Munch page itself (Fig.11) is a Shockwave FLASH animation, with the text coming on page via fly-ins from the sides and the photo rising from the bottom of the page.

There are two choices: a link to the "Munch Biography" which presents a (very brief) point-form chronology of his life, and something called the "Munch Web Project". Here we have more of the Web builder's art displayed for us. There is interactivity through mouse-overs. These occur when the cursor passes over a photo of Munch (we see the name of the exhibition replace the photo), and when the mouse is over the main hyperlinks I am presented with fly-outs that seem to be eye candy and don't inform me about where the link will take me. The choices are: "Exhibition", "Discussion", "Pop Culture", "Cool Gifts". Oh-oh, there is that "Cool Gifts" link I saw when I was about to enter a discussion on death and loss; hmm... hard to get away from commercialism.

The exhibition permits me to enlarge a print of "The Scream" (Fig.12). By clicking on the photo of Munch I can return to the exhibition, only to realize that it consists of just one (albeit famous) image. I have no access to images of the other works in the show. But I am given the opportunity to listen to audio clips by both Munch and Marion Woodman, a psychoanalyst who discusses "The Scream". The Web designers offer both a text and RealAudio version of the clips. I try the RealAudio player, but it doesn't work with my plug-in. I suspect this is because I'm using a 14.4 modem and the AGO's RealAudio server has been set to stream audio for 28.8 speeds only. Thankfully I can read the excerpts.

After my visit to the AGO Web site, I feel there are a number of design issues that can be pointed out. This site pushes Web technology by using frames, and many interactive elements requiring JavaScript, and other forms of programing. But the overall sense is that the site is confusing. It "feels" like there is a lot to explore, and there is, but finding one's way is often just as important
fraught emotional turmoil.

Munch web project

Figure 11
Figure 12
as offering a lot for the visitor to do. I suggest that visitors interested in some form of art education would benefit from a site map that would clearly point to specific areas of the collection, reproductions, information, lessons, and community interchange. This site map should be accessible within one or two clicks of the Homepage and should be obvious, not tucked into one of too many frames per page. I suggest there is a need to re-conceptualize and re-design the use of frames throughout the site. I recommend using no more than two frames per page, or substituting frames with a perpetual navigation bar. The frames make for visual clutter, the pages need more “breathing room”, and a better use of positive and negative space is required.

An art education visitor would benefit from links in the text referring to items in the collection which lead to other sources of related material, either housed on the AGO’s server or on other institutional servers. While the museum education department has provided plenty of information about its programs, it should consider developing online programs for virtual visitors interested in learning about art. There is no obvious presence of the museum curators online. Efforts should be made to introduce these specialists and show learners just what it is they do and how it relates to DBAE’s four disciplines. It should be possible for learners to query the different curatorial departments. Interaction with others through a form of community dialogue is something the AGO’s site is positively engaged in. This effort must be applauded. The HyperNews server is unfortunately not the best choice of vehicle, other systems should be considered.

In conclusion, the AGO’s Web site is an excellent example of innovation and should be recognized as one of the pioneers in this area. However, there is no clear effort to organize site contents for online learners interested in art education. Learners who do access the site will discover that they must still consider a real visit in order to benefit from the museum’s education department and other resources.

A Central Hub: The Art Museum Network
Under the supervision of the AGO's New Media Centre, The Art Museum Network (http://www.amn.org/Default/AMNDefault1.htm) acts as a hub permitting access to over 180 of North
America's premiere museums (Fig. 13). The New Media Centre's chief designer, Brian Boigon, has stated that the AMN will become a broadcast centre for push media which will deliver Web pages to users who have subscribed to specific channels.

Push media is a new Web concept that acts much like automated e-mail listserves, except that it delivers Web pages to subscribers every time the page is changed or updated. Subscribers to push channels can set parameters for when a page should be pushed to their desktop. For instance, they might ask that a page be delivered to them only when the headings, specific contents or the meta tags change.

This thesis will not review the AMN site because it is still under construction. However, it promises to become a central feature for learners in the near future who wish to have access to information stored on servers across the full gamut of museums that are part of the AMN.

Figure 13 shows three channels that are of specific interest to those wishing to use museum Web sites for art education. They are channel 5 "Scholars", channel 7 "Students", and channel 8 "Teachers".

Channel 5 is for scholars and would likely be of interest to those learners at more advanced stages of their art education, it states:

As museum libraries go online, stay connected to AMN for updates and news bulletins on resources available over the Internet. AMICO, the Art Museum Image Consortium, will provide thousands of networked images through a searchable database, useful for research and for assignments. We will provide you with networked access to museum stores, enabling you to search out hard-to-find titles, including exhibition catalogues, monographs, and collection catalogues. Online publishing is just beginning, and ArtMuZine will provide a searchable forum for recent scholarship on art museum collections throughout North America. (http://www.amn.org)
The official website for the largest art museums in North America

These channels will provide centralized, authoritative and frequently updated information from 120 of the foremost art museums in Canada, Mexico and the United States. All are members of the Association of Art Museum Directors, the world’s leading professional association of art museums. Come back often, and let us know how to improve our offerings!

<table>
<thead>
<tr>
<th></th>
<th>Event Planners</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Kids</td>
<td>Teachers</td>
</tr>
<tr>
<td>3</td>
<td>Press</td>
<td>Tour Operators</td>
</tr>
<tr>
<td>4</td>
<td>Museum Staff</td>
<td>Visitors</td>
</tr>
<tr>
<td>5</td>
<td>Scholars</td>
<td>Volunteers</td>
</tr>
<tr>
<td>6</td>
<td>Sponsors</td>
<td>AMICO</td>
</tr>
</tbody>
</table>

Figure 13
Channel 7 is for students, it states:

Students, watch this space for internship and fellowship guidelines and deadlines. Have a look at full-time and volunteer positions currently open to get a sense of what skills art museums are seeking in applicants and how to obtain them. Drop in everywhere on AMN - there's no better way to stay in touch with current program offerings and developments in museum practice and research. (http://www.amn.org)

Channel 8 is for teachers, it states:

Teachers, the Art Museum Network is committed to enabling networked distance learning about art and art history, and we are in the process of developing this utility. In the meanwhile, visit this page to follow select museums as they innovate, building curriculum guides, teacher training packets, and virtual tours of collections and exhibitions. Please e-mail us at AMN with comments and suggestions about the kinds of services you'd like us to offer. (http://www.amn.org)

The site has links to "Museums", "Exhibitions", a "Museum of the Week", and "Stores". Clicking on the link to "Museums" brings the visitor to a map (Fig.14) of North America which permits users to search for museums alphabetically or by region. Clicking on "Exhibitions" calls up a scrolling text box that gives an overview of exhibitions that are on at this time (Fig. 15). Selecting any of the choices links the learner to each exhibition's online version. This is a useful feature permitting a quick review of what is currently available.
Figure 14
Selected Exhibitions

- Art Gallery of Ontario
- Birmingham Museum of Art
- Boston Museum of Fine Arts
- Butler Institute of American Art
- Canadian Centre for Architecture
- Center For Creative Photography
- Dallas Museum of Art
- DeCordova Museum and Sculpture Park
- Dia Center for the Arts

Figure 15
I will use the AMN's interface, which links the user to museums of their choice while maintaining two thin frames at the top and bottom of the browser window permitting me quick access to the complete AMN selection. This is handy for learners at the beginning of a search for specific information, (this feature is not illustrated in the Figures in order to show more of the actual pages). In this second tour of an online museum I adopt the perspective of a learner needing to know more about Andy Warhol.

One of the essential functions missing from the AMN, at this time, is a search engine that would let a visitor enter a search term and then be pointed towards relevant sites housed under the aegis of the AMN. Without some kind of searching device I have no way of knowing which museum contains information about Andy Warhol. I call up Alta Vista as a search engine and entering the search string "Andy Warhol +museum" I am pointed towards many links to the Andy Warhol Museum, and the Dia Centre for the Arts. Choosing the less obvious Dia Centre permits my tour to investigate how this museum, which is part of the AMN, deals with art education.

When the Dia Centre is accessed, it is apparent that the designers of this museum Web site have decided to avoid a tour de force Homepage (Fig. 16). There are no required plug-ins to download and install, and this page displays well even in graphics-off mode. The museum's mission is evident in the first paragraph of text on the Homepage, and explains that "The name Dia, taken from the Greek word meaning 'through,' was chosen to suggest [the museum's] role as the conduit or means for realizing extraordinary projects."
Dia Center for the Arts is a multi-disciplinary contemporary arts organization based in New York City. The name Dia, taken from the Greek word meaning "through," was chosen to suggest our role as the conduit or means for realizing extraordinary projects.

Cheryl Donegan: Studio Visit

Dia's fifth artist project for the web is by Cheryl Donegan, who takes as her starting point a mainstay of art practice, the studio visit. In Studio Visit, Donegan has put together a visually rich and playful interface constructed from imagery she has utilized in her work.
Immediately beneath the opening mission statement are unadorned hyperlinks to all parts of the Web site, including a search engine. This permits the learner to understand, at a glance, what the overall structure of the museum Web site is like. Scrolling down the page reveals information about where the museum is located, current exhibitions, and upcoming events. The bottom of the page has a copyright notice which implies that I should not copy any of the reproductions at the site:

Permission to reproduce any of the text or images on this Web site must be obtained by contacting Dia at 542 West 22nd Street, New York, NY 10010, or (212) 989-5566. All images of Walter De Maria's works are copyright Dia Centre for the Arts. All images of Andy Warhol are copyright The Andy Warhol Foundation for the Visual Arts, Inc.

This clear warning, could be an impediment to learners who might not be aware of the concept of "fair use" which permits the copying of text and images for scholarly purposes and study.

Returning to my role as a learner seeking to know more about Andy Warhol, I realize from the links on this Homepage that I can either explore the site, or use the site's search function. For the purpose of this tour I will first visit the site and then use the search engine. Obviously, if I was trying to be efficient, the first choice would be the search tool.

The link to "Exhibitions" reveals a page that uses the same spare-look design approach (Fig.17). The designers are interested in providing information quickly, and ordering it into logical, hierarchical steps. The heading and the opening paragraph explain briefly where the exhibits are, and what the museum's philosophy is towards choosing which artists to show. Photographs from each exhibit are placed next the artist's name with a link to each exhibit. The designers have set the hypertext link colour to black and viewed-links to gray, indicating only by an underline that a word is a link. This decision reduces the influence of other colours on any reproductions. The choice of a white background also indicates a concern about extraneous colour influence.
Changing Exhibitions at
548 West 22nd Street, NYC

Dia’s 548 West 22nd Street location is dedicated to large-scale, long-term exhibitions. The program here offers artists the opportunity to develop new work or a focused presentation of work on a full floor of the building. The building is a 40,000 square-foot turn-of-the-century warehouse which was renovated by Richard Gluckman Architects in 1987. Following please find information on current exhibitions, as well as an overview of previous exhibitions.

Hanne Darboven:
*Kulturgeschichte 1880-1983*

Juan Muñoz: *A Place Called Abroad*

Figure 17
At the bottom of this page is a list of links to previous exhibitions in reverse chronological order. I notice that one of the items is called "Andy Warhol: The Last Supper Paintings".

Returning to the Homepage (Fig. 16) I next choose to look at "Long-Term Projects at Dia". Visual continuity means each page is laid out exactly like the last one I viewed, with a heading and opening paragraph designed to inform. I learn that:

Dia Centre for the Arts has emerged in the past few years as one of the largest organizations in the country dedicated to contemporary art. Dia's first major projects, undertaken in the late 1970s, were long-term sited works of art not likely to be accommodated by conventional museums because of their nature or scale.

(http://www.diacenter.org)

Scrolling down this page brings me to another Warhol link (Fig. 18). This provides me with a way to access The Andy Warhol Museum in Pittsburgh. So far, I have two hits to follow after viewing only two pages. The Homepage also links to a page about Dia's permanent collection, which, when pulled up, also reveals two links to Andy Warhol. Other Homepage links go to the Robert Lehman Lectures on Contemporary Art (there is a lecture about Warhol), the Dia Centre for the Arts press releases also has links to Warhol, and the "Links" link leads to Warhol too.

The "Arts Education" link is disappointing because it states, in it's typically clear fashion, that the Arts Education Program at Dia is housed at the physical address of the institute; the Web document simply describes the program. At this point it seems that it might be a good idea to try the search engine at Dia's Web site.

The search engine (Fig. 19, actually an extension of Excite!) continues with the spare user interface (UI) that is found throughout the site. An art education student can enter terms or expressions into a simple text entry box. For those who are unfamiliar with searching there is a link to "help on making queries". In addition to the search engine this page provides an overall
Figure 18
view of the entire site in the form of a link titled "Index of Dia's site", which is a straight-forward double column list of all the pages the site supports. I like this feature, because I can clearly conceptualize the entire site. I see immediately that there are three high-level links to pages about Andy Warhol, and I can link to any of them by clicking through.

The search term "Andy Warhol" returns an extensive list grouped by confidence weighting. Investigating the first ten or so links, shows that most of them are part of the Dia museum Web site or its associate, the Andy Warhol museum in Pittsburgh. As a learner, I now have access to a lot of information about Warhol, for example here are the first nine hits:

1) 84% The Andy Warhol Museum (summary)
2) 82% Images from Andy Warhol: The Last Supper Paintings (summary)
3) 80% Andy Warhol (summary)
4) 80% Andy Warhol: The Last Supper Paintings Press Release (summary)
5) 80% Andy Warhol: The Last Supper Paintings (summary)
6) 78% Discussions in Contemporary Culture #3: (summary)
7) 72% Last Supper Essay (summary)
8) 70% Dave Hickey Lecture Press Release (summary)
9) 70% Dia's Permanent Collection (summary)

The highest rated link is The Andy Warhol Museum (Fig. 20), which has the same design philosophy as Dia. This approach to design fundamentally says that the Web interface should be transparent to the information. These pages load fast, and have layouts that are immediately compressible to everyone. The visitor is not conscious of the designer behind the page, rather s/he is able to concentrate on the information. While this may seem to indicate a lack of inventiveness on the part of the museum Web site designer, this is a case where the designer has chosen to create a site that succeeds in being easy to use, and informative, instead of trying to wow a visitor thus removing the focus from the art. Further exploration shows there is a huge amount of information available in both visual and text formats at both these museum Web sites.
Andy Warhol Museum, Pittsburgh

In 1989 Dia entered into a historic agreement with the Carnegie Institute and the Andy Warhol Foundation for the Visual Arts, Inc. to form the Andy Warhol Museum, which opened in Pittsburgh in May, 1994. Approximately nine hundred paintings, hundreds of drawings, film, and vast archival material from every phase of Warhol's career, drawn from the collections of Dia and the Estate of Andy Warhol, form the core of the permanent collection of the museum. The Museum's program combines fixed installations of Warhol's work with changing exhibitions focused on Warhol's art and legacy. The creation of this museum as a joint venture of three organizations presents a model for the possibilities of museum development in the future. In cooperation with the Andy Warhol Museum, Dia will create an ongoing series of Warhol exhibitions at Dia's West 22nd Street facilities in New York, the first of which was *The Last Supper Paintings*, which was on display through June 25, 1995 at 548 West 22nd Street.

*Figure 20*
The writing is informative and scholarly, providing substance for learners at all levels.

Figure 21 shows a page from the Dia site that gives a general overview about who Warhol was. This information is written so that it is useful to all categories of learners, even young ones in the K-12 range. By clicking on the link from this page to "The Last Supper Paintings" I discover a description of this series and at the bottom of the page is a checklist of all the paintings in the series with standard information about size, medium and date, and a selected bibliography which points me towards relevant publications about Warhol. On associated separate pages I can click to: 1) Essay by Lynne Cooke, 2) Images of the Exhibition, 3) Press Release About the Show, 4) Info About Andy Warhol, and 5) Biography and Other Dia Projects (Fig. 22).

The Dia museum Web site is a good example of a design philosophy which places content first. There is a serious effort to make functionality and ease of use the most important factors considered when developing the user interface.
Andy Warhol

Andy Warhol was born in 1928 in Pittsburgh to immigrant parents of (Ruthenian) Czechoslovakian stock. He studied pictorial design at Carnegie Institute of Technology in Pittsburgh from 1945-49. After a successful and distinguished career as a commercial illustrator in New York in the 1950s, he began exhibiting his paintings with silkscreened Pop imagery in 1962. In 1963 he began making films. His art was thereafter shown widely in numerous exhibitions throughout the world. Warhol Il Cenacolo (The Last Supper) opened in Milan at the Galleria Italiana delle Stelle on January 22, 1987. On February 22, 1987 Warhol died following gall bladder surgery. In 1989 the Museum of Modern Art in New York organized a major retrospective of his work.

Figure 21
Andy Warhol

The Last Supper Paintings

September 16, 1994 - June 18, 1995

Dia exhibited one of Warhol's major late series: the Last Supper paintings, at 548 West 22nd Street. Based on the renowned painting by Leonardo da Vinci, this image was used by Warhol at the end of his career for a remarkable group of monumental paintings. Approximately half of the dozen vast paintings, some up to forty feet in length, were made by silkscreening the image, and the other half by outlining the image as projected on the canvas. Very few of these monumental Last Supper paintings, often considered Warhol's finest late works, have been seen in United States museums. The initial exhibition for which the series was devised was held in Milan in 1987. Dia brought together five of the major monumental versions from collections in the United States.

Figure 22
The Cleveland Museum of Art, has designed support for art education by providing three learning links on the Homepage (Fig.23) of it's Web site. This permits the visitor to immediately follow prominent links if they wish to engage in learning activities. At the top of the page is "Lady Alexandra's Egg-Stravaganza" and "Rosetta Stone's Pharaoh Adventure". There is also a link to "education" from the main image map centered on the screen.

Beginning with the link to "education" the visitor can access a page (Fig.24) that is well designed with a nice use of colour and white space. However, like most museum Web sites, at this moment in their evolution, the "education" page links are simply informative announcements about what the museum offers to actual visitors. For example, by clicking on the "Teacher Resource Centre" link, I am informed that, "The TRC offers workshops and in-service programs to help area educators use the museum's collection as a curriculum resource" (http://www.clemusart.com/educatn/trc-news/index.html).

The initial temptation I have is to be disappointed with the Web site's ability to support online art education. But this is quickly rectified when I followed the other two links at the top of the Homepage (Fig.23) and find some exciting pages which support learning, albeit for younger children.

The "Lady Alexandra" link opens a page (Fig.25) for younger learners. The philosophy here is to use guided discovery in the form of a ladybug named Alexandra. The image itself is an animated
lady alexandra's egg-stravaganza

rosetta stone's pharaoh adventure

Welcome | What's New? | Exhibitions | Museum | Membership | Merchandise | Education

Figure 23
Young Peoples Classes

School Tours

Beyond Looking: Art-making for All Ages

Teacher Resource Center

---

Figure 24
Lady Alexandra's Egg-stravaganza

Hi kids, I'm Lady Alexandra, and I'll be your guide to "Fabergé in America." We have some fun things for you to do here, from pages to color to making your own decorative egg stand.

First, let me tell you a little bit about myself and this wonderful exhibit called Fabergé in America.

This special show features objects made of dazzling jewels like diamonds, sapphires and emeralds and precious metals like gold and silver. There's even a ladybug box complete with diamonds -- just like me.

They were all created in Russia a long time ago by the House of Fabergé under the direction of Peter Carl Fabergé.

Who was Peter Carl Fabergé? He was a famous goldsmith and jeweler who was born in St. Petersburg, Russia in 1846. Peter and his wife had four sons, and they were all designers for the family business. The House of Fabergé is most popular for creating imperial Easter eggs which were gifts for Russian czars and their families.

Figure 25
.GIF with flapping wings which obviously will catch the eye of young learners. The text is written in a first voice narrative style that informs, engages and leads the learner through information about the *Faberge in America* exhibit. The second sentence in the first paragraph says, "We have some fun things for you to do here, from pages to colour to making your own decorative egg stand" (http://www.clemusart.com/exhibit/faberge/kids/index.html). The designers have chosen to present activities for the learner to do; by rejecting passive absorption, they have embraced one of the DBAE disciplines, studio activity.

The page design is a good combination of elements and presents itself much like a printed page, except that there is a hyperlink in the text, and at the bottom of the page, which is not terribly long (Fig.26), is a simple to use navigation bar permitting the learner to access both the colouring book and the building activity mentioned in the text. I like the design, colour choice and the way they stand out against the white background. The feeling is crisp, simple, and suggests that the site will be easy to use and offers fun things to do.

The single hypertext link on this page to the "ladybug box" is included because the designers, believing it might inspire learners, want to give them a look at one of Faberge's masterworks. The activities will build upon knowledge the children gain by investigating this link which leads to a detailed close-up of the object itself (Fig.27). This gives the young learner a concrete visual concept of the kind of work Faberge's studios produced. The choice is well made because this item is toy-like and delightful in it's subject matter. The bottom of the page (Fig.28) displays the same clean navigation bar, except there is a problem.

The problem is that when the learner clicks on the "back" button in the navigation bar, s/he is not returned to Lady Alexandra's page. Instead s/he is linked to the online exhibit. This is an example of either poor navigation design, or simply an error on the Web developer's part. The link should return the visitor to the last page they were at, otherwise the risk of becoming lost is very strong. If the user clicks on the browser's back button they are returned to the previously viewed page, which is logical. This brings up an argument many Web site designers must deal with. Should a
They were all created in Russia a long time ago by the House of Fabergé under the direction of Peter Carl Fabergé.

Who was Peter Carl Fabergé? He was a famous goldsmith and jeweler who was born in St. Petersburg, Russia in 1846. Peter and his wife had four sons, and they were all designers for the family business. The House of Fabergé is most popular for creating imperial Easter eggs which were gifts for Russian czars and their families.

Fabergé even created a decorative Easter egg with a surprise inside for Czarna Alexandra (who I was named after)

In addition to Easter eggs, Fabergé made lots of fancy objects like flowers, animals, opera glasses, clocks, tea sets and perfume bottles. He even made miniature shoes, chairs and teapots.

The success of the House of Fabergé lasted from the late 1800s until the Russian Revolution took place in 1917.

So, now you can see how excited I am to be a part of bringing these famous Russian treasures all the way to the Cleveland Museum of Art.

Have fun, and bring your family to the museum!

- coloring book
- build an egg stand

Figure 26
Ladybug Box
Cat. no. 94
Workmaster: Mikhail Perkhin (1860-1903)
St. Petersb. 1906 1908

Figure 27
Ladybug Box
Cat. no. 94
Workmaster: Mikhail Perkhin (1860-1903)
St. Petersburg, 1896-1903
Gold, enamel, diamonds
The Cleveland Museum of Art, The India Early Minshall Collection

Ladybugs proliferate among products available at the Museum Store.

Return to Index
navigation bar on the page, replicate the navigation controls found in the browser's toolbar? In this case there is clearly confusion since the two back buttons available to the learner lead to different places.

Choosing Lady Alexandra's colouring book leads to a page with the same look (Fig.29) as her first page. Now the ladybug guide is holding a crayon to indicate what kind of activity learners will engage in. The text is well conceived because, while encouraging the young learner to begin the activity, it also provides information about items from the exhibit. Farther down the page (Fig. 30) is a selection of Easter Egg designs which are actually photographs of real objects in the Faberge exhibition. The Web page designer has removed the colour and rendered the photograph in 1 bit resolution. I click on "Easter Egg 2" and find that it is linked to a larger image of the egg which the learner can print and colour as an activity, (relates to DBAE's studio discipline).

This enlargement (Fig.31) seems to take a long time to download. A quick check of the file size shows another error on the part of the Web site designer. The egg file is 148K in size. This bloated file size indicates that the designer forgot to reduce the indexed palette to two colours. By leaving it as a grayscale image the file information requires data on each of the 256 levels of gray when in fact only 2 are needed.

Returning to Lady Alexandra's page and selecting the link to "Build an egg stand" reveals more activity learning in the form of a template that may be printed. The pattern requires the learner to cut out shapes which can be folded and coloured in order to create an egg stand.

I wanted to see what "Rosetta Stone's Pharaoh Adventure" was and found that this page (Fig.32) used the same guided learning approach. The following excerpt from the page gives an example of the tone used by the guide to invite and excite younger learners.

Hi, I'm Rosetta Stone and I'll be your guide for this site. We have a lot of cool things for you to do here, from pages to colour to making a cutout figure of a Pharaoh.
Lady Alexandra's Coloring Book

Welcome to my coloring book. You can pretend you are a famous designer like Peter Carl Fabergé. Just pull out your crayons, print out the images, and start coloring!

Click on the images below, then print when the larger image is on your screen.

**Imperial Lilies of the Valley**
Did you know the lily of the valley was Czarna Alexandra Feodorovna's favorite flower? The Lilies of the Valley basket is one of Fabergé's most magical creations.

(you can see a photo of the real exhibit in the Exhibition Preview area.)

Lady Alexandra

Check out my fancy coat of gold and diamonds!

(you can see a photo of the exhibit in the Exhibition Preview area.)

Figure 29
Easter Egg (design 1)
The House of Faberge designed many imperial Easter eggs like these as gifts for Russian czars and their families.

Easter Egg (design 2)

Easter Egg (design 3)

Easter Egg (design 4)

Figure 30
Easter Egg (design 2)

Figure 31
Hi, I’m Rosetta Stone and I’ll be your guide for this site. We have a lot of cool things for you to do here, from pages to color to making a cutout figure of a Pharaoh.

We even have a little quiz - nah - it’ll be fun. For example, did you know some Pharaohs were women?

There are a lot of other things to learn - like what they did to make mummies and how they built the pyramids.

Have fun and bring your family to the museum for an archaeology dig!

- kid quiz
- fact/fiction
- ask the mummy
- build a pharaoh
- coloring book
- book list
- hidden treasures
- welcome to the cleveland

Figure 32
We even have a little quiz - nah - it'll be fun. For example, did you know some Pharaohs were women?

There are a lot of other things to learn - like what they did to make mummies and how they built the pyramids.

Have fun and bring your family to the museum for an archaeology dig!
(http://www.clemusart.com)

The page has coloured links towards the bottom to a variety of activities designed to engage learners by having them do things. The "Kid quiz" link takes me to a page with 23 questions whose purpose is to entertain and engage the learner (Fig.33). Beneath each question is "Show me the answer" which displays correct information on the specific subject. By offering multiple choices, some of which are rather silly, the learner actively seeks the right answer because their curiosity has been stimulated by the interesting alternatives.

The link to "fact/fiction" brings me to a page that gives the learner a choice to view and/or read about “Pyramids, Mummies & Mummification, Hieroglyphs, Papyrus, Book of the Dead, Pharaohs, Ra, Daily Life, Food, and Clothing”. Selecting "Mummies & Mummification" presents a page (Fig.34) with an illustration and a fair amount of textual information about the subject. The writing is suited for grades 4 - 12, and has enough detailed information to act as a resource for art history projects. This information provides a connection with another of the DBAE disciplines, art history.

"Ask the mummy" links the young learner to a page where Rosetta Stone answers questions the learner might have. Most of the questions could be categorized as relating to art history. For example, visitors may discover the answers to questions such as:
Kid Quiz with Rosetta Stone

1. What happens to an archeologist when faced with a mummy's curse?
   1. Cleans up his room.
   2. Dies immediately.
   3. Suffers a slow, painful death.

   *Show me the answer!*

2. In 1923 Lord Carnarvon financed the excavation of King Tut's burial chamber. He died soon after it was opened. How did he die?
   1. He died in a secret passage.
   2. He died from a mosquito bite.

Figure 33
type of scaffolding, would also have been used and later discarded.

Mummies and Mummification:

A mummy is a dead body or corpse that has been preserved so that it does not rot or decay. The process of preserving the body is called mummification. The Egyptians were extremely interested in mummification because they believed that the dead would need their bodies in the afterlife. They did not believe that death was final. Instead, they viewed it as a prelude to the afterlife. They also believed that everlasting life could be ensured by being pious to the gods, by mummifying the dead, and by providing equipment in tombs for the afterlife. They believed that each person had a life-force or ka, (a word that cannot be translated into English), that continued to live after a person died. It was important to preserve the body so that the ka could still recognize it. The ka needed to return to the body because it was still dependent on food to keep living. Food offerings were left in the tombs which the ka would inhale and the priests would then eat.

The process of mummification involved cleaning the body, inside and out. The organs and intestines had to be removed before the body could be preserved. Using one method, the brain was removed through the nose with an iron hook and the other organs and the intestines were taken out through a cut made in the side of the body. Then the inside of the body was cleaned and the cut was sewn up again. The removed liver, lungs.
Where were the pharaohs buried?
What happened to the royal mummies?
Why do we excavate?
Who were the artists?
Where did the artists obtain their materials?

The "Build a pharaoh" page is another activity centre (Fig.35). Here learners can print out templates which they can, by following the instructions, construct into a "Paper Model of a Pharaoh Death Mask". The page has an illustration which gives the learner some idea of what the mask might look like. The instructions are clearly written and use colourful icons to tell a learner when items like scissors or glue or folding is required.

There is also a link to a colouring book, a book list, and a link to "hidden treasures", which is a clever way of directing the learner to investigate the Cleveland Museum's Egyptian collection (Fig.36). From this page of thumbnail images and descriptive text, the learner is able to enlarge pictures of various important objects in the collection and obtain contextual information about the objects (Fig.37).

The Cleveland Museum's Web site is a good example of design which is aimed at younger learners. With the links available directly from the Homepage, the site uses clear and simple devices to encourage youngsters to engage in activity learning.
Build a Pharaoh

Paper Model of a Pharaoh Death Mask

Read instructions

Get page 1 of the Model (112k)

Get page 2 of the Model (61k)

(When you get the Model pages, just print when the image finishes loading on the screen)

Some printing tips: Make sure you print to letter size paper. If you can, turn off graphics smoothing and disable any heading information to be printed by your browser (like page number, file name, etc.)

Figure 35
The Cleveland Museum of Art
Egyptian Highlights

Palette in the Form of a Fish
Mudstone, length 9-1/4 inches
Egypt, Predynastic, ca. 3500 bc
The Cleveland Museum of Art
Bequest of Elisabeth M. Skala, 1989.32

Amenhotep III Wearing the Blue Crown
Granodiorite, height 15-1/2 inches
Egypt, Dynasty 18, reign of Amenhotep III, 1391-1353 bc
The Cleveland Museum of Art
Gift of the Hanna Fund, 1952.513

Nome Gods Bearing Offerings
Painted limestone, length 42-3/8 inches
Egypt, probably Kom el-Ahmar (ancient Heliopolis), Dynasty 18, reign of Amenhotep III, 1391-1353 bc
The Cleveland Museum of Art

Figure 36
Nome Gods Bearing Offerings

Painted limestone, length 42.5/8 inches
Egypt, probably Kom el-Ahmar (ancient Heliopolis), Dynasty 18, reign of Amenhotep III, 1391-1353 BC

The four portly figures on this painted temple relief bear emblems on their heads identifying them as nomes, or provinces, of ancient. Carrying trays heaped with offerings and leading in sacrificial animals, they represent the bounty of the land. Their faces are miniature portraits of Amenhotep III, in whose name they speak: "King Nebmaatra [Amenhotep III] has come to you, bringing every good thing in this land, so that you might give him all life, stability, and dominion." The god of the temple, to whom these words were addressed, appeared in the upper register. Only his feet remain. The other foot belonged to a standing figure of the king facing the god.

Figure 37
The Center for Creative Photography's Homepage (Fig.38) is a straight forward, nicely laid out page without any animated features. I can quickly orient myself to the online museum's structure through the main heading list directly beneath the page title.

I am visiting this site in the guise of a middle grade art educator. My classroom needs require that we learn about artists who use photography. This museum seems like a good place to look for information that I might be able to integrate into the curriculum. Once at the Web site's Homepage the obvious choice is for me to click on the link to "Education".

This brings me to a page (Fig.39) about Educational programs. Unlike some of the other Web sites I've visited, this page goes much farther than simply informing me about what programs are offered at the museum. I have the choice of two Teacher's Guides which are focused on the two current exhibitions showing at the museum in Tucson. I choose the first link, “A Teacher's Guide for Encounters 7: ‘The Waving of Foliage and the Coming and Going of Ships:’ Live Projections by Richard Torchia”.

This brings me to the guide which employs a very text-like design philosophy (Fig. 40). The guide’s introduction clearly explains what I will find:

This guide provides ideas for incorporating the exhibition of Richard Torchia's camera obscura projections into your curriculum. With an emphasis on the origins of
Welcome to the Center for Creative Photography, a museum and research center devoted to photography as an art form. Our collections are among the most accessible in the world. Founded in 1975 from the combined vision of photographer Ansel Adams and then-university-president John P. Schaefer, the Center is a unique institution offering public print viewing from the photography collection, research archives, changing exhibitions, educational programs, a library, online publications, and a museum shop. You can also find out how to contact the Center for Creative Photography and its staff, and how to become a member. Please visit our Photography Comment Page and tell us a little about yourself.

April 18 - July 6, 1997

Figure 38
EDUCATIONAL PROGRAMS

The Center for Creative Photography offers gallery talks, lectures, activities for families, and special events throughout the year.

Exhibition tours of the Center for Creative Photography and customized printviewing sessions for classes and other groups are available but must be arranged in advance.

A Teacher's Guide for Encounters 7: "The Waving of Foliage and the Comming and Going of Ships." Live Projections by Richard Torchia is now available. Educators, students, and those with an interest in the background of these master photographers are encouraged to visit.

A Teacher's Guide for Mexican Tableaux: Photographs from the Aaron Siskind and Max Yavno Archives is available.

Figure 39
CENTER FOR CREATIVE PHOTOGRAPHY

EDUCATOR'S GUIDE

Exhibition dates: February 26 - April 13, 1997

Application: This guide provides ideas for incorporating the exhibition of Richard Torchia's camera obscura projections into your curriculum. With an emphasis on the origins of photography, the nature of light and perception, and an artist's reaction to our desert environment, the exhibition will complement classroom study such as art, photography, language arts, optical science, astronomy, history, literature, and composition.

Index:

- Message From the Curator
- Suggestions for Viewing the Exhibition
- Camera Obscura Projections
- Artist's Statement

Figure 40
photography, the nature of light and perception, and an artist's reaction to our desert environment, the exhibition will complement classroom study such as art, photography, language arts, optical science, astronomy, history, literature, and composition.
(http://www.ccp.arizona.edu/ccp.html)

The page includes an index of links that provide just about everything I could wish for when informing myself about the exhibition, particularly how I might employ its contents as part of my curriculum design. The index contains links as follows:

Message From the Curator
Suggestions for Viewing the Exhibition
Camera Obscura Projections
Artist's Statement
The Installations: Description and Activities
1. Introduction and The Anteroom
2. Desert Bloom
3. Klepsydra
4. Limelight
5. Dial
6. Aristotle's Problem
Studying Photography
Glossary (key to linked words)

The curator's message (the first link) is brief but does an excellent job of summarizing the show. The writing is at adult level, but not so difficult that a learner over the age of 10-12 would be lost. A nice feature is that each word in his text which might possibly be new to me is hyperlinked to a glossary of relevant terms designed specifically for this exhibition.

The link to "Suggestions for Viewing the Exhibition" calls a page (Fig.41) that I discover has a
SUGGESTIONS FOR VIEWING THE EXHIBITION

The Waving of Foliage and the Coming and Going of Ships: Live Projections by Richard Torcha addresses the art of photography as it existed before the fixed image was invented. As Torcha says,

"I am more an architect than an artist. I create problems with the optics of photography which, in their solving, need the involvement of many people. And then, after the installations are in place, my art is not complete until the viewer interacts with it."

To see Richard Torcha’s installations, it is important to slow down and observe things. Your eyes will need time to adapt to the dark environment. The exhibition provides opportunities for students to develop their skills of observation as they watch each piece evolve. The installations invite us to explore, as the artist makes visible phenomena that we normally would miss.

The unusual title of the exhibition
The exhibition’s title The Waving of Foliage and the Coming and Going of Ships is taken from the nineteenth-century sign board (pictured below) for a public camera obscura projection in Bristol, England, that is still in operation and still as captivating to viewers today as when it was first installed. Referring to the live nature of that projected image, one that casts an inverted, true color, moving picture of the sunlit scene outside into a darkened space, Torcha transforms the traditional application of the technology using artificial light with his more manipulated and compelling projections.

A viewing challenge awaits those who visit Torcha’s exhibition for, rather than being an exhibition of photographic prints, it is an installation that deals with light, time, motion, gravity, sequence, and in general, principles of perception. The projections on view are ephemeral and mysterious. They move, as if floating in space. They are live/real time images. Those who do not remember that photo means light and that errant means drawing might misunderstand the work.
wealth of detailed information about the artist, how the title of the show was developed, information about the contents, how to view the projections, etc. Moving to the link titled "Camera Obscura Projections" I am brought to a page (Fig. 42) which is a wonderful learning resource on background issues that covers the camera obscura which is the device that the artist has used to create his artworks.

Linking to the "Artist's Statement" (Fig.43) bring up a page containing a photo of the artist at work, and the text of his statement concerning his exhibition. The statement is detailed and provides insight for someone who has never encountered this artist's work as well as giving a sense of the magic and wonderment that informs his visions. The design continues to be very museum catalogue-like, but gives me a wealth of information with very few clicks required.

The link to "The Installations: Description and Activities" provides six pages devoted to the exhibition itself. While it is immediately evident that the objective is to inform me, the teacher, so that I can act as a knowledgeable docent, there is so much rich information about the artist, the show, the objects, etc. that I can easily see using this Web site as a curriculum aide even if my class can never get to Arizona to see the show. Clicking through the various exhibits such as "Limelight" (Fig.44) presents still images from each piece. The still is clickable for an enlarged view, and next to the image is explanatory text which has been composed by an art educator who obviously has a talent for describing art and helping viewers to give it meaning. There are hyperlinks back to the glossary throughout the text for difficult words. Each page that is devoted to a work of art has an activities section which suggests how I might design some form of learning by doing which uses the artist's work as a beginning point.

The exhibition guide provides a link to page titled "Studying Photography" which has a rich account of why photography is important, and sets it into a contemporary context that relates to my class room. The text is highly informed by DBAE philosophy (the University of Arizona at Tucson is a center for DBAE work). I am also told that "You and your students may use the interpretive exercises provided by the Center throughout the year. With each new exhibition
The first mention of the camera obscura principle was in the fifth century B.C. and concerned the observation of eclipses of the sun. Much later, smaller portable camera obscuras were created and lenses were added to sharpen and the image. A person could put his head into the box or could peep through an opening in the side of the instrument to see the image it created. Artists like Vermeer (1632-75) used the camera obscura to produce a two-dimensional model of a natural scene. Fortunetellers used the wondrous instrument to frighten or charm their audiences with images created by the amazing invention.

An early portable camera obscura which produced a projected image on a small screen, used as a drawing aid.

Figure 42
ARTIST'S STATEMENT

When I was twelve I discovered an inverted image of a window on the wall opposite the keyhole of a closed attic door in our house. Perhaps because no one knew could explain how it was produced, the image cast a spell on me and became a special attraction of any tour of the house's upper reaches. It was not until years later, when I started experimenting with the photocopier and reading histories of photography that I realized that this phantom picture in the attic was a camera obscura projection.

Since 1990, working as an artist, I have used telescope, photocopier and video lenses to project images of illuminated objects and exterior views onto walls and screens in darkened spaces. These works create variations of the camera obscura and its optically related cousins: the solar microscope and the magic lantern. Their resulting live, full-color images are characterized by inversion (dramatizing the force of gravity as the world appears upside-down), extreme sharpness at the focal plane, and silence.

Many viewers experience a sense of bodily displacement and perceptual disorientation when first confronted with the projections. They sometimes assume they are looking at videotape or film as opposed to events or objects existing in real time in adjacent spaces. But rather than record live imagery for later and more remote encounters as in conventional, chemically fixed photography, I use the camera obscura as an instrument of imminence, a tool for attending to what is at hand and in the present.

The camera obscura is also a potent cultural site, a point through which the histories of astronomy, philosophy, painting...
Limelight is a theatrical, mysterious environment in which viewers often feel as though they are witnessing a swirling nebula. Visitors stand on one side of a frosted screen and view projections of magnified grains of dust, pollen, and other particles floating in convection currents created by the heat of a spotlight placed on the opposite side of the screen. The appearance and size of the particles change as they float in and out of focus. When the particles are in focus, they possess color, shape, and form. When out-of-focus, they lose their hard-edge identity but retain their ability to absorb and reflect light. These out-of-focus particles are seen as circles of confusion (out-of-focus highlights).

Dust is everywhere in Tucson. Although we usually do not take time to notice, airborne dust is frequently visible in light rays both inside and out-of-doors. The dust in Limelight was gathered from air vents, floors, and other locations in the Center for Creative Photography.

Activities: Seeing dust

1. Investigate where dust is visible in the classroom. For instance, can you see dust in the sunlight streaming through the window? Or, in a darkened room, can you see dust in the beam of a flashlight or in the light of a slide or film projector?
2. Explore depth of field, a concept that applies to both a camera and our human eyesight.
   1. Tell the students to hold their thumbs up about six inches from their eyes.
   2. Tell them to focus on their thumb and notice that, while it is in focus, the rest of the room is out of focus. Then, tell them to look at the far wall beyond their thumb and to notice that when their eyes focus on something far away, they cannot also see their thumb in focus.

Note: This is an example of depth of field. In photography, it refers to an area between the nearest and farthest points from the camera lens that are acceptably sharp in the focused image. The same concept holds true for our
presented in our gallery, we provide new learning materials." This is such a useful site that I plan to return frequently.

This museum Web site is a teacher's dream. The site has provided me with a wealth of well considered information about the artist, the exhibition, the artworks, and the background concepts, as well as helping me to place all of these in a DBAE context and suggesting learning activities that might benefit my students.
Chapter 4:

Conclusions

Discussion
Each of the museum Web sites described in chapter 3 make some attempt at addressing issues surrounding art education. It can be argued that the Cleveland Museum has a Web site that successfully points the way forward towards integrating aspects of DBAE, particularly for young learners, while the University of Arizona's Centre for Creative Photography does the best job of assisting art educators. All of the sites embrace the idea that a Web site is about experience. John Dewey (1934) describes "an experience, [as a] flow [which] is from something to something" (p. 36). He explains that in art the experiences merge and flow together into a sense of unity. So too must a well designed Web site leave the learner with a perceived sense of flow through information which is unified by the learning process.

Dewey (1938) insists that we should not ignore "the importance of personal impulse and desire as moving springs" (p. 70). How to harness and develop impulse and desire in the learner are essential objectives for a museum Web site designer. The way to do this requires planning activities that lead to educational schemes encompassing information which is designed to permit learners to share in the formation of its purpose.

It is a mistake to suppose that the principle of the leading on of experience to something different is adequately satisfied simply by giving pupils some new experiences... It is also essential that the new objects and events be related intellectually to those of earlier experiences, and this means that there be some advance made in conscious articulation of facts and ideas. It thus becomes the office of the educator to select those things within the range of existing experience that have the promise and potentiality of presenting new problems which by stimulating new ways of observation and judgement will expand the
area of further experience... Connectedness in growth must be the constant watchword (p. 75).

The weakest point in the design of a museum Web site which supports art education may in fact not be related to visual elements or navigation control at all. It could be in the selection and organization of intellectual subject matter. These choices cannot be cursory. The problems set up in a learning activity are the stimulus to thinking. The designer should consider this process as a continuous spiral in which there is an attempt, through design, to arouse in the learner an active quest for information and ideas which once obtained become the ground for further experiences and the production of new ideas.

Successful organization of information through design cannot take knowledge which is already organized and ladle it out in small doses. Again Dewey is able to guide us by saying:

... the active process of organizing facts and ideas is an ever present educational process. No experience is educative that does not tend both to knowledge of more facts and entertaining of more ideas and to a better, a more orderly, arrangement of them. It is not true that organization is a principle foreign to experience (p. 82).

Hobbs (1975) says that when dealing with art the learner must examine and understand the structure or form of a work of art, and that this is an essential dimension of the experience which helps convey the meaning of a work. How can a designer incorporate this concept into a museum Web site? It is critical that the designer consider academic literature which reports on recent research which asks whether the way learners see depends in large part on how they see. Hobbs, along with many others, argues that culture determines how we interpret what we see. Does this mean that some effort must be put into educating learners on how to see?

What we see in a work of art also depends on a combination of visual data and past experience. The ability to perceive images in the lines and shapes that an artist puts on a
piece of paper or canvas is not automatic. It requires practice and experience -- usually when one is very young -- just to develop the ability to interpret the kind of pictures that are widely familiar in one's own society (p.3).

How should a designer help learners to perceive? Hobbs suggests comparisons and contrasts.

Perception does not take place in a vacuum; it is influenced by a complex setting of concepts and values... interpretation and appreciation require a viewer to give at least as much attention to the intellectual and emotional elements that are involved in the meaning of a work of art as to the visual elements (p. V).

One area of DBAE that is conspicuous through its absence at the sites I reviewed is a focus on aesthetics. None of the sites dealt with aesthetics in any obvious way. This seems true of the vast majority of museum Web sites. Why is this? No doubt, aesthetics are a difficult issue to design into a Web page. The ideal setting for treatment of this issue is likely what Max Anderson refers to as "the conversation".

An example of Anderson's "conversation" concept may be found at the AGO Web site, which presents a visitor with a chance to engage in a dialogue through its HyperNews CMC interface. But issues of aesthetics will not necessarily arise in this forum. Smith (1966) points out that with aesthetics the easy part is identifying and classifying the "types of knowledge involved in knowing about the content of a work of art" (p. 44). What is more difficult, particularly given the nature of the discipline, is to design for it in a museum Web site. Smith says, "The intrinsic value of the aesthetic experience in one way simplifies the problem of justifying aesthetic education because none is needed...". What he means by this is that in many instances what is expressed in a work of art is less important than the "rich and full perception" that it stimulates in the viewer. Unless there is some "extra-aesthetic" (p. 45) value to a work of art, learners will find little curriculum support for their investigations. Can this issue be addressed through some kind of Web site design element? It is hard to say since clearly there are very few examples to date.
Museum Web site designers face great challenges when developing Web sites that support art education. There are many issues to deal with when implementing the design, chief of which is stimulating interaction between 1) learners, 2) learners and teachers, and 3) learners, teachers and museum personnel.

Today we are seeing the very beginning of serious consideration of how to deal with art education at museum Web sites; however, the next few years museums will see advances in the quantity and quality of their online offerings. This is important because recent quantitative research has found that learning in a virtual environment can be quite successful. Learners in virtual classes score higher test results than learners studying the same material in face-to-face classrooms. Schute (1997) explains these results based upon his observation that learners in a virtual environment cannot question a professor in a face-to-face encounter. He notes that this paradoxically leads to students compensating for this lack by more involvement between themselves in the form of online study groups which are able to supplant real classroom encounters. The discovery of better test results by the virtual classroom learners is consistent with other findings in the collaborative learning literature. Schute also reports that learners had a greater perception of flexibility of process, a better understanding of the class, and the subject matter. Schute concludes, “I suspect as much of the performance differences can be attributed to student collaboration as to the technology, itself.” In fact, the highest performing students (in both the [virtual and actual] classes) reported the most peer interaction. Therefore, it is important that faculty contemplating the use of the virtual format pay attention to the issue of real time collaboration, whether carried from within the traditional classroom or in the context of virtual space” (http://www.csun.edu/sociology/virexp.htm). This shows that designers of museum Web sites must consider ways that implement not just interactivity with information, but communication between learners.

Another design issue revolves around a museum Web site’s philosophy in which consideration is given to what the museum’s purpose is in the online world. Max Anderson, head of the AGO and author of the Introduction to The Wired Museum says that it should be about multiple human
conversations relating to and bearing on the actual collection. Donovan (1997) points out that the primacy of the authentic object is paramount only in an actual museum space. In cyberspace, it's no longer an issue. Since objects in the collection are only available as lo-res digital images why organize content in an object-centric manner? Learners are less concerned with the structure of a collection as they are fascinated by the context and the history associated with the artworks.

I suggest that designers and curators make a conceptual shift from presenting ‘What is it’ to a more narrative or conversational ‘Who, Where, When, How and Why’. Most learners accessing a site for art educational purposes will find typical museum information about objects too detailed to be of use. This kind of information should be available to serious scholars, of course, but access to it should be from specifically designated links at the Web site where those requiring higher level contextual information can drill, at their option, to reach detailed object specific information. (As of this writing, museum Web sites that offer this is level of interactivity are very few. However, within a few years this will become common.)

Instead of organizing the Web site’s presentations hierarchically with objects forming the starting points, begin with stories from represented cultures within the museum’s collection (i.e. Rosetta Stone at the Cleveland Museum Web site), historical context, important people and places, and their importance to us. As an option, design engaging tales or mysteries with the museum’s collection of artifacts woven through them. By making this entertaining, the designer may set out paths that encourage curiosity and gently guide learners towards deeper understandings.

How this might be constructed is dependent on the designer’s inventiveness, skills and backing, and a precise definition of the Web site’s goals and users. Suggestions are coming from the museum community’s IT specialists, proposing that the building of these kinds of Web sites should employ dynamically assembled HTML generated from database sources. This avoids problems which large sites encounter when too many static pages become unwieldly to manage and difficult to keep current. Static HTML is hard to scale upwards as a museum Web site grows in size and complexity. If employed, SGML encoding standards could create more handles to the
enriched information that an object-relational database and indexing tools could use.

So far, it appears that the content of most museum Web sites is miniscule compared to the vast amounts of visual and textual information they actually have stored. Museums generate huge volumes of content all the time, but it seems that they are not saving or managing it in formats that can be reached by Web visitors.

Rich content is being created through the preparation of -- historical narratives, chronologies, biographical profiles, images, video, audio, graphics -- for use in exhibits, publications, marketing materials, and instructional curricula, etc. Efforts must be made to develop ways in which this content can be incorporated into a management system. The major investment in time and expertise that goes into creating content should not go to waste. For example, when an exhibition is created there is usually an accompanying publication, labels are printed, texts are developed, graphics are created, transparencies shot and scanned, essays written, etc. All this content should be developed using a system that can manage and store it in a database accessible via the museum’s Intranet and also selectively available to the Internet. There would be enormous value when accumulating this content over several years, and being able to reconfigure it for learners accessing a museum Web site. When museums switch to content management systems, they will require changes to the internal structure of the underlying database as well. The old paradigm, which was object-centric, will be replaced by a database structure that must confer equal status to information about people, places and events, and allow relationships to be defined between who, what, where, when, why and how.

When this occurs, museum Web site designers will discover that they must encourage museum staff responsible for creating enriched content (curators, conservators, and educators) to contribute to the new system. In this vision, museums assume a new role in addition to being keepers, they must begin to think of themselves as both publishers and hosts to an ongoing dialogue revolving around their data. This process continues to build added value into a process of content creation and management of intellectual assets.
Obviously, this is a huge undertaking. It is unreasonable to envision entire collections being thoroughly reconstituted for this purpose. But it will be beneficial for learners when museums begin developing rich story lines about parts of their collection rather than presenting a brief description for every object. By gradually adding to their "books of stories", museums create achievable goals, and with each new installment they will, over time, develop a tapestry and a source of rich content that can be continually repurposed and massaged for many different visitors and learners.

Designing a clear, logical, and easy to conceptualize museum Web site structure is another paramount concern. As revealed in both the literature and from my own online research, learners must be able to quickly understand the way in which a museum Web site is organized. If the site is confusing, the potential for assisting in the art education process declines. There is the likelihood for interesting arguments concerning a designers' freedom to be creative versus the need to establish some standards for page design (where the logo should go, proper positioning of a search button, etc.) so that visitors do not need to learn a new navigation strategy for each museum Web site.

Nick Ragouzis an independent Web consultant is reported to have said in an argument against the idea of standards for page design, "The Web is not a control panel - it is an experience. If you put a control panel for someone who wants to get an experience, you have totally miserved that person" (Hertzberg, 1997, p. 31).

A Web site is a product like any other which requires good design. A soundly built, beautiful to look at, efficiently functioning site can suggest ideas that transcend its form and function. Paola Antonelli (1997) thinks that moments in history produce quality of design which is defined within parameters unique to the time. So it is with the evolution of the WWW at the end of the Twentieth Century.
From my investigations, and from my personal sensibilities towards design, I propose that the most valuable attributes of a well designed museum Web site are as follows.

Economy, simplicity and sensitivity must take precedence over indulgent and flashy approaches. Experimentation must be inspired by genuine necessity. The designer must strive for elements of surprise and deep intellectual beauty by relying more on invention than the elaboration of hollow styles. Through ingenuity and economy the designer may develop a coherent minimalist approach whose apparent modesty should embody a design attitude that I would term correct.

Visually spare designs sometimes appear "poor", though this illusion should not mask the depth of a site's information, it can at the same time create an aesthetic that honors the art housed in the museum collection. While some designers might argue that understatement robs them of individual style, I disagree. Elegant poverty of style can be an extremely powerful approach that, while perhaps formally austere, still permits playfulness through design and use. Modesty should be on the surface, without being coquettishly false, and yet it should provide the tools to access the richness of a site. Designers must be able to cross disciplinary boundaries. They must be able to see the beauty of an engineer's aesthetic. While appreciating this they should nonetheless be able to adopt a minimalist approach to design which can still be quirky, smart, simple and delightful.

Museum Web sites that support art education must never lose sight of the fact that it is learning and the curriculum that are the foundations of education. Design is a tool that helps to make the fruition of knowledge and understanding possible. Design is only a way to move towards the objective.

There is no doubt that experimentation will continue, requiring a hands-on attitude and a craft-like sensibility. The novelty of the elements that a Web designer can command demand flexibility and new methods of production that will stimulate the exploration of numerous possibilities.
Suggestions for Further Research

Further research is required in several areas that relate to this study. They stem from both pedagogical and technical issues. In the former case, White (1996) forcefully argues that "Never before have people had so much information about the world and at the same time been so out of touch" (p. 114). He points out that learners must be able to see beyond technically imposed abstractions to reality. He worries that technology might be used to reduce both the teacher and pedagogy into purely symbolic forms. White insists that it is "the presence of the teacher [which] animates technology" (p. 120). Research should be undertaken which investigates ways in which museum Web sites might be "authored" so that learning can occur without losing the lived experience that resonates in the interchange between a real teacher and learner. This research must answer the question, how can pedagogy animate electronic media?

Clark (1994) explains that developing trends in art education seem to be converging two different notions which might form halves of a unified whole. These are: education in art, and education through art. Research might be undertaken to determine if these "polar segments of a curriculum continuum" (p. 14) might be sequenced into a whole through museum Web site designs that present support for art education. The two elements, 1) a scientific-rational curriculum theory (cognitive/discipline/product), and 2) a romantic-expressionist curriculum theory (affective/methodological/process) "could be the opposite sides of the same coin" (p. 15). Though this notion is not new, research on these models will bear upon design issues for museum Web sites.

A final issue, that I see, concerns whether it can be proved that pyramid-like hierarchal information structures are more effective than laterally organized hyperlinked information environments, when the needs of art education learners are at issue. Narrative structures for presenting information appear promising, but studies ought to look at ways to organize these stories so that they produce learning and not just entertainment. Research needs to focus on determining which metaphors translate well from actual physical museums into their virtual
counterparts. In fact, this is such a new and unexplored field that for those who are excited by its prospects the research horizon seems very broad indeed.

Conclusion

It seems likely that the designers of museum Web sites will only increase the public’s desire to encounter artworks in the original. The proof of this is obvious when considering the number of young art students who flock to galleries and museums from New York to Moscow after having become entranced by poor colour slides and off-registered reproductions in their art history texts. Knowing this should inspire designers and impress upon them the importance of their roles in the process of art education.

Max Anderson (1997) says that the authors of museum Web sites have a daunting task finding technology that becomes transparent by “demystification and simplification [that can] reduce the distracting hiss and crackle not only of communication itself, but also the polemical tone that attends the debate, since the terms of engagement will be simplified as well as the ends” (p.22). The designers creed must be to enhance understanding and banish confusion.

These designers must realize that they do not create in isolation, but that very soon all online museums will become intimately networked. This interconnectedness will create demands of unforeseeable complexity demanding solutions dependent on the community of Web site designers’ ability to visualize workable and understandable solutions. These inventions will likely have to change and mutate continually, since it is difficult for designers to imagine the effect of the next technical innovation. As people differ - interactions will too, and Web styles, contents, and interactive strategies toward pedagogy will vary digitally as much as they do in our analog world. The remarkable inventiveness that will be required is part of what will transform museums, reintegrating their purpose within society, and providing learners of every kind with a new adventure in knowledge building.
Bibliography:


148


Glossary:

Active X - A programming language developed by Microsoft.

Animated .GIF - A way of displaying several digital images sequentially so that the illusion of movement is created.

Applets - Small programs written in the Java programming language that are downloaded to the user's browser and which function independently from the server once on the client PC.

Authorware - An object oriented programming package developed by Macromedia.

Bandwidth - A term which defines the amount of data that can pass through a connection, usually given in bytes per second.

Bezier Curve - A mathematically described curved line, in computer graphics these lines may be described using very small amounts of data information.

Bookmarking - A system of recording URLs that a user wishes to return to.

Constructivism - A theory of learning that sees the learning process as a series of potentially related experiences which are assembled internally by the learner as s/he synthesizes the basic blocks into relationships which may be presented as personal knowledge.

Cookies - A small piece of data that may be recorded in a file that is part of a users browser. The data is placed there when the user visits a Web site. This data can be retrieved the next time the user revisits that site and may be used to present the user with updated or personalized information.

CMC - Computer mediated communications.

CGI - Computer gateway interface, describes ways in which programs which run on an Internet server may dynamically respond to queries from users on the Web.

Database Servers - Internet servers which can respond to requests from Web users and access information stored in a database.

Director - A computer application by Macromedia permitting easy authoring of interactive programs, for example Shockwave and FLASH.

Display Resolution - The definition of how a computer monitor can present visuals. Described by
both the number of colours and the number/size of pixels that appear on the monitor.

FAQ Database - Frequently asked questions and answers stored in a database for quick retrieval permitting users to find answers to common questions.

Feature Creep - When the user features designed for a Web site change style, or location, or function from page to page.

Forms - A way for users to input information on a Web page and have that information sent to a server.

FLASH - A browser plug-in permitting streamed interactive animations to be delivered to a user.

Fly-outs - A small pop-up window or other similar event triggered by a mouse click or a mouse over event.

HTML - Hyper text markup language. The coded tags which tell a browser how to present information in the browser window.

Hyperlink - The connection between two points of information on the Web, maybe a clickable word, icon, or image/image map.

Interactivity - The ability of a computer program to respond to various kinds of user input, in general these responses should appear to be dynamic.

Java - A recently invented platform independent programming language.

JavaScript - A simple programming language which is embedded in an HTML document and which executes on the client PC.

J Script Errors - Error message which pops up in the browser window when the client browser cannot execute downloaded JavaScript, likely due to a bug in the code.

Mailto - A browser function in which the user clicks on a highlighted word or image and is presented with an email function, usually designed to permit a reply or response to a Web page’s author.

Meta Tags - An HTML tag for specifying additional information not supported by the <HEAD> tag, can serve various functions including providing information to search engines about changes in an HTML document.

Mouse Over - An action which triggers a response when the mouse cursor passes over a hot area.
ODBC - Object oriented database connectivity

Object Oriented Programming - Permits programmers to move screen objects around to create programming code instead of writing it out as text.

Proprietary Systems - Computer systems which cannot interact or work effectively with standard systems.

Plug-ins - Additional programming resources for computer applications, usually developed by third party companies to support a program they have created to run in tandem with or support additional functions of a highly successful application such as Netscape Navigator.

RGB - Red, green, blue.

Search Engines - Applications residing on servers available via the World Wide Web that help users find Web sites with information that is relevant to the user’s query.

Shockwave - A Macromedia plug-in for Netscape Navigator and Internet Explorer which permits the delivery of streamed interactive multimedia to a browser.

SME - Subject matter expert.

SQL - Structured query language.

Streamed Delivery - Sending multimedia elements to a browser on the Web is often difficult because the size of the multimedia document can be very large. With low bandwidth the document might take a long time to completely download. Streamed delivery permits the document’s multimedia elements to begin playing as soon as they arrive, thus eliminating the wait time.

Threaded Messages - In multi-party CMC it can be difficult to follow extensive and complex message postings, by visually arranging the subject headings of the messages in some kind of order users can follow the logic of posts and replies.

Three Click Test - An unofficial Web design rule that says that if a user needs more than three clicks to find some piece of information there is a good likelihood that they will get lost.

User Features - Computer application functions that the user can control.
