The essence of hypermedia is the ... computerized linkage of and navigation through chunks of information in several different media (known as multimedia information). Non-text information might be two- or three-dimensional graphic images, animation, film, video tape, or monaural or stereo sound recordings. (Myke Gluck, 1989)

Few people would argue that architectural education, ideally a complex holistic experience, completely integrates the many aspects and concerns that contribute to the design and realization of a building. This is hardly surprising given the vast array of information that architecture schools with limited resources attempt to present to students within constricted time frames.

One may argue that in attempting to approach such a holistic educational goal, representations of reality on a computer screen are no more useful or provocative than conventional communication devices: slides, photographs, drawings, the spoken and printed word, moving pictures (film, video), and various combinations of all of these. The opportunities offered by computer-driven multimedia presentations, however, lie in the speed and relevance of connections made between associated ideas in various media formats. In particular, a multimedia presentation, if carefully authored and developed, can provide a wide range of interactive information gathering pathways.

The approach called ArchiMedia offers a means for presenting a wide variety of information about a range of building types in an interactive format with the goal of supporting the creative and practical processes of communication among teachers and students.

The ArchiMedia Prototype.

This special way of seeing includes the ability to see a whole field while at the same time perceiving parts within the field in relationship to each other as well as to the whole ...; the ability to see with un-distracted attention what is actually "out there," quite apart from language considerations; the ability to perceive both the thing as it is and its possible metaphorical overtones. (Betty Edwards, 1986)
In ArchiMedia, we intend to allow more to be seen than meets the eye. By providing information on both the technical and the artistic, on both the quantities and qualities of buildings, the synthesis of left-brain and right-brain processes is encouraged.

In demonstrating the prototype, we will show the various routes that can be followed in navigating through ArchiMedia, and some of the features of the application.

An introductory card explains the operations that are necessary to navigate through the program. Options are 1) clicking the mouse on highlighted text to go to additional information on the topic; 2) clicking the mouse on outlined images (such as the photograph) to enlarge it, or 3) clicking the mouse on an outlined button ("Quit", "Begin") to move in a specified direction.

The ArchiMedia "Main Menu" card serves as the signpost for navigation. The major headings under which information is organized are presented here: Architects; Context (historical, cultural, physical, economic); Formal Analysis (for example, diagramming); Building Types (for example, residential, museums, libraries, government buildings, schools); patterns of Experiential Awareness (for example, prospect and refuge, procession, mystery); Structure, including tectonics and materials and construction methods; and Environmental Control Systems (including both qualitative and quantitative aspects of acoustic, lighting, and thermal analyses). By selecting any of these topics, further options are presented. For example, the selection of "Architects" leads to a list of architects. When Frank Lloyd Wright is selected, a new menu appears listing his buildings included in ArchiMedia, each represented by a small icon.

Another option is to select a topic, such as patterns of Experiential Awareness. Then a particular pattern, such as "Prospect & Refuge" can be chosen from the submenu, at which point a menu with available selections appears, again with building icons. We'll now go further into the application by selecting "The Cheney House".

Although there are several topics included in the Cheney House section, we have arrived at "Prospect and Refuge" due to the path we have chosen. A plan and a photograph are presented along with text that addresses the subject at hand. But the images are too small for careful study. Clicking on the photograph will enlarge it to the size of the entire screen, with a small plan superimposed in the upper left corner. On the small plan, a red arrow shows the exact direction of the photographic view. Another click and the enlargement returns to its original size on the previous screen. The plan can also be enlarged for easier reading. In this building presentation, an animated sequence revealing the circuitous entry path to the living room illustrates the Prospect and Refuge design pattern as used in Wright's residences.

The Menu bar at the right allows the user to take different directions at any point during the exploratory process. The upper section
facilitates navigation through the application at three levels. The first selection, "Main", returns the user to the Main Menu, where one's current location is highlighted. The second selection, "Prospect", returns the user to the Prospect and Refuge menu, to examine further examples in that subject. The third selection, "Chenery", causes a menu to pop up presenting topics related to the Cheney House: Architect, Context, Formal Analysis, Experiential Awareness, Structure, Environmental Control Systems, Bibliography, and direct access to Drawings (plans and sections). Below is a "Help" button, leading one to a card that goes over basic navigational aids. And at the bottom are buttons that provide navigation through the current selection, i.e. to "Previous" and "More" cards.

A look at the sections on Salisbury and Wells Cathedrals illustrates some of the capabilities of ArchMedia. When blown up to full screen size, the digital images from high-quality originals allow presentations that the viewer can peruse thoroughly for detailed information. In addition, the plan of Salisbury Cathedral can be called up, and then overlaid on the plan of Wells (currently as bitmapped images, ultimately as vectors to allow for rapid scaling). From that comparison, the viewer can go into the Wells section, where further references are highlighted in the text, allowing direct access to a particular building or menu.

At any point, the viewer can change subject areas entirely, for example, by switching to "Museums" as a Building Type to explore. On "visiting" the Kimbell Museum, the connections between structure and light are pointed out in the text as well as in the accompanying sketches and drawings. Here an animation sequence is included as an explanation of the origins of the structural system: the path of a dot on the circumference of a circle rolling along a horizontal plane traces out the cycloid shape as the circle.

One might choose at this point to investigate the lighting in the Kimbell, and then perhaps be enticed to explore additional examples of daylighting, or other buildings by Kahn. The possibilities should seem endless, but follow logically from what is presented.

Information on buildings will be presented in an abbreviated case study format, organized according to the categories listed above.

Presentation Format Issues.

I must begin not with hypothesis, but with specific instances.*

[Paul Klee and Altes Fraulein, 1931 as quoted by Betty Edwards, 1986]

Case study formats for presenting and studying buildings have been explored and used successfully for several years in architectural education. The point of view expressed and the pedagogical lesson offered in the case studies differ according to the writer and the teacher. Presenting a complete picture of a building - its strengths and weaknesses, its expression and
function, its context and details - is challenging because we do not know all the lessons the students are going to learn from it.

Case studies are often written with a certain lesson in mind. An example of pedagogical use is to give the student information up to a critical decision-making point in the design or construction process, and then ask the student to find a resolution. In ArchiMedia, however, a major goal is simply to make available the basic images and background material on selected buildings in an easily accessible format. The use envisioned is a large "armchair tour sketchbook" to be used as a resource during the design process. What will the student have learned from this architectural armchair tour? That will depend on the questions asked - the question that instigated the tour, and also the queries that follow along the way - and the possibilities provided for answering these questions.

For example, there are two basic approaches to structuring the navigational routes: one, "hard" connections where options are limited to those indicated on the screen; and two, "soft" connections, where by the use of Macintosh navigational tools such as pull-down menus, any piece of information can be brought up on the screen and compared with others.

An example of the first approach, or "hard" navigation options, not to limit choices but to indicate buildings that address similar issues. An example of the opportunity presented is that if a student is reviewing Kahn's Exeter Library and wants to investigate additional brick bearing wall construction, he or she could follow a path through the Structures link, finding appropriate comparisons without having to know the buildings beforehand. It will be important to insure that any building can also be located easily simply by name, location, or architect.

Recognizing the variety of learning styles, we will be designing and testing a variety of interface formats during subsequent development stages of ArchiMedia.
Hypermedia.

The sheer amount of information and the simultaneous spatial perceptions are at levels of complexity beyond the capability and unsuited to the style of the linear, sequential, language-based mode of thought.

[Betty Edwards, 1986]

The effect of these various aids is to alter the traditional computer interface from a very sequential, logical, or left-brain dominant environment to a richer, multi-directional, right-brain dominant environment.

[Myke Gluck, 1989]

Hypermedia as a tool is both helpful and dangerous, as is any tool: helpful in that the job may be done more effectively; dangerous, in that the new tool-based method may bypass previous valuable experiences in doing the task.

One advantage, according to Gluck and our own experience, is that new and associative connections can be made. And the user, in defining his/her own path and method of pursuing information links, learns more quickly and thoroughly than when presented with a preset tour.1

On the other side, Gluck points out some "deep problems". Opportunities for becoming disoriented increase as the quantity of data and extent of cross-referencing increase. One can essentially "get lost" in a complex multi-dimensional matrix of data. Navigation can be facilitated via data organization maps and automatic path tracing routines in open, "soft-linked" data sets. In more constrained, "hard-linked" data sets, carefully designed networks could restrict the user to associated excursions that always loop back to main trunk lines. While these and other methods all attempt to solve the problem for specific applications, "there is no optimal set of navigational instruments that will be totally effective for all users at all times."2

The second "deep problem" Gluck raises is that of cognitive overhead - how does a user return to points of divergence after traveling paths no longer of interest? Or how does one assimilate, organize, or record for future use meaningful segments of data of various media? We envision a personal sketchbook and tool kit could be integrated with capabilities for quickly annotating, extracting, and recombining data.

The third issue is that of the presentation rhetoric, or "how well ... links communicate the intended relationship among ideas."3

Hypermedia is a new method of transmitting information, and both authors and users are still largely dependent on their usual resources: the printed word and images, drawn or photographed. New possibilities are arising from the use of the media itself, such as animation-creation packages that can control multimedia presentations.4

Unresolved issues at this point include the specific structural relationship between the database and the interface, the "look and feel" of
the interface and navigational devices, the exact slate of buildings to be presented in the first and subsequent modules, and the method of production and distribution.

Writing.

One thing that does bother me, however, is the belief that hypertext will save the author from having to put material in linear order. Wrong. To think this is to allow for sloppiness in writing and presentation. It is hard work to organize material, but that effort on the part of the writer is essential for the ease of the reader. Take away the need for this discipline and I fear that you pass the burden on to the reader, who may not be able to cope, and may not care to try. The advent of hypertext is apt to make writing much more difficult, not easier. Good writing, that is.

[Donald Norman, 1988]

We have discovered in the process of developing the ArchiMedia prototype that the linkage between images and text is critical, since the reading of long texts on the computer screen cannot be well tolerated. The texts must therefore be succinct without being mundane or boring. And they should, where possible, point out possible linkages to other buildings or topics of interest. The balance and placement of words and images on the screen, and the succession of screen images, is also important to a presentation of overall concept with adequate detail.

We have also discovered that the writing and presentation of images and graphics must follow a very rigid format to allow the links among the parts to be made in any meaningful way. Indeed the structure to allow the linkages to be truly associative is the most important aspect of the design. Our current approach to this design problem, as was shown in the explanation of the prototype, is to include the various aspects of building analysis within a limited number of categories, and then to build linkages among the categories.

Within this rigid framework, however, there is room for the personal and the idiosyncratic viewpoints of multiple authorship. We were initially enthusiastic about the possibilities of networking among schools of architecture to include the many points of view and bits of information and images that constitute our large national teaching resource. Such an effort might resemble a national journal, with an editorial board, and production in modular bits, such as one building per "issue". Or schools might produce a module on a building near them, in order to work from primary sources. Or experts might be identified to address particular topics or buildings. The organisational aspects of such an approach imply a massive coordination task.

At the other end of the scale, a user-friendly input format could be created and distributed to interested contributors to fill in themselves. Here, however, the problem of making the necessary links to other units, which is the heart of the project goal, is left unresolved. In fact, the design of the whole and the parts are interrelated, since the full potential of
Archimedia lies in the elegance of both the format and also the connections.

Conclusion.

There is something antic about creating, although the enterprise be serious. And there is a matching antic spirit that goes with writing about it, for if ever there was a silent process, it is the creative one. Antic and serious and silent. (Jerome Bruner, 1965 as quoted in Betty Edwards, 1986)

Hypermedia is a humbling tool. One quickly realizes, in developing it, that there is no one way of presenting information; in fact, the goal is for the person using the program to choose his/her own path through the learning process. Yet to achieve this flexibility the hypermedia program itself must be very tightly programmed and controlled.

Does hypermedia have a future in architectural education?

The complexity of architecture lies in its combination of artistic and scientific modes of thought. In architecture, right and left brain must work together to serve the synthetic process of design. In the teaching of architecture, how do we help the student to meld the two approaches? We do it in many different ways, depending on what we teach and how we teach it – then, too, we often leave the student to figure it out. One student describes it as "...like being in a washing machine with a thousand ideas going at once." Then she heads off to the library to find the books on Aalto her studio instructor recommended. None there. Then she looks through the periodical indexes, but the library closes and she can't take the magazine out. Xerox copies help, but much detail, as well as the color, is lost. And in the middle of the night, reading the article, she comes across a reference to the lighting of the building that catches her interest, and refers to other buildings. But she can't tell from the xerox copies how the lighting works. And even if she could read the photograph, it may not be clear. A diagram from yet another book might explain it. Too late.

We cannot suggest that the hypermedia approach can offer a perfect answer to the frustrations of this task. But it does offer the possibility of providing various bodies of information about a wide range of buildings in an integrated way, providing both "soft" images to evoke the functioning of the right brain, and "hard" images to stimulate the left brain. And it could start, in a directed way, to make this information available at the students' drawing boards (assuming at least one computer in every studio).

As the student or teacher or practitioner navigates through Archimedia, he/she will undoubtedly want to keep a record, a sketchbook, of the voyage. It is our goal to allow sections to be "clipped" from the base package in order to produce a personal notebook for each user. For the student, it is a design and study aid.
teacher, it is the lecture, the handout. For the practitioner, it is a design notebook. Each document will be personal, as will each tour, and will lead to further questions. But the resulting explorations should be much richer for the wealth of the input, and the ease of access.

_The more one probes the more one deepens the mystery: it's always out of reach. Mysteries have to be respected if they are to retain their power._

_Art disturbs: science reassures._

[Georges Braques as quoted in Betty Edwards, 1986]

Footnotes

1. Donald Watson, personal communication from informal testing of Hypercard application.


3. Ibid.


References


