

A Web-based Architectural Case Study System

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A Web-based Architectural Case Study System

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This paper describes a project to develop an extensible, low-tech, cooperative case-study collection via the world wide web. The project includes template files which persons with access to a web server but minimal technical knowledge can download and utilize to assemble new web-based case studies.

Anticipating that other case study repositories have been or will be developed by different researchers, and wishing to provide greater value than that afforded by simple HTML links, the overall system is designed to form what we call a multi-site. Using HTML "frames" each case study is linked together via a central administrative database to form a shared case study pool.

This new multi-site approach to cooperative web projects offers a means to fill the gap between simple manual linking of HTML pages and searches conducted using global indexing engines such as AltaVista, Web Crawler, or Yahoo.

THE ROLE OF CASE STUDIES

Collections of antecedent building projects, whether real or imagined, provide one of the key components of architectural theory, education and practice. The study of architecture involves not only a study of supporting technologies, but also the evolution of ideas about the use of space, changes to the cultural milieu within which the building is embedded, and the style or signature character of the designer, whether an individual or an institution.

This dependence is often recognized through student study projects and reference texts which utilize the case study approach. Through application of a standardized taxonomy, case studies make projects more quickly accessible. By browsing a select set of characteristics of the project(s) under study, the designer can achieve a fuller understanding of all or selected aspects of a particular building as it relates to their current design project.

One limitation of the case study approach is the difficulty of restructuring the process of browsing in response to the material which is uncovered. Printed texts almost invariably proceed from one *building* project to

another, making it difficult to pursue a particular *subject*, such as response to climate, across a variety of projects.

Efforts have been made to break out of the linear, project-centered character of text-based references using authoring and publishing tools that fall into the hypermedia or multimedia categories. Unfortunately, with few exceptions, these efforts do not appeal to traditional CD-ROM publishing houses, and are not readily distributed by other means. As a consequence, much information of potential value to students and professionals is not widely distributed.

DIGITAL-MEDIA CASE STUDIES: ARCHIMEDIA I

Between 1990 and 1992 a group of faculty at the University of Washington developed a series of architectural case studies using digital media. Several different content organization schemes were tried, but all of the projects were based on the SuperCard hypertext authoring and presentation system. SuperCard uses the same "card" metaphor popularized by the HyperCard application and, at the time, offered superior support for color images and large screens. The case study of Alvar Aalto's Mount Angel Abbey Library, located outside of Portland, Oregon, was the most complete and successful of the efforts (see Figure 1). This case study occupies approximately 13MB of disk space, and took many hours of student work to research and assemble. Presentation of this research at ACADIA (Millet, 1991), Ed-Media (Millet, 1993) and ACSA conferences was met with very positive response. In particular, the richness of the data incorporated into the case study was appealing. Unfortunately, efforts to secure funding for a continuing case study series or publication of a digital case study journal met with no success.

It seems reasonable to assume that similar investments of energy at other institutions also end up just short of being available to a wider audience. In each case a few copies get distributed through word-of-mouth contacts, but lack of a common hardware and software base hampers widespread distribution. One of the few such projects to achieve publication is the "Great Works Collection" developed at the University of Oregon. Unfortunately, the primary product of the "Great Works Collection" seems to be the 3D models.

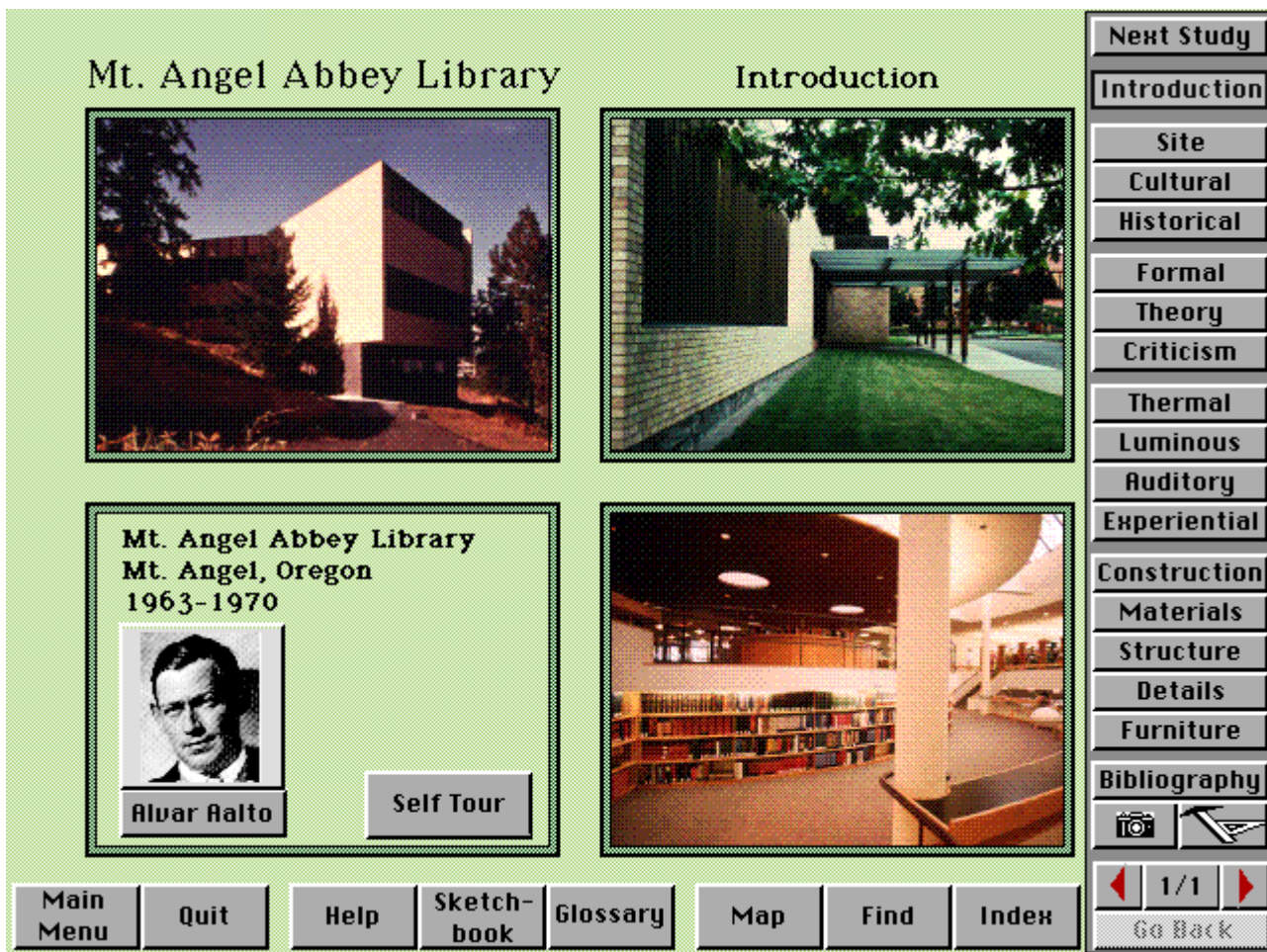


Fig. 1. The Mount Angel Case Study

While interesting and certainly novel, the case studies have a limited amount of additional information about the projects.

Several factors would seem to impede the distribution of these efforts. The relatively small market and high front-end costs is probably the major factor that keeps publishing houses from such endeavors. Computer dependencies (Macintosh vs PC, file formats, CD-ROM distribution media, etc.) certainly make it more difficult. The transition from "fair use" of copyrighted images in student projects to properly credited and permitted use in a published project contributes to the cost. The relatively high cost of storage, while plummeting in recent months, remains a difficulty. Finally, most case study projects are "one off" efforts which lack a uniform structure or categorization scheme. This makes it difficult to move from case study to case study without re-orienting to the "local dialect."

THE WORLD WIDE WEB

Promises and Limitations

Since 1991 the world wide web has exploded onto the scene. A web-based approach offers solutions to a number of the problems mentioned above. The web is easy to use and

almost universally accessible. Users would not have to dedicate large amounts of disk space to storing case studies or cataloging CD-ROMs since each case study can be delivered via the web as it is needed. Web browsers are available for most platforms and a fairly large subset of HTML tags renders similarly on each, reducing hardware and software incompatibility problems significantly. If a standard template document (or set of linked documents) could be developed and placed on the web as an easy-to-use resource for new case studies, the human cost of presenting content could be reduced, and as a side effect, the resultant uniform structure would make it easier to browse from one case study to another without getting lost.

Unfortunately, this solution is not without difficulties. The speed with which a browser can retrieve information from the web is nowhere near that with which it can access local disk storage, so some kinds of content cannot be easily delivered (full screen video, high quality audio, etc.) Serving a large number of case studies from a single site would be a significant burden on someone's web server. More importantly, updating or modifying the case studies over time would almost certainly become awkward, and the sense of ownership that attends publication of material on one's own web site would be lost.

THE PROBLEM OF FINDING THINGS

There is a subtle problem with the idea of delivering content via the web: How do people become aware of the addition of new case studies to the web? It is important to remember that the Hyper Text Transfer Protocol (http) and initial Hyper Text Markup Language (HTML) specification were developed to support cooperative authorship of documents on heterogeneous networks. That is, they were developed to create integrated content such as that found within a single web site. This is usually augmented by traditional acquaintance-based word-of-mouth, browser "bookmarks" and hand-edited "Favorite Links" collections. These interlinkages provide the first justification for the phrase "world wide web," but also introduce the term "link rot" which is used to describe the gradual die-off of link function that seems to occur in most of these lists.

Within a small closely-knit community, it is possible for electronic mail and other media to distribute awareness of new or altered home pages, but this becomes more difficult and cumbersome as the number of participants (i.e., web servers) in the community grows. Thus, while the web promises interconnectedness, the result of everyone being a content creator must ultimately be a sort of chaos.

The only hedge against this chaos has been the family of automated web browsers and indexers called variously robots, spiders and web crawlers, which feed sites such as InfoSeek, and AltaVista. Given a list of starting points, these programs retrieve each HTML document, extract any links it may contain, index the contents, record the page URL and indexing information in a database, and then do the same thing for each of the links. Over time such a robot can access a significant number of pages. The database may then be used to find HTML pages that have user-specified key words in them.

Unfortunately, because these databases simply catalog pages according to the words they use, rather than the meaning of those words, it is very difficult to compose searches of these indexes using discipline-specific but common wording, or to sort out chaff from wheat. Try searching AltaVista on "prairie school"--there are some 100,000 documents that satisfy this request! Even narrowing it to those pages that have both Prairie and School on them gives 20,000 separate documents! Alternatively, a search on "Frank Lloyd Wright" nets some 10,000 documents, and a quick look at the first 100 indicates that EVERY ONE is actually about "the" FLW. Amongst these, however, are pages cataloging stolen merchandise (a portfolio of FLW drawings), etc. Even if all this information is correct, sorting through it is time consuming.

Clearly, trying to "catalog the web" according to the subject of the documents rather than their words would be an incredibly costly undertaking. But what about trying to develop "trusted sources?" That is, what about developing a source of web-based information that might become both the place where the author would want to be listed, and the place where the researcher would think to go to find data?

ARCHIMEDIA-II: PROJECT GOALS

Low Cost

While the web may offer a tempting means of distributing information, it offers few opportunities to make money doing so and is unlikely to attract a "publishing" sponsor. We sought to develop a system that offers some chance of achieving it's goals without requiring any single institution to bear the brunt of substantial hardware, software, administrative, or authoring costs. One of the expected benefits of distributing the authorship task for case studies is avoiding copyright problems. If students and scholars document projects which are near or familiar to them, it will be likely that they will have, or can take, photographs that are free from copyright. At the same time, if authors wish to preserve their copyright claims, they need not worry that they are surrendering them when the case study is "published" since the files will always be served by their local server.

Template Project

There is a pedagogic value to creating case studies as well as accessing them. We wanted to foster development of case studies by making an easy-to-use template available on the web. That such a template might help standardize the structure of case studies, or facilitate automated cross-referencing between case studies was important, but only one factor.

Multi-site Experiment

We believe that the web needs some new mechanisms for structuring the cross-linking of individual sites. Further, we believe that indiscriminate web indexing is unlikely to be the solution to the problem. We think the ArchiMedia "multi-site" approach to distributed content and central indexing may offer one solution to the problem.

"Multi-site" is the term we have coined to describe the idea of multiple web pages, served by separate servers, but woven together into what is perceived to be a unified larger site through the use of smart indexing agents which facilitate searching and browsing across all the participating sites.

ARCHIMEDIA II: PRINCIPLE COMPONENTS

ArchiMedia II (AM-II) consists of three main pieces: a template project for developing case studies; a set of navigation pages; and an administrative home site, where documentation indexing engine and template project reside.

The Template Project

The template project consists of a set of web pages providing a completely linked, but content free case study. The file structure of the template project is illustrated in Figure 2. All the case study developer needs is a text editor, a source of imagery, and a web server. The pages provide complete HTML templates, so that simple content editing is all that is required to document a case study. Thumbnail and enlarged

graphic images exist as place holders, complete with appropriate HTML links. The case study author simply creates or scans images, names them appropriately, and drops them into the correct folder. It is not necessary to establish links for them. Pages are divided into subject sets, making it straightforward for teams of students to work on their own content and simply drop the finished folders full of HTML and images into the case study folder. At the same time, the pre-existing pages encourage case study authors to provide information on all pertinent topics.

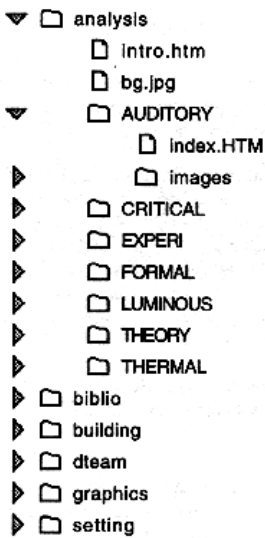


Fig. 2. File structure of the template project

The template project was derived from the structure of the Mount Angel Abbey Library study that was done in 1992. Five major categories exist at the top level, plus an introduction and bibliography. Each of the five categories is broken down into subcategories. The overall scheme is illustrated in Figure 3.

Introduction

Setting

Physical, Cultural, Historical

Analyses

Luminous, Thermal, Auditory,
Experiential; Formal, Critical
Theoretical

Design Team

Firm, Lead Architect, Assistants,
Engineers

Building Parts

Construction, Details, Finishes,
Furnishings, Material, Structure

Graphics

Drawing, Photographs, Sketches

Bibliography

Fig. 3. Information hierarchy within the template project

Each content page in the template is similar to that shown in Figure 4. Depending on the HTML knowledge

and skills of the author, these pages may be extended to almost any length, or abbreviated as necessary. The prepositioned graphics, complete with "enlarged view" links, make it easy for someone with modest scanning skills to include graphics on their case study pages. To provide "local control" separate background image files are available in each subject area (initially these all consist of the same graphic), as well as a case study logo. Space is provided at the bottom of each page for authorship credits. The page is designed to make clear where the information is coming from, even while it is included in a frame housed at another site. A finished page from our test project (Koti, 1996) is shown in Figure 5.

The Navigation Pages

The navigation pages are of two types, home site pages and case study pages. Both utilize HTML Frames, a mechanism for subdividing the browser window which enables two or more HTML pages from to be viewed at the same time and which allow links in one frame to update the contents another (Netscape, 1997). The primary pages are used during navigation of the ArchiMedia administrative, or "home site" resources, but are not part of the template project. The case study frame definition pages are included as part of the case study template. This enables the case study developer to browse their case study as it is being developed.

The three frames used in navigating a case study are visible in Figures 4 and 5. The left hand frame contains links back to the main ArchiMedia site, the case study title, and the major topic links. The frame along the bottom provides links to the sub-topics within the current major topic. The largest frame is used to display content. For instance, when a major topic link is selected an introductory page is displayed. This page can be used to summarize content, explain importance, or simply provide an appropriate graphic for the material which follows.

The use of frames allows the content HTML to be separated from the navigation HTML. This should lead to fewer problems with broken links during the process of developing a case study. It is also critical to the concept of a "multi-site".

The Indexer

When a case study is submitted to the AM-II central index, the URL of its home page is added to a list of URLs which guide a robotic indexer. Each page in a standard case study contains an identifier. This, along with other page contents, allow the indexer to search "across" a set of case studies rather than simply within a given case study. This dynamically updated and automatically maintained cross indexing of case study contents is intended to provide a significant inducement to abide by the standard case study structure.

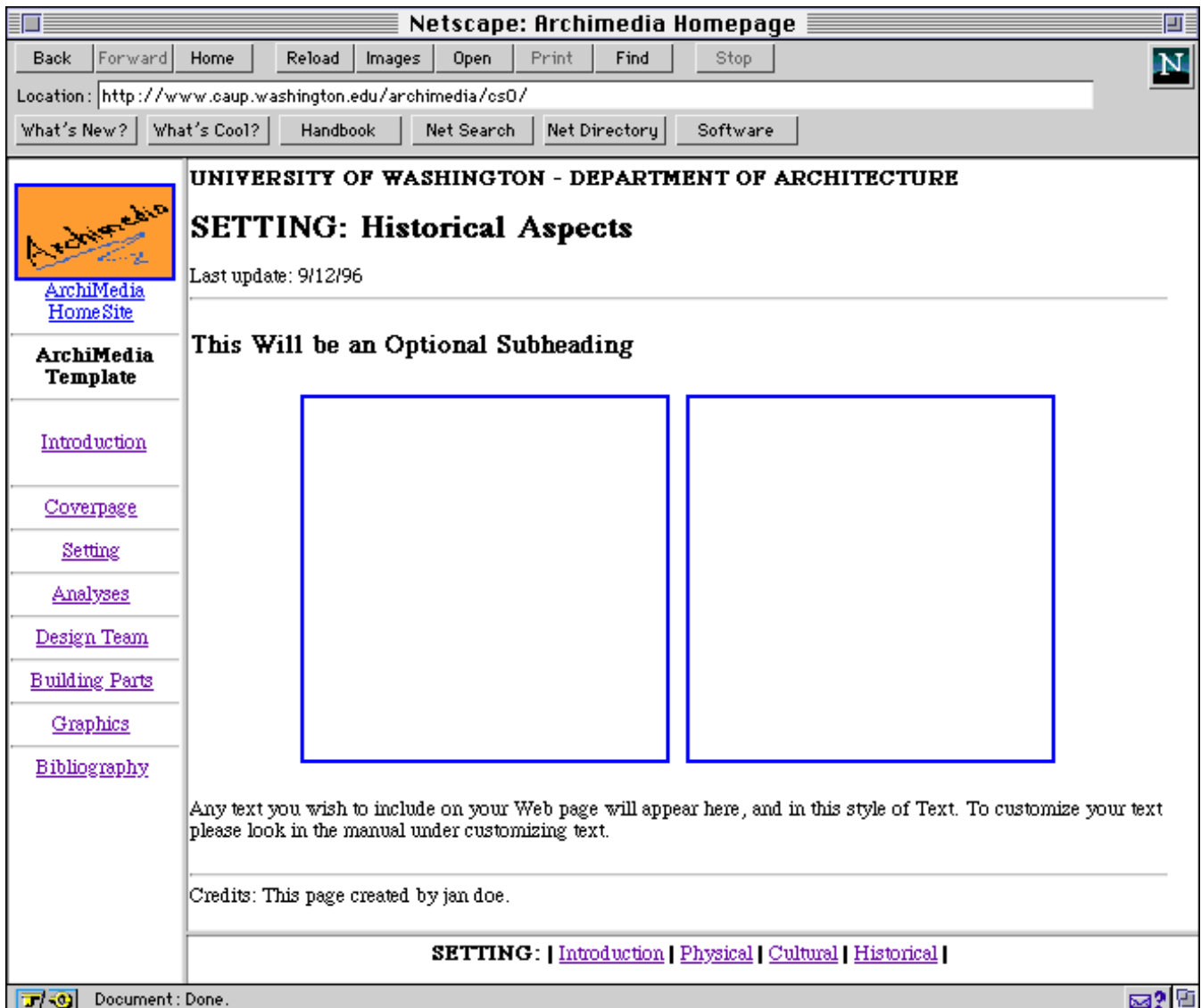


Fig. 4. Unaltered "Content page" from a template project

SUMMARY

Project Status

The ArchiMedia site can be found at <http://www.caup.washington.edu/archimedia/>. The administrative pages (index, documentation, help information, etc.) are substantially complete, though some of the automated site indexing and cross-linking functions still need to be developed. A template project has been completed and can be downloaded. The template project can also be browsed, to get a sense of the structure. A case study of the Museum of Anthropology, in Vancouver, B.C., was done utilizing the template (Koti, 1996) and is available on the site. We continue the task of converting the Mount Angel SuperCard stack into a complete online case study, and we are continuing to refine the meaning and procedures for cross-project browsing (see below).

Problems

What connections exist between an arbitrary set of case studies? Not many. Yet, it's hard to imagine randomly selecting one case study and then another. Similarly, it is hard to see what the selection page would look like for a "cross study" browse on "Cultural context" (for example). Is the next case study "adjacent" because of project location, architect, date of case study indexing, or what? What variables are allowed to change, and which ones would you like to hold constant? Without defining categories (a daunting and dangerous proposition) how can this be done?

When the template project is downloaded, we lose the ability to modify it centrally. Should we wish to change its content, we have no means of doing so. This is one of the reasons that the template contains only internal links (links to pieces of itself). As long as the project's file structure is maintained, these links should work. The use of frames permit the template documents to be distributed with a fairly low probability that the "big" links (to major sections of the case study) will be broken, simply because they are

Netscape: ArchiMedia Homepage

Location: <http://www.caup.washington.edu/ArchiMedia/moa/>

What's New? What's Cool? Handbook Net Search Net Directory Software

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[ArchiMedia Home Site](#)

ArchiMedia Template

[Introduction](#)

[Coveragepage](#)

[Setting](#)



[Analyses](#)

[Design Team](#)

[Building Parts](#)

[Graphics](#)

[Bibliography](#)

Architect Arthur Erickson has said,

"North west Coast Indian culture is the chief collection of the UBC Museum of Anthropology, and the main problem of our native population, the North west Coast Indians is that the white people took away their dignity by destroying their culture and beliefs and offering nothing but welfare in return. The museum should reassure our Indians of the greatness of their culture, and perhaps give them back some of their dignity and confidence, which

SETTING: | [Introduction](#) | [Physical](#) | [Cultural](#) | [Historical](#) |

Fig. 5. "Content page" from a test project

located in files that the case study author(s) do not need to edit. However, if it were necessary to do so, the navigation pages in a case study could be replaced almost without any editing being required.

CONCLUSIONS

We have designed a system which should require minimal administrative, server, or editorial overhead, and yet provide a value added web site for students and scholars interested in browsing case studies of architectural projects. Whether it will do so will depend on the palatability of the standard case study format, the persistence of frames in the HTML vocabulary, and the operability of the multi-site concept. We will have to wait and see.

REFERENCES

"Alta Vista Main Page." [web page] by Digital Equipment Corp. from <http://www.altavista.digital.com/>, search text was "prairie school" or "+Prairie +School". (January, 1997).

"Frame Basics." [web page] by Netscape Communications Corp, available from http://home.netscape.com/assist/net_sites/frame_syntax.html (January, 1997).

Millet, Marietta, P. Cohan and G. Hildebrand, "ArchiMedia; Interactive Architecture." Educational Multimedia and Hypermedia Annual 1993, (Association for the Advancement of Computing in Education, Charlottesville, VA, p 616.

Millet, Marietta, P. Cohan, G. Hildebrand and M. Read, "ArchiMedia Case Studies: Integrative Architectural Education," Reality and Virtual Reality: Proceedings of ACADIA91, Los Angeles, California (New Jersey Institute of Technology, Newark, NJ, 1991), 127-134.

"MOA." [web page] by Vijayalakshmi Koti, an ArchiMedia case study from <http://www.caup.washington.edu/archimedia/moa/> (January, 1997).