

Net-Based History of Architecture

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Topic Area: Pedagogy: general aspects about teaching design and related disciplines with digital media and critical discussion of pedagogical experiences.

History sequences in professional architecture programs must meet broad educational objectives. Inherent in an architect's education is a tension between the rigorous consideration of important ideas in the history of architecture and the inspired implementation of these ideas in the design studio. A digital history course can bridge the education/training divide by making the study of history emulate the methods and strategies used in the architecture studio.

Using a relational database and navigation software, we have developed a course in which students move through a digital environment of text, image, audio and video resources pertaining to broad historical categories in architecture. Charged with producing historical genealogies, students must incorporate current architectural and cultural concerns in their distillation of the history presented by the articles, surveys, manifestoes, photographs, drawings and interviews encountered online. The immersive multimedia environment uses hyper links as a structure, placing emphasis on the student's role in navigation while increasing the possibilities for chance encounters in the material. The delivery of basic material having been accomplished independently by the student, class meetings are used for higher-level discussions of the issues that surface.

The project is currently being implemented as a half-semester course in 20th century architecture for a small group of sophomore students in the professional Bachelor of Architecture program. The project's pedagogical and technical aspects will be discussed with respect to this stage of its development.

Historias de Arquitecturs en el Red

Programas profesionales en arquitectura requieren que sus cursos de historia sigan amplios objetivos educacionales. Inherente a la educación de un arquitecto es la tensión entre la consideración rigurosa de ideas importantes en la historia de aquitectura y la implementacion de estas ideas en el taller de diseño. Un curso digital en la historia de arquitectura puede crear un puente entre historia y diseño a través de hacer la producción de historia imitar los métodos y estrategias usadas en el taller de arquitectura.

Usando a relational database y software de navegación, nosotros hemos desarrollado un curso en el cual los estudiantes viajan a través de un ambiente digital de recursos de texto, imagen, audio y video, refiriendose a amplias categorías históricas de arquitectura. Encargados con producir genealogías históricas para cada categoría, los estudiantes deben formar una actitud con respecto a la multitud de ideas explícitas é implícitas en los artículos, surveys, manifestos, fotografías, planes y entrevistas que encuentran online. La naturaleza personal de este encuentro con la materia induce los estudiantes a incorporar asuntos al día en arquitectura, así como intereses culturales mas amplios, dentro de su producción de historia. El recibo de materia básica habiendo sido realizado independientemente por el estudiante, las reuniones de clase se pueden usar para discusiones de mas alto nivel acerca de los asuntos que surgen.

El proyecto, en estos momentos, está siendo implementado como un curso de medio semestre en arquitectura del siglo 20 para un pequeño grupo de estudiantes de segundo año en el programa de Bachelor of Architecture.

Los asuntos pedagógicos y técnicos del proyecto serán detallados a través de una discusión acerca de esta parte de su desarrollo.

When architecture students begin the history sequence in professional programs, they are generally introduced to a narrative model of history. Such a history presents objectified examples of architecture that retain some value for our current cultural circumstances. Meanwhile, the design studio that is central to an architect's education maintains a difficult relationship with the discipline of history. On the one hand, a thorough understanding of the history of design is necessary for imbuing designers with a sense of architecture's position in a broader cultural sphere. On the other hand, design work often requires more levity in putting historical material to practical use. Forms and spatial relationships, for example, must sometimes be brought forward in an unselfconscious way. Maintaining the distinction between academic rigor and inspired creation requires that the history lecture and the design studio polarize their emphases within a school of architecture. Hence the lecture concentrates on delivering a knowledge of history in the form of seamlessly packaged material, while this material is uncritically instrumentalized in the studio as justification for design decisions.

A cursory look at the history in question reveals that the most significant contributions in the discipline of architecture come from those who articulate a clear position for their work with respect to both past and contemporaneous issues. The nature of studio work plays a significant role in eliciting engaged practice. As the design process requires the consideration of a multitude of factors, the sheer quantity of information and knowledge that rise to the surface of a design problem induce the designer to employ strategies that aid in projecting a resolution. But the strategies are not deployed in a neutral manner: alongside ostensibly objective concerns are individual intentions rooted in the designer's understanding of her cultural position. The designer employs tactics of selection, elimination and amplification that recast the problem in terms of a clear position within a perceived cultural field. This process of handling a complex set of factors by personalizing the issues is an excellent model for a critical approach to the history of architecture that would imbue practice with a rare level of articulation.

At Rice University School of Architecture, we are exploring this proposition by developing a net-based curriculum in the undergraduate history of architecture sequence. Using a relational database and simple web browser software, we have created a course environment that emulates the raw chaos of historical fact faced by the architectural historian. As when students begin a studio project, they must filter, compare, select, reject and reformulate relationships among the various images and texts that are encountered online. Weekly work consists of producing historical genealogies in textual and visual form in which students incorporate current architectural and cultural concerns with relevant facts from the historical record. The course project is an expanded genealogy presented in movie format using Adobe Premiere software. As course material is covered independently by students, class meetings are devoted to higher level discussion of issues raised in the texts, increasing the quality of the encounter between professor and students.

In addition to corresponding better to the form of studio work, the net-based course promotes the critical consideration of design issues in the past while emphasizing the necessarily partisan nature of producing history. This paper will discuss the course environment being developed at Rice in terms of its technical aspects and in relation to the pedagogical goals of a critical history of architecture.

Multimedia architecture database

The underlying component of the net-based course is a multimedia architecture database. Microsoft Access, a form of relational database, is used to organize a large quantity of digital files. The files consist mostly of digitized photographs of significant works of architecture, with multiple images for each work. Rather than attaching a complete set of information about a building to each image that depicts it, the relational database allows such information to be entered only once by storing it in a separate table. Each time an image is viewed, the database can cross reference different tables and present accurate information about the depicted work. In addition to eliminating the redundancy inherent in entering the same information many times, errors such as the incorrect spelling of a building's name need be corrected only once. Expanding the relational database is also more efficient: because the structure is in place, no technician is needed for adding more images and additional buildings.

Students never encounter this database directly. All the material is accessed using a web browser, such as Internet Explorer. Having the material online is beneficial in many respects. First, the online course can be accessed from anywhere. On campus, we use MacIntosh G3 computers with 17" screens that are networked using Ethernet, but the course is designed to work well through a standard modem connection. Second, students are always using an up-to-date version of the course. Other kinds of digital course packages, such as those using MacroMedia Director, are issued on CD-ROM's or are installed directly on a hard drive. Any changes made in the form of a new release of the software require its reinstallation. This leads to the final point: the

course designer can add material whenever it is necessary and make corrections whenever errors are noticed. The online course responds to needs as they present themselves.

The instantaneous access to current course material is made possible using Cold Fusion Application Server. Based on decisions made by the student at a computer station, Cold Fusion communicates with the database, compiles relevant information and presents it to the student as a collection of web pages. Acting between the database's complex group of tables and the web browser, Cold Fusion ensures that students control their access to course material, which itself is accurate and complete with respect to the curriculum.

In order to give form to the multimedia architecture database, a simple concept was used: all digital files that are entered into the database are called resources, and each of the resources must be related to a work. Considering the resource before the work explains why they need to be distinguished. An image of a famous building, for example, is not itself an architectural work. And while it may be a work from the standpoint of visual art, it is most likely being placed in the database because it allows us one form of access to the architectural work that it depicts. The photograph is a resource. Together, a group of resources build an idea of the architectural work in question. The same applies to non-architectonic works, as with multiple translations in English of Alberti's text the *Ten Books of Architecture*. Alberti's real written work is not in the database, but versions of it may be. The work is abstract and is not itself a digital file. It is a set of attributes that can be associated with any number of digital files or resources.

A basic organizational attribute for works is the work type. In our database, there are four broad categories, each of which comprises specific work types. There are textual works, such as articles, book chapters and manifestoes; video works and audio works, which include documentaries, interviews, and movies; and finally object works, including buildings, furniture, unrealized projects and all forms of visual art. Other important characteristics of a work are its name, its creator or creators, its date of creation, and its location. Together, these attributes describe a work to which real files, or resources, can be attached.

Resources are divided into types that reflect their specific digital character. There are four of these data types¹: text, video, audio and image. These data types should be distinguished from their work type counterparts. The latter refer to the real manifestation of the original work, while the former describe the format of the digital resource for software and display purposes. Thus the work type of the Paris Opera House is "building," while one resource in the database for that work might be a video data type. Similarly, a critical review from an architecture journal is an article work type, while an audio recording of someone reading the review would be stored in the database as an audio data type. Figure 1 shows a table with the possible combinations of work types and data types.

The web of works and resources

When a student encounters a work in the course environment, it is seen, heard or read through the collection of different resources associated with it. For example, a student accessing the work "Villa Savoie" can view images of the building in France, listen to Philip Johnson discuss the building in an interview, and eventually view a video clip of a promenade through the villa and up to the roof solarium. The course environment uses two principal navigation windows or pages: the Work Page and the Resource Page. A Work Page displays information about a work while bringing together the resources that are associated with it (Figure 2). The name of the work, the year that it was created, the place of its creation, the name of its creator, and its type appear on this page. As we saw earlier, this information is an abstract record: the work exists elsewhere, and here we can only describe it in words. However, the Work Page gives access to manifestations of the work that are stored in the database as resources through hyper links. The hyper links take different forms, depending on the data type of the resource to which the link leads. Each of the text, audio and video data types has their own icon that acts as a link, while image files are represented by thumbnail images.

When one of these thumbnail images or icons is activated, the second kind of page opens on the screen. Resource Pages display the individual digital files that together describe the work. There can be four different Resource Pages on the screen at any time: one for each of the image (Figure 3), text, audio and video data types. All four kinds of Resource Page display the same work information found on the Work Page, as well as a source or citation for the individual resource. For image files, the page presents a large format JPG picture (450 pixels fixed width) below the work description. For video files, the page displays a RealPlayer interface with

¹ More are possible, and we foresee adding 3D model and VRML data types in the next generation of the project.

video screen and control buttons. Audio files also use RealPlayer, but without the video screen. The Resource Page for text files is a HTML window that displays the text with any hyper links that have been programmed into it. Together, these pages constitute the points at which a student comes into contact with the multiple manifestations of an architectural, visual, written or audio work.

We have seen how a student can access the resources of a work using the links found on the Work Page. Although already a step beyond traditional study methods, this interaction cannot in itself create an environment in which link navigation is the principal activity. A truly immersive environment requires that the database organize thematic relationships between the works themselves. These relationships, which come in addition to such obvious groupings as creator, place and date, contribute to the creation of a navigable environment.

The concept for this level of navigation is called Related Works. The most important element in the creation of a web of Related Works is the text file. When considered as a tableau, the text is seen to be a bounded surface that uses visual language in order to portray a coherent argument. Yet a text's surface is also embedded with references to works that lie outside its bounds. Especially in the case of writings on architecture, the text is an individual work at the same time as it is a node from which many other works can be accessed. Drawing on this quality of textual works, a set of links between works is created in the database using Cold Fusion Markup Language. Any time that an article, review, manifesto or book chapter makes an explicit reference to another work in the database, a hyper link is established between the two. The link functions in both directions: descriptive words and phrases in the text are made into links to Work Pages, while the targeted works offer links back to the text from a Related Works list. A student can jump freely from work to work using these links, while the buildings, movies, manifestoes and paintings that are encountered maintain a thematic coherence. This network of relations is the beginning of a navigable environment. However, the network must be considered as particular to the database alone, as each course curriculum that makes use of the database adds its own layer of work relationships.

Curriculum

In this case, a course in 20th Century Architecture was built from the database. Five topics that cover the major aspects of this period in the history of architecture were created: Craftwork, Industry and Modernity; The Architectural Avant-Garde; Function, Form and Social Action; Non-Western Modernism; and Popular and Vernacular Architecture. One topic was covered each week during a half semester, with students responsible for viewing topic material online in preparation for discussion during the class meeting period.

In order to create groups of readings that presented an interesting body of ideas and arguments, three types of readings were identified: the narrative history, which includes the traditional *grand élan* histories of architecture; the analytical text, which is meant to encompass the focused research found in scholarly journals; and the primary source, principally manifestoes from the beginning of the century but also more recent polemical writings and critiques. Each course topic contains texts of all three reading types that are drawn from different points in time.

The selected texts bring with them a large pool of related works. While most of these works are buildings, there is an interesting selection of drawings, engineering works, unbuilt projects and visual art. However, rounding out the course material required the inclusion of some works to which the texts do not explicitly refer.² The additional works were either linked to works already referenced by the texts, or they were given links from words or phrases in the texts themselves. In some cases, these latter forms of links were required between two textual works that addressed important themes in the curriculum. For example, the topic Popular and Vernacular Architecture brings together chapters from history books by different authors. These works are not related in the database itself. However, because each of them deals with the theme of universal culture, the two works are related in the course environment.

These additional links can be considered implicit as opposed to explicit. They constitute a web of relations that is specific to the course curriculum. This web, or layer, remains distinct from the "neutral" links in the database from the point of view of the programmer and course planner. However, the student experiences something

² In this case, the missing works were buildings or projects. Video works, such as biographies of significant architects, and audio works, such as interviews, could also be of interest for the course. Keep in mind that video clips of specific architectural works are already included as resources for those works; here we are considering only video works in their own right.

else: the interposition of the explicit inter-work relations in the database and the implicit, qualitative relations on the curriculum's surface gives virtual form to a fully navigable environment. Beginning with any one text, the student can navigate through a seemingly free web of material, while course clarity and coherence are sustained by the closed set of links. As we shall see, this web reinforces our principal pedagogical goals. The form of the historical and critical themes inherent in the curriculum can be inferred by navigating in its environment, and it is to the visual and functional aspects of the environment that we now turn.

Course environment

Modeled on web sites, the course environment is entered through a home page (Figure 4). The layout and form of the page can vary from course to course, but our 20th Century Architecture Home Page exhibits the constant elements. At the bottom left of the screen is a toolbar with links to exit the website, to return to the home page, to access an online dictionary and encyclopedia (offsite), and to perform a search of the database. In the main area of the screen, there are links to the course syllabus and to each of the topic pages. As we have seen, the 20th Century Architecture course is divided into five topics. Clicking on one of the squares, a topic page replaces the home page (Figure 5). The topic page displays the works that act as the primary navigational nodes when students are covering course material. Each title is a link, and clicking on one opens a text Resource Page that contains the body of the text in which are embedded links to Related Works.

In the first few paragraphs of a typical book chapter, there may be links to built architectural works, to unrealized projects, to articles by authors mentioned in the text, and to articles related by an important theme. Selecting a link opens a new window that contains a Work Page. Placing the Work Page next to the text Resource Page allows rapid navigation through works and their resources (Figure 6). The student can select one of the thumbnails, which opens an image Resource Page containing an enlarged image. Given the constraints of this screen, the image Resource Page is placed over the Work Page (Figure 7). Clicking on the work title brings the Work Page to the fore. Selecting another thumbnail brings forth the image Resource Page, and the previous enlarged image is replaced by a new one (Figure 8).

Meanwhile, the text remains on the left side of the screen. The student can continue reading, scrolling down and encountering more links. When a link to another work is activated, the new work replaces the work currently in the Work Page (Figure 9). Selecting one of the thumbnail images brings up the enlarged image in the image resource window. In other cases, one of the resources on the Work Page may be a video clip of the building or an audio clip of a discussion of the buildings. Each of these two different types of resources has its own page in which RealPlayer G2 is used to view or hear them.

Sometimes a text will contain a link to another text resource. In Figure 9, the phrase "Bauhaus proclamation" appears as one such link in the context of the founding of the Bauhaus school in Weimar. Clicking on the link replaces the current article with Walter Gropius's foundation manifesto. The document can be read quickly, and links within the manifesto can be followed as explained above. The "back button" in the web browser's toolbar returns us to the previous article.

Looking back at the Work Page, we see that below the thumbnails is a list of Related Works. As with the works that are linked to a text, some of these works have explicit references from the current work. The Bauhaus School, for example, is linked in the database to the Bauhaus housing facilities. Other works are linked because of a theme specific to the curriculum: it is interesting to compare, for example, Constant's New Babylon project with Koolhaas's master plan for Lille. We have seen how selecting architectural works from such links brings us through a series of Work Pages and image Resource Pages. When a link to a textual work is activated, the distinctive text Work Page is opened in the work window (Figure 10). This text Work Page differs from other Work Pages in that there are no thumbnail images. Instead, there is a text icon that, when activated, opens the body of the text in the text Resource Page. This form of access to textual works is important when a single work has multiple versions or translations. Below the icon is a long list of Related Works that brings together all the links that are found in the text resource itself, including both explicit and implicit references. Thus the text Work Page is a condensed hub for a large number of works.

Navigating among a variety of works in the web environment gives access to different types of resources in the database. It is this navigational mode that best serves the pedagogy in which the history of architecture is both critical and instrumental. Because of the explicit nature of the decisions involved in navigating on the net, the historical record appears fragmented and subject to critical reconstruction. All material exists in the same plane because of its accessibility in the environment, but not all of it has been put together. The process of mapping

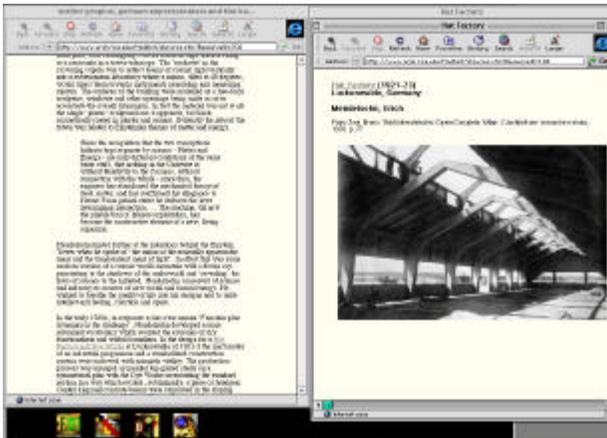
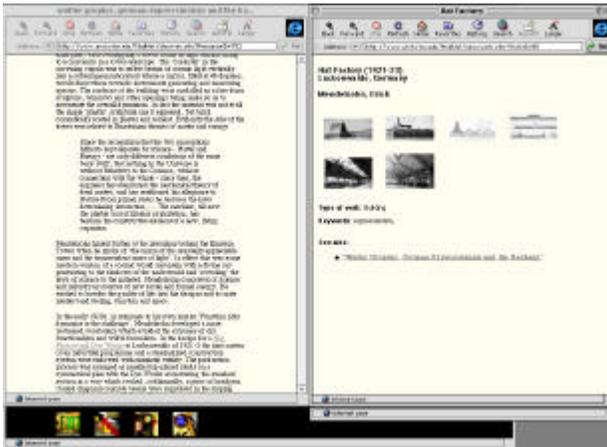
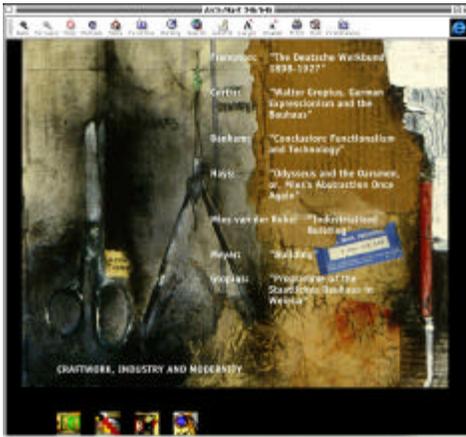
helps the student to develop ways of relating various works and issues, as well as forcing the student to position herself, figuratively and literally, within the debates that arise from the new relations.

Even when navigation in this course isn't so deliberate, it prompts interesting forms of education and work. Skimming textual, visual and audio material leads to a juxtaposition of information and ideas that can be helpful in producing new conceptions of various works. Chance encounters may cause a work to be viewed in relation to issues with which it is not conventionally associated; they may infer a new conceptual model with which to relate different works; or they may suggest parallels between historicized and contemporary practices. In addition to juxtaposition, the course environment allows a rapid progression through a large quantity of visual material, which helps to develop the student's formal architectural vocabulary. Related to this effect is the subversion of the idea that the history of architecture is a history of styles. The temporal disorder of the material covered through random links highlights aspects of architectural design other than the exaggerated concern with stylistic evolution. Facilitating this barrage of material are the traces retained onscreen. As a session in the environment progresses and more works and resources are called up from the database, the different pages on the screen develop "memories" of the material covered. The Work Page and the various Resource Pages each store a record of all the information that they have displayed. Using the back and forward browser navigation buttons, a series of image resources, for example, can be reviewed quickly, while a Work Page that had been viewed at the beginning of the session can be recalled without having to find the link that led to it. These characteristics of the net-based course produce design history as something other than an easily packaged product.

The increased accessibility of course material affects the pedagogy on a number of levels. Works and resources can be viewed from home, from stations in the school or in the library, and from remote parts of the planet if necessary. The second level of accessibility lies in the ease with which a previously unimaginable volume of information on architecture can be called up onto the screen. For example, because each architectural work has resources taken from various sources, the reader of a text that references a work will have access to more images than they would in a traditional publication of the same text. The third level is due to the simultaneity of access to the many different kinds of records in the database. In a single environment, texts can be read, movies screened and sound clips played. The net environment allows the images and multimedia clips to be more than support material for the text. As separate objects, these resources gain a form of autonomy from the text's claims, and can begin to suggest different interpretations of the work.

A final benefit of the net-based course is that it introduces a new mode of working with historical material that is particularly suited to students of design. Electronic resources offer a mode of collection that blurs the distinction between study and production. The encounter with historical records online induces the student to process and edit information as it is collected. Text can be cut and pasted into a word processor running parallel to the browser, and images can be clicked and dragged into personal file folders. Large volumes of complete texts and image files can be collected for later perusal and editing. Because the digital medium flattens information into common, workable formats, the student's rough work becomes enmeshed in the environment itself. Thus primary texts, critical analyses, vast image galleries and narrative histories all exist, from the student's point of view, in the same location as her own groupings of significant quotes, text files that juxtapose opposing opinions, and images taken from the database. The impression of critical, productive study is heightened by this montage of previously privileged material with the student's work-in-progress, which itself can explore unconventional media in the field of architectural history.

The net-based course addresses the broad educational objectives that history sequences must meet in professional architecture programs. Harnessing the methods of navigation and work inherent in the net while taking advantage of the accessibility and flexibility offered by an online database has produced a course in which the knowledge of design history is augmented by a critical and creative attitude toward the work of the historian. Like the exceptional practitioners studied in the course material, students of design are brought to consider their own work in terms of a perpetually evolving discipline. Unlike those practitioners, students of architecture today can undertake their work directly on the historical record and across the space that previously bound them to established centers of intellectual production. As the net-based history sequence expands to cover all the periods that have been objectified by traditional historical narratives, it will produce new ways of considering our material world, both past and present, that transcend nostalgia and the ironic stasis of evolution. With its gestures to the design studio, this historiographical work can found a new space for architectural practice.



Walter Gropius, German Expressionism and the Bauhaus

Walter Gropius (1893-1969) was a German architect and designer. He was the founder and first director of the Bauhaus school of art, design, and architecture in Weimar, Germany. The Bauhaus was a revolutionary school that sought to bridge the gap between art and industry. Gropius's work was characterized by its functionalism and its embrace of modernist principles. He believed that architecture should be based on the needs of the user and that it should be a reflection of the social and economic conditions of the time. His work was a key part of the German Expressionist movement, which emphasized the emotional and subjective aspects of art and design.



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