

# Computer Visualization as a Tool for Historic Preservation and Education

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## 1 Introduction

This paper will discuss the possibilities of computer visualization to address many of the common pitfalls associated with historic preservation and the study of historic sites. Viewing historic locations enables us to provide a tangible link to history, and strengthens the connection during the educational process. Computer visualization of historically significant buildings can enrich distance learning possibilities as well as the visiting experience. As a case study, the James and Ann Whitall House, an historic home located in Red Bank, New Jersey, was used. The residence was built in 1748 and is sited on the banks of the Delaware River, in what is now Red Bank Battlefield Park.

## 2 Pedagogical and Preservation Concerns

The study of historic sites often leads to problems, due to issues of inaccessibility. These concerns are often related to the distance one must travel to view the site. Current educational materials address this issue using primary source material, photographs, maps, and other valuable documents. However, these materials still fall short when compared to the value of an actual site visit. By constructing interactive simulations, children are able to manipulate their environment and explore aspects that are not available to them through static source material. Another issue, the inability to place a building within its historical context, is also a problem when viewing a site. While many buildings of historical significance have changed very little, the environments often have not. A large part of understanding the importance of an historic structure is comprehension of the building, as it once existed. The only way to accomplish this is through synthetic means, such as computer visualization. Lastly, many historic structures no longer exist or have structural problems that limit their accessibility. As long as documentation exists, one can virtually reconstruct the site in such a manner as to allow for experiential and interactive visitation of the building.

While many buildings merit preservation, not all are restorable due to extenuating circumstances such as structural instability or lack of information. Using existing visualization techniques, it is possible to recreate a structure in layers, denoting what is fact and what is speculation. In this way, false information is not relayed to the public, and another layer of preservation strategy can be addressed. Handicapped accessibility is also of great concern when visiting an existing location. Many historic structures, while compliant with the Americans with Disabilities Act Accessibility Guidelines (ADAAG), do not offer disabled patrons the same level of interactive experience as those who are not disabled.

## 3 Process

As an independent study, students in the Digital Media department of the College of Media Arts and Design at Drexel University in Philadelphia were given the task of digitally recreating the James and Ann Whitall House in Red Bank, New Jersey. After an initial site visit, it was determined that the best

way to proceed would be to use the 1934 drawings from the Historic American Buildings Survey (HABS) supplemented by site information gathered over the course of the project and a structure report generated by Watson and Henry Associates of Philadelphia. These materials included photographs of the existing conditions, historical texts by National Park Service staff, and video shot of recreations that take place on the site.

The modeling process began in the common room of the house, located on the southeastern side of the building, on the first floor. Due to the attention to detail given during the survey, moulding profiles, hardware details and materials could all be accurately represented. While the house has gone through many changes over the past 250 years, the decision was made to represent the house as it stood during the late 18<sup>th</sup> century rather than the current state. Care was taken to accurately transfer information from the HABS drawings to the digital model to ensure a truthful reproduction. Existing furniture in the house was modeled to populate the space and texture material was ascertained through records left either by the survey team and the structure report, or from photographic evidence of materials from the current state of the house. Additionally, 3D scans were taken of small artifacts to better capture the fine detail. Lastly, a global illumination solution was decided upon to most closely match the natural lighting conditions from the existing windows in the room. While the digital recreation of the Whitall House allows for accurate representation of the structure, it does not permit the viewer to move through the space in real-time. After the high resolution model of the house was completed, optimized meshes were exported for real-time distribution formats.



**Figure 1: Whitall House Common Room**

## 4 Conclusion

The possibilities of computer visualization as a means of historic preservation and education are far reaching. Continuing development in the field of artificial intelligence could lead to simulations where participants could interact with historical figures situated in an accurate environment. Museums with on-site interactive terminals could further enhance the significance of the space by positioning the visitor in a digitally reconstructed historical context. While these implementations involve movement of a person through a site, construction methods could also be documented through animation of methods and practice.