



JISC Final Report (*Public Report*)

Title Page

Resurrecting the Past: Virtual Antiquities in the Nineteenth Century

Final Report

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Executive Summary

This project is run by Shelley Hales (SH) and Nic Earle (NE) of the University of Bristol. Its main aim has been to meet a need to make accessible to the public a collection of the material displayed in and produced in response to the Pompeian Court, one of the exhibits of the Crystal Palace. The new Crystal Palace was rebuilt in Sydenham, South London, in 1854 as a 'museum to receive, instruct, amuse and interest' which featured reconstructions of buildings from past civilisations. Of all of those, the Pompeian Court, a replica house which housed a collection of copies of Pompeian painting and domestic objects was amongst the most eagerly received and generated a host of responses alongside the official publications of the Crystal Palace Company. It had only recently been fully restored following the Palace's requisitioning during WW1 when the Palace burnt down in 1936.

Our aims were to make accessible to the public knowledge of the Crystal Palace and its collections, to increase awareness of and stimulate research into the Crystal Palace and, through dissemination and evaluation of our project, to stimulate new approaches to teaching and learning, to encourage dialogue between academic institutions and the wider community and to encourage the increasing use of digital technology within the Arts and Humanities to reach its full, interactive potential.

Our objectives were to develop and digitise at the University of Bristol a **Collection** of material of the Pompeii Court of the Crystal Palace; to make that **Collection** useful and engaging to a range of different user groups across UK education sectors, research communities and heritage industry through an interactive, online **Virtual Model**, presented in the popular virtual platform Second Life, and a **Website** and, through developing a number of innovative, interface techniques within Second Life, to help different user groups engage with the material in the **Model**.

During the project we gathered a collection of images, reviews and descriptions and guidebooks of the Pompeian Court and made them accessible in Second Life. Our **Virtual Model** is a scale model of the Pompeian Court, complete with all the rooms and most of the paintings with which it was decorated. A device, called a HUD, allows visitors to find out more about individual rooms and paintings, providing them with audio, visual and text descriptions and aids at different levels, from very brief descriptions to analysis of the origin of the paintings. Within the **Model**, visitors can observe and talk to robot avatars which assume Pompeian and Victorian characters and also give information about the Model and its Collection. Learning activities aimed at Key Stage 2 and GCSE level students guide teachers and students around the space, allowing them to use techniques familiar from computer gaming to retrieve information and complete tasks. Our plan throughout has been to use modern techniques that have some resonance with the aims and techniques of the Crystal Palace. Throughout the project we have evaluated our ideas with user groups from the education, research and community sectors and have taken the opportunity both to reflect on and gain ideas about how best to enhance the **Collection**. For instance, it was school students' enthusiasm for social interaction that led us to develop the robot technology and group activities. Observation of how these groups navigate the **Model** has also helped us to understand the ways in which our **Model** reflected the successes and failures of the Crystal Palace and replicated or diverged from visitors' experiences of that building. We also organised a vigorous dissemination schedule to ensure that all our user groups got to hear about the model. We gave formal presentations at conferences, lessons in schools and manned stalls at community events to promote our **Model**, its **Collection** and the heritage of the Crystal Palace.

At the close of the project we are happy to report the successful completion of all our objectives and the beginning of realising our wider aims. As well as having promoted the Crystal Palace material in the **Collection** through the **Model** we have also been able to use it to explore and challenge expectations of virtual reality in the Humanities and to demonstrate that cross-sector resources are possible. One of the main aims of our project was to ascertain whether environments like Second Life really could enhance people's use of and engagement with collections. Such an approach would not be suitable for the presentation of all collections and Second Life does not appear to be the most appropriate virtual world platform. Nevertheless, we are very excited that our preliminary evaluations and consultations suggest that our approach is both innovative and meets definite perceived needs, particularly in the heritage and school sectors and that the content of the **Collection** is perfectly suited to its mode of delivery, by which it is both made accessible and enhanced.

Background

This project is run by Shelley Hales (SH) and Nic Earle (NE) of the University of Bristol. Its main aim was to meet a need to make accessible to the public a collection of the material displayed in and produced in response to the Pompeian Court, one of the exhibits of the Crystal Palace. The new Crystal Palace was rebuilt in Sydenham, South London, in 1854 as a 'museum to receive, instruct, amuse and interest' which featured reconstructions of buildings from past civilisations. Of all of those, the Pompeian Court, a replica house which housed a collection of copies of Pompeian painting and domestic objects was amongst the most eagerly received and generated a host of responses alongside the official publications of the Crystal Palace Company. It had only recently been fully restored following the Palace's requisitioning during WW1 when the Palace burnt down in 1936. The majority of contents were lost and, despite the efforts of amateur groups and a surge of academic interest in the Palace (the subject of an exhibition at the Dulwich Picture Gallery and a monograph by Jan Piggott [1]), no formal, full collection exists to record them. Before the project, NE and SH had already been involved in discussions to improve the Court: SH had talked at the Dulwich exhibition and published on the Pompeian Court [2] and we were named as possible project partners in the London Development's Agency 2007 white paper on the future development of the Crystal Palace Park [3]. As the recession has this year thrown the future of the park back into jeopardy, projects that stabilise the inheritance of the Sydenham Palace are increasingly important.



The terrace on which the Crystal Palace once stood

The Palace was an important experiment in combining entertainment, education and academic research and we wished to explore precisely these features in our project. Following the gathering of the **Collection** data, a **Model** of the Court was exhibited in Second Life (SL), a popular virtual world, which is increasingly being used to test new approaches to education, entertainment and enterprise in a challenging social context of diverse users [4]. The reconstruction serves as an archive of the objects displayed within the Court and the textual and visual material produced by the press and by the Crystal Palace Company in response to it. It also acts as an interactive space, in which visitors are able to tour the Court and interact with us, other visitors, the archive and the objects on display.

This project intended not only to make accessible in one place the material but, in doing so, to investigate the effects of 'immersive' techniques of activating classical antiquities and displaying digitised collections. Interest grows in the potentialities of virtual reality for archaeological reconstruction. New fora such as the Digital Classicist seminars (Institute of Classical Studies, London) consider the impact of technology on Classics and on wider perceptions of the classical world. There has been significant research into the use of 3D models to reconstruct and render realistic images of incomplete sites and artefacts. Advanced photorealistic and atmospheric lighting effects have been used to achieve impressive video fly-throughs, such as those of the Temple of Kalabsha [5]. Numerous projects have created less detailed 3D models that can be accessed via the internet and explored in real time: students can visit the Parthenon and fly over ancient Rome from their PCs [6]. These unpopulated worlds generally offer less detail and interaction is limited to navigation. More recently, real-time multi-user 3D environments, such as Second Life, in which visitors are represented by an avatar, offer potential for an extremely high level of interaction with

other visitors, the world itself and objects within it as well as the possibility of incorporating other media such as photographs, audio and video. However, despite this proliferation of projects, few are openly reflective in discussing with their users the contingency of their 'reconstructions'. The nearest equivalents are the projects run by King's Visualisation Laboratory, which specialises in high spec. computer modelling of historic buildings. There has been much criticism of the ways in which, ignoring KVL's high standards, virtual modellers have failed to engage an audience, to invite critical reflection or to engage with the medium itself [7]. At the same time, as work develops on the possibilities of virtual collections within the museum sector, the role of virtual worlds as archive and exhibition space becomes more important [8]. We also drew on pioneering work on the educational possibilities of these environments, e.g. the recent EduServ project 'Learning from Online Worlds; Teaching in Second Life' [9].

In this project we wanted to build on all these three lines of enquiry by enhancing a digital collection through placing it in a virtual environment that encouraged reflection on its original and new, virtual context. This particular format has been chosen because the questions of authenticity and the responsibility of reconstructors raised by such virtual models echo questions faced by the creators of the Crystal Palace themselves. In this respect, the project allows consideration to be given to the links between the content of the collection and the mode of its delivery. How do the failures and successes of Victorian projects affect the way we might approach digital opportunities and how might our understandings of nineteenth and twenty first century reconstructions inform each other? How might the social and interactive possibilities of online multi-user 3D virtual environments be harnessed to support learning of, and improve access to Classics, as well as to enable scholarly research, in the twenty first century?



Gwendoline Beningborough (SH's SL avatar) in the atrium of our Model of the Pompeian Court

Aims and Objectives

The Aims and Objectives listed on our Project Plan and available on our Website were as follows:

Aims:

1. to make accessible to the public knowledge of the Crystal Palace and its collections.
2. to increase awareness of and stimulate research into the Crystal Palace and to broaden our understanding of the place and perception of Classics in the nineteenth century beyond the universities and museums by reconstructing the collection and display techniques of a private speculative enterprise that shaped and reflected mid century ideas of classical taste.
3. through dissemination and evaluation of our project to stimulate new approaches to teaching and learning, to encourage dialogue between academic institutions and the wider community and to encourage the increasing use of digital technology within the Arts and Humanities to reach its full, interactive potential.

Objectives:

1. to develop and digitise at the University of Bristol a **Collection** of material of the Pompeii Court of the Crystal Palace in order to increase access to up until now scattered and vulnerable but rich resources for use in teaching, learning and research.
2. to make that **Collection** useful and engaging to a range of different user groups across UK education sectors, research communities and heritage industry through an interactive, online **Virtual Model**, presented in the popular virtual platform Second Life, and a **Website** [10].
3. through developing a number of innovative, interface techniques within Second Life to help different user groups engage with the material in the **Model**.



Gwendoline in the Peristyle of our Model

These did not change during the project. We believe evaluation reflects our success in meeting our objectives. Our aims were more ambitious and less tangible and will only be proven over a longer time frame. However, we have met aim 1 and we hope that the completed and intended ongoing dissemination and analysis of our project will lead to the fulfilment of aims 2 and 3.

Methodology

Our overall strategy for delivering the project was arranged around a simple sequence of development: digitisation, evaluation and dissemination. Of course, these activities were not always sequential and some activities overlapped between categories. However, the project tasks were divided between these categories and are presented this way in the Implementation section. In writing the project bid and plan, NE and SH devised a framework for the project, guided by issues of standards, quality assurance and usability. As will be explained below, interoperability was also an important consideration.

Project framework

Although the team (SH and NE) were equal partners in the project, we delineated distinctly defined roles at the outset of the project, which enabled us to meet our project objectives.

SH, Project Manager & Principal Investigator (15 hours a week). Her role was to:

- manage the team, oversee the budget, implementation of Objectives and creation of Outputs.
- call and chair steering group consultations and weekly team meetings.
- liaise with and respond to JISC, particularly the Programme Manager.
- prepare project plans and reports and **Website** content.
- research the data and metadata of the Pompeii Court for the **Collection**.
- collaborate with NE on compiling the paradata on the **Model**.
- write and present a **Conference Paper** introducing the **Model** and its relation to its prototype.

NE, Technical Manager & Co-Investigator (15 hours a week). His role was to:

- manage the technical aspects of the project, overseeing the construction of the **Model**.
- oversee digitisation of data.
- take the lead on research questions concerning the educational use of the technology.
- create and maintain the project **Website**.
- collaborate with SH on compiling the paradata on the **Model**.
- write and present a **Conference Paper** on the process of creating the Model and its learning activities.

In addition to these roles, we worked together on evaluation and on several joint presentations.

The team met weekly for three distinct purposes, to:

- report on progress of work packages.
- discuss creative ideas for the **Model**.
- review the project timetable and budget.

We met regularly face to face at work and, increasingly as the project progressed, also in Second Life. We also communicated via the blog, Google documents, and instant messaging.

In addition we recruited a Project Steering Group of representative senior academics from relevant disciplines (art history, computer science, education). Although their busy schedules meant that our formal schedule of full meetings did not quite work as planned, we were able to consult with individuals from the group as and when needed.

1. Digitisation

i. Data Collection

At the beginning of the project the scope of the collection was agreed and the methods by which the material would be stored.

The guidebooks we chose to digitise were the official Court guidebook: G. Scharf, *The Pompeian Court in the Crystal Palace* (1854) as well as the relevant sections of S. Philips, *General Guide Book to the Crystal Palace*, the two unofficial Routledge publications, *The Ten Chief Courts of the Crystal Palace* and the *Routledge Guide to the Crystal Palace* and the *Official Illustrated Guide to the Brighton and South Coast Railways* (all 1854). Reviews and descriptions in the press should be from 1853-5 rather than later in the Court's history and are from journals such as *The Builder* and

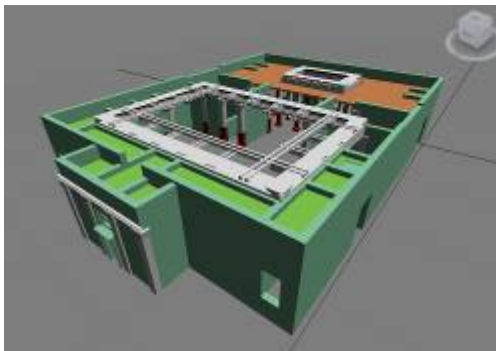
Quarterly Review. Data collection by SH was to involve gathering photographs, catalogues and press cuttings scattered across various London archives, in particular the National Art Reference Library, and local history collections at a number of South London libraries including the Bromley Library, Minet Library and Upper Norwood Library. These contain images and literature produced by the Palace Company (including journals e.g. *Illustrated Crystal Palace Gazette*) as well as reviews in the popular press. The University of Bristol holds all the official guidebooks to the Palace and some key contemporary journals e.g. *Illustrated London News*. Recent digital databases such as the JISC funded *British Library 19th Century Newspapers* project and *British Periodicals Online*, also offer searchable access to contemporary resources.

Whilst general information on the Crystal Palace was to be offered as introductory, contextualising material, the data and metadata related solely to the entirely self-contained Pompeian House. This ensured that we did not attempt to gather an unmanageable amount of data within the time frame of the project and allowed us to focus more on strategies of display. Metadata would include information about the Pompeian source for a room or painting (date of excavation, address etc), explanation of a room or panel's contents and also reference to the nineteenth century source to which the guidebook referred.

Images were scanned and stored as JPEGs, the digitised texts would be transcribed as Word documents. Text metadata was compiled in Word and then transferred to XHTML. Audio files were recorded using Audacity and then exported as WAV files. Throughout the project, the project PC housing all the data was automatically backed up every 24 hours via the University's backup cycle as was any data temporarily stored on our workstations.

ii. Virtual Model:

The **Model** was to be the medium for the delivery of the collected data. It also included the metadata giving information on the Pompeian origins of the material and comment on the Victorian interpretation of the Pompeian material. The **Model** was built by NE in 3D Studio Max before importation into Second Life.



The Architectural Skin in 3dS Max

This ensured that if Second Life crashed and its back system failed, everything could be reinstated from the models stored on the project PC. In planning this project, NE and SH consulted widely within the University of Bristol: with the High Performance Computing Team, with academics from the Dept of Computer Science and with the Research and Development Office and senior academics within the School of Humanities. Externally, we had extensive discussion with King's Visualisation Laboratory (KVL) and were guided by the London Charter in the quality of the model and paradata [11].

2. Evaluation & Dissemination

Stakeholders, represented by the Project Steering Group and user groups, were engaged at key points throughout the project to offer formative and summative evaluation. This allowed us both to improve the project as we went along and reflect on the final outputs. We identified key Stakeholder Groups as our main target of dissemination. In the Implementation section, we have shown how each of these groups was included in dissemination activities. In addition, we also selected 4 of these groups (group i, ii, v and vi) to be our focus for formal evaluation and searched for representative user

groups from these groups.

i. UG Students & HE Lecturers looking for an intellectually challenging medium through which to explore Pompeian painting, Roman houses and Victorian modes of display. Their support was crucial to evaluation and future embedding of the **Collection** and **Model**.

ii. School Teachers & Students need an accessible and free interactive teaching resource for use in key areas of the curriculum (in Bristol KS2 History 'Romans' and GCSE Classical Studies 'Pompeian Houses' and in Sydenham, the KS2 History 'local history' requirement). Their support was crucial to evaluation and to gaining insight into future roles for the **Collection** and **Model**.

iii. Learning Technologists are involved in experimentation with and evaluation of teaching and learning possibilities of emerging technologies. Their approval of the quality of the methodology and outputs of the project was important for the reputation and credibility of the **Model**.

iv. JISC Projects within the 'Enriching Digital Resources' theme may be interested in sharing ideas and methods in the pursuit of best practice. As above, their approval was important for the reputation and credibility of the **Model**.

v. Humanities Researchers require access to a full, reliable database contextualised and notated by an expert. Their support was needed in order to give the **Collection** and **Model** intellectual credibility, to ensure the viability of the **Collection** by seeding further investigation of the research questions and by making possible future research funding bids.

vi. Local Community & Heritage Sectors desire full access to, and the means for innovative and engaging interaction with, historical material relating to the Sydenham Palace site. The input of this sector was crucial in evaluating the **Model's** use beyond the education sector. The adoption of the **Model** by the heritage sector may be the route to further funding for long term sustainability and expansion of the **Collection**.

In advance of evaluation, we devised a series of questions which we used in some form in all evaluation discussions. We used a variety of methods to gather data: with large groups we used electronic voting systems to record data quantitatively alongside group discussions and small group work. We also adopted more qualitative interview techniques with smaller groups of adults and distributed paper questionnaires at public events. The responses from our user groups gathered in this way allowed us to tailor our approach to the interface techniques and learning activities in the **Model**. Following theories of user-centred development, we were aware that user experience is affected by their own internal state, the context, and perceptions of the product [12].

In choosing dissemination activities we also made sure that we would reach all of these stakeholder groups at one event at least and ensured that we attended a variety of formal and informal events so that we could meet different groups in appropriate settings.

We set ourselves three critical Success Factors, to determine the final outcome of the project:

- Completing the **Virtual Model** housing the **Collection** of the Pompeii Court.
- Securing the participation of representative user groups from each Stakeholder Group.
- Demonstrating that two thirds of our user group participants find the **Model** to be appropriate for their needs either as it is or with a few specified modifications.

We achieved all of these targets.

Implementation

As stated in the Methodology section, the project was planned around a sequence of Digitisation, Evaluation and Dissemination. The narrative of our project is laid out according to these categories.

A. Digitisation

This part of the project involved researching and compiling data and metadata and building the **Model** itself as the home for the **Collection**.

1. Data & Metadata Collection

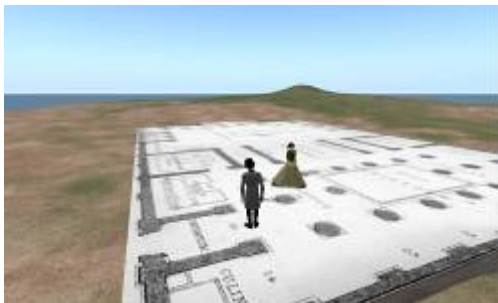
SH began by collecting archival material from the identified libraries. The role of these archival visits was to trace images that might serve as instruction for the building of the Model, to track the paintings of the collection, to trace textual material for digitisation and to find information for metadata. Where there were no IPR issues, the images of the Court which were used as a basis for the Model were saved for eventual upload into the Website and SL. Bromley Library hold a fantastic photo archive of the Palace including a long series of photographs taken by A. Talbot, the official Crystal Palace Company photographer. Among them is a great sequence of the Pompeian Court both post and during its post-WW1 restoration. We obtained permission from the Library (with the consent of Mr. Talbot's son) to use these photographs in the **Model**. We are very grateful to them for this possibility. Around two thirds of the original panel paintings were traced via contemporary publications of Pompeian paintings and the engravings published in them were photographed for evidence from which to model the paintings in the **Model**. As NE placed each room or painting in the Model, SH supplied text for the audio and visual material, and, where possible, contemporary photographic evidence from Pompeii (all our own photographs so as to avoid IPR issues).

2. The Model

i. The Architectural Model

Before the project started, NE spent two days training with King's Visualisation Lab (KVL) at their satellite office in Leamington Spa. The KVL team provided helpful advice about modelling methods and the importance of accessible paradata to a 'visualisation' that strives to have academic integrity. They focussed on appropriate modelling techniques in 3ds Max, importing models into Second Life, and advanced modelling techniques using maps and basic scripting. This meant that by October 1 (project start date) NE was ready to go: the dedicated project workstation was set up, 3ds Max installed as well as the relevant plug-in to enable models to be exported to Second Life. NE had also already spent time in Second Life locating, setting up and practising using additional 'in world' tools that would help him to develop the virtual model, e.g. Prim Finder.

At the outset of the project we had discounted other virtual platforms as they offered neither the modelling, interactive capacity nor the popularity of Second Life. Within a few months of the project starting, it became clear that Open Sim (an open source, interactive, online world) was developing rapidly. We held off the build for as long as we could in case it might be possible to switch into Open Sim from the beginning but it was not quite ready. In committing ourselves to carry on in Second Life, however, it was important that the **Model** would be fully migratable to and compatible with Open Sim and NE's reconsideration of his work practices in this light involved rebuilding the foundations of the **Model**. This slowed us down somewhat, but the delay was worth it to ensure longer term sustainability.

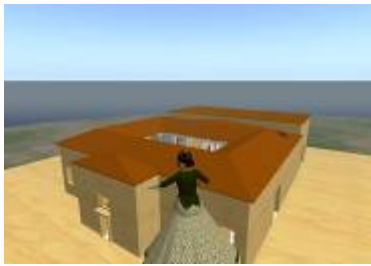


Our avatars, Gwendoline and Lucien, on the 'real size' ground plan of the Pompeian Court in Second Life

The first phase of building in SL was dropping the guidebook ground plan onto our island. NE used this ground plan for the relative room sizes and for absolute measurements we used the Paxton Palace grid of 24 feet and one room measurement mentioned in the guidebook text. The architectural details were gleaned from the engravings, daguerreotypes and stereographs we had collected as well as guidebook descriptions. We found quite quickly that building to the correct size would not work –

our avatars seemed far too big in relation to doorways. This turned out to be because the social emphasis of SL has caused avatar sizes to be exaggerated. In order to compensate, we made everything bigger by 10%. This alteration was particularly appropriate as the Victorians, too, had scaled up the house (both to accommodate crowds and to make it 'worthy of empire') [13].

The hardest part of the **Model** turned out to be the roof. Although the focus of the model is the interior of the Court, the roof has to work because, in Second Life, the avatars' flying function means that many people's first impressions of our house will be from the air. As well as the technical and mathematical difficulties NE had in fixing the roof firmly on the walls, we had the added difficulty that there are no very clear images of the roof. Whilst it is easy to guess the atrium part, which mimics Pompeian roofs quite closely, the central part defies the logic of ancient building entirely, making it harder to second guess what was going on.



Gwendoline flying above the Model, showing Roof solution

When the architectural skin was in place, NE also had to contend with rendering the floors and walls. Again, we worked from a mixture of the Bromley archive photographs and earlier engravings and stereographs and postcards alongside descriptions of the walls in the guidebook. Details from these were traced using a Graphics Tablet. This work was clearly much more than we had anticipated and so we subcontracted some of it. We are lucky that the court was clearly designed with a strong sense of mimicry: so if we knew the decoration of one room we could duplicate its scheme in the corresponding room on the other side of the house. Where we had nothing we duplicated existing sections (going for a 'best fit' based on the guidebook description) or divided the wall into its basic tripartite arrangement with plain lines. The effect of tracing, using the Graphics Tablet, worked particularly well because it chimed with the process by which the wall patterns and paintings were originally designed, by copying tracings taken by Giuseppe Abbate on site in Pompeii. All these decisions (essentially paradata) are explained in the research metadata accompanying each room and panel painting.

ii. The Painting Collection

Once this was done, we could begin to upload the figural myth paintings, the core of the **Collection**, of the court. Our first idea was to trace the identification of the paintings and then use photographs. However, this would have been expensive (necessitating either a trip to Pompeii or the procurement of permissions to publish) and also would have ended up cutting out the nineteenth century by going straight back to source. After much discussion, we decided to adapt the tracing process we had used for the wall decoration since it offered both practicality and authenticity, relating to the process used by Abbate. The paintings in the Model are based on photographs made by SH of nineteenth century engravings of Pompeian paintings, published in volumes such as the *Real Museo Borbonico* (1824-57) – to which Abbate himself contributed. Details from these are traced and modified to create clear sharp outlines at a resolution appropriate for Second Life. Later they will be coloured in with reference to the guidebook descriptions and photographs of any paintings still extant in Pompeii.

3. Interface Techniques

One of our objectives was to develop innovative interface techniques to make the collection engaging and useful. We had two main ways of looking into this, one was to research other online solutions, another was to use the evaluation process to probe what sort of techniques would most meet user needs and expectations, and the third was to conduct real site visits to see how other places did it. On a trip to London to visit user groups, we took the opportunity to observe how the remaining elements of the Crystal Palace (the terraces and the dinosaur exhibit) are presented to the public in the park. We were particularly interested to see how the information boards at the dinosaurs display tie together

information about the prehistoric creatures themselves and the circumstances of their production and display in the park – and how they deal with the ‘mistakes’ made by the Victorians.

We also spent time in the National Gallery observing how people move around space and interact with each other. We wanted to see how dependent people are on the cues of others: which paintings should you look at? What reaction should you show? The use of the audio guide technology was useful; you can choose to have, for example, a child or adult tour and the tone level of detail offered varies accordingly. Another aspect of the audio guide is the way in which they effectively cut off communication with the rest of the social space of the gallery and other visitors.

We took these experiences and the results of the evaluation, which showed that overwhelmingly people wanted control over the information given them and that there was great interest in the social interaction afforded by avatars, to propose these techniques:

i. The HUD

The HUD (Hears Up Display) is regularly used in virtual worlds. It is a personal information device that delivers information to the visitor and which is picked up (like a real audio guide) at the entrance to the house. It looks like an unobtrusive opaque tool box in the corner of the screen with a few straightforward icons. The HUD knows where it is in the house so that when a visitor clicks on a painting panel or the spinning disc in each room it will deliver relevant information. The information is personal, in that only that one visitor will see or hear the material, so other people won't be disturbed. Information is delivered in two ways, audio or text, and at three levels: one for general visitors or younger children, one for older students (with a particular eye to the GCSE Classical Civilisations syllabus) and one for researchers. The HUD also delivers the relevant segment of text from the official 1854 guidebook. The particularly useful thing about the HUD is that the visitor can skip between levels or ignore information at will.

The HUD was too complex for NE to create in the short time available. As a result we paid KVL to customise one of their own to our requirements. Although this means that the HUD does not work exactly as we would have designed it, the use of KVL's HUD does allow us to evaluate its potential usability.

ii. Robot Avatars ('bots)

The use of robots is an innovation afforded specifically by Virtual World technology. These pre-programmed avatars, controlled by script rather than an online user, can be used to help visitors access information in the **Model** in various ways. There are three categories of robot avatar in the **Model**:

1. The welcome 'bot. This female 'bot, Eudora, in Victorian dress, stands still at the entrance of the house but is programmed to turn to face new visitors and to give them information about the HUD and how to use it. She does this by making suggestions and offering the visitor a series of responses so they can get the information they want.

2. The tourist 'bots. These two Victorian characters, Alva and Isaac, move on a predetermined route around the atrium of the house, pausing at 6 or so 'hotspots' where they inspect a painting or a room. At these points they speak to each other, either reading from the guidebook or passing comment on what they see. The point of these 'bots is to ensure ongoing population of the model and to help the visitors orientate themselves – giving clues as to what should be looked at.

The tourist 'bots mimic known reactions to the site, for example Isaac gestures shock at the naked Venus and Alva will pause to read her guidebook. All their dialogue is genuine: either extracts from the guidebooks or else comments from reviews (Alva, for instance, mostly speaks the words of Lady Eastlake, who reviewed the courts for the *Quarterly Review* in March 1855. Isaac speaks the rather critical and (often hysterical) response of *The Crystal Palace: An Essay, Descriptive & Critical* and also quotes the *Routledge Guide: Ten Courts of the Crystal Palace*.



Image showing a modern avatar observing the Victorian avatars

3. Roman character 'bots. Claudia, a young Roman girl and Acheron, a rather ominous sounding slave cook, occupy the rear part of the house. They are divided from the Victorian characters in this way to reflect the idea of travelling into the past as the visitor gets deeper into the house experience. These 'bots are also designed for the intended learning activities: visitors are able to ask them questions and the 'bots have a variety of subjects they can talk about to help children find out more about Roman life. Their dialogue also contains information needed to complete the learning activities.



Acheron & Claudia in the Winter Triclinium

As with the HUD, it would have been impossible to develop the scripting necessary within the time frame of the project without outside help. In the spring, we negotiated with a private, SL based company, Beta Technologies. They had some great ideas but could not develop the 'bots within our tight budget and timeframe. We went in-house, paying the Institute for Learning and Research Technology at Bristol to develop some basic 'bots. Again, the 'bots are very basic and we aim to develop further the role of 'bots in virtual worlds beyond this project. However, we feel that we have plenty here to evaluate the potential of such technology.

4. Learning Activities

From the start of the project, consultation with teachers, research into other projects and presentations at the first JISC meeting by the First World War Archive project made clear that only the provision of ready made and easily implemented learning activities would make the **Model** attractive to students and busy teachers.

We began by looking at some of the educational projects that have already run in Second Life – our project is slightly different as it is more about resurrecting an exhibition experience than teaching per se but the lessons learned about issues of competency in SL, authority and student expectations/experience etc (see, for example, the 'Learning From Social Worlds' project funded by EduserV at KCL [see 9]) were very useful in deciding how to maximise the teaching and learning potential of the **Collection**. The Schome project website was very useful from the point of view of the responsibilities of working with children in SL [14]. We were particularly interested in work done by Gilly Salmon into the 'edutainment' possibilities of SL [15], both because the gaming and social aspect of SL scored so highly with school groups (see Appendix A) and because the Palace collections themselves were designed with this mix of education and entertainment in mind.

NE also held meetings with researchers into the role of virtual worlds in Education. For example, in October he met in SL with a doctoral student, Michele Ryan [16], who lent some valuable advice: effective learning activities must be constructive. Simply clicking on images and getting information (such as text metadata) will soon bore the learner. The use of audio and video can be effective here, as will some well thought out learning activities – particularly ones that employ problem based learning. NE also attended the Virtual Worlds conference in Scotland [17], an excellent opportunity to network with others working in the area and learn more about relevant legal and ethical issues.

NE gained practical experience in teaching in SL when he ran a workshop for staff of the University of Bristol on the current use and potential of virtual worlds within Higher Education. He took participants through several carefully thought out activities and gathered data through observation and a focus group style discussion afterwards. The activities included a basic navigation task, a discussion activity that involved self-organisation into pairs then fours then sixes, a guided tour of the Crystal Palace island and a tour of other places in Second Life of educational interest which they were able to explore more freely.

The experience showed us that it was possible for a group of participants new to Second Life to become competent enough with minimal training to engage effectively with a range of learning activities in a single session (important because an incredibly high proportion of our user group members had either never heard of or never used SL). NE also identified many important practicalities of managing a class in SL, e.g. in Second Life, beyond a range of 10 metres, a presenter's text or voice instructions cannot be heard so instructions must be given in the real world and some other mechanism found if participants are not in the same real world room as the presenter. It was also interesting to gain insight into how the participants felt about interacting with each other in the virtual world and how their personalities and behaviour changed when channeled through an avatar.

Richard Brawn, a member of our Project Steering Group, was particularly useful in advising on the learning activities and how best to suit them to the constrictive objectives and time limits on exercises imposed by the National Curriculum. NE came up with the term 'Virtual Field Trip' as a way of being able to use the **Model** in a more expansive way inside school. Again, this was inspired by evaluation, in which museum and sites visits scored very highly as a means of learning about the past (see Appendix A).

i. KS2 Learning Activities

There are two learning activities, one centred around the use of rooms in the house by the family, one focussing on the myths told in the painted panels. Outside the house, the teacher and class can find information about the activity, download activity sheets and read instructions as to what they have to do. On the advice of Mrs Thorne from Chantry High School, we have tried to make sure these fit wider curriculum concerns, particularly PLTS [18] which stresses group work, IT skills and self-directed research. Before they enter the house, students are given a list of questions they need to answer and a floor plan of the house to fill in. The answers are contained in the level one audio or text note cards they can collect in rooms around the house. They have to decide who will explore which rooms and then use the plan to find their way around the house and collaborate on the answers. The activities of collecting and exploring use techniques familiar from gaming. Students can only fully complete the tasks if they talk to the Roman character 'bots. To unlock the correct answers in these dialogues they need to be able to tell the 'bots information acquired elsewhere in the house.



'Live avatars', Lucien and Gwendoline, talking to one of the character 'bots.

ii. GCSE Learning Activities

These also have two strands, domestic life and painting, but the questions they are asked to look at are more reflective and open ended. In their present form, these might be described more as guides for use than learning activities per se. As stated above, the information provided in the metadata has been written with special attention to the GCSE syllabus [19].

B. Evaluation

The goal of the Evaluation phase of the project was to collect and react to feedback from key stakeholders in order both to improve and to reflect on the Project. We began by establishing user groups; we were lucky in being able to use groups and schools with which we had worked with before. At first, we did find it difficult to establish a user group in South London. We sent letters to all the primary schools within 4 miles of the park and received no response. However, at the Crystal Palace Park Event (see C. Dissemination in this section) we were able to meet and set up a working relationship with teachers from Woodside School, Croydon. Our initial plan was to hold formative evaluation in December, January and then summative evaluation in the spring. Unfortunately the **Model** took so much longer to complete than anticipated that we decided rather than rush it before the holidays (a hard time when schools are busy with exams) we would hold further formative evaluation and wait until September for final evaluation.

Meetings with all groups were extremely positive. They resulted in the confidence that we are delivering a useful product and generated lots of ideas for the learning activities and delivery of metadata.

1. Initial Evaluation (December 2008)

i. School Teachers & Students

We decided that it might be too hard to explain abstract ideas to KS2 children before we had anything tangible to show so decided to concentrate on GCSE students at this early stage, visiting a class of Year 10 Classical Civilisations students at Clifton High School. We introduced the aims of the project and stressed how the **Model** fitted with their syllabus. Although the group was small we used voting tablets to record quantitative answers and made notes of longer responses. We identified two major interests of the class:

1. the social component: the group was excited by the opportunity to communicate and work with others within the **Model** via avatars. They were quite open to meeting people beyond their own class in this space.
2. the opportunity to feel ownership of the environment: they were eager to be able to add to the metadata or create their own exhibits or comments.

ii. Undergraduates

These undergraduates were recruited by seeking volunteers from the department of Classics and Ancient History at Bristol. We had about 15 volunteers to whom we showed images of the Crystal Palace, introduced our plans and discussed ideas. They particularly enjoyed the layers of history experienced in the **Model** and the opportunity to experience a lost place spatially. They were eager to talk to experts in the space and liked the idea of uploading their own material. They were, however, wary of the reputation of SL and of the quality or reliability for other people's uploaded work. They had some very good ideas about how to exploit the tourist theme of visiting the Crystal Palace (making maximum use of the SL postcard, for instance) and had some very interesting observations about the lack of engagement and disappointment with other virtual reality models they had come across.

iii. Researchers sought from Arts and Humanities in Bristol and elsewhere (Liverpool, Birkbeck). This group were very useful in assessing the quality and veracity of the **Model** and for discussing the value and problems of reconstruction. This was a small group of interested colleagues and took the form of informal dialogue based around the questions we had shown others. The biggest stumbling block with this group was worries about ease of access and problems associated with the reputation of SL. Whilst the immersive effect of the environment is interesting, it is also time-consuming and potentially distracting. For this group value to the collection really came in the form of further metadata attached to the collection (for example, detail explaining from which house in Pompeii a painting was copied). Rather than engage with other avatars in the **Model**, this group were more interested in observing

others' use of the **Model**, in order to aid their own research into how the original Court may have been used.

iv. Community & Heritage.

We met with representatives from both the Joseph Paxton Society and Crystal Palace Foundation to introduce our ideas and find out what would be most interesting to include from their point of view. They were particularly interested in the quality and veracity of the model (though pleasingly open to strategies other than the most advanced virtual modelling) and more interested in the Victorian context than the Pompeian content. They were very positive about our project and eager to facilitate dissemination.

We also consulted a member of staff at Tyntesfield Manor, a local National Trust home, to see how our plans fitted with heritage industry engagement strategies. We learned the importance of branding and of having a strong, deliverable message targetted at all visitors, regardless of how much time or energy they spend there. We gained a very useful insight into how the heritage sector organises and plans its interpretative/learning activities. This was the only session in which concern was expressed that children would be confused by the mixture of Victorian and Roman information.

2. Formative Evaluation (May 2009)

By the late spring we had an architectural skin for our user groups to explore and decided to revisit groups with the **Model**, to see how they found using Second Life, and also to relay the decisions we had made about how to progress.

i. School Teachers & Students

Now that GCSE classes were preoccupied with exams, we turned attention to KS2. We began by talking to the teachers from Woodside. They were very interested in the **Model**, though interestingly from the KS1 angle rather than KS2. Their KS1 children tackle the Crystal Place as a topic in local history and they were interested in how the **Model** might help develop the theme to include wider curriculum objectives: IT, social, communication and maths skills. They would really like to use it and offered excellent suggestions of how these kinds of skills could be incorporated. We hope to develop this relationship further beyond the project but felt we could not diversify into KS1 at this stage.

We then talked to 120 Year 7 students from Bristol Grammar School. We showed them the model and talked about our plans for learning activities. The students gave us loads of useful feedback, with inventive ideas and thoughtful comments that certainly helped us plan the rest of the project. We again used the electronic voting system to register the students' responses to the key questions (see Appendix A) and made notes of longer responses. We were also allowed to set them homework to design an activity in the **Model** for the competition.

SH was also invited to a Year 7 Humanities class at Chantry High School, Ipswich and to St Mary Redcliffe Sixth Form Centre, Bristol. At Ipswich, the students gave us loads of great ideas whilst Mrs. Thorne told us how we could most integrate the model with the national curriculum by making sure we take on board key stage 3 PLTS objectives. This was an exciting visit because if we can do this, Chantry may be able to use our **Model** as an integrated part of their Humanities curriculum (again, we decided we would have to pursue this after the finish of the JISC phase of our project). What was most encouraging was the ease with which these Year 7 students were able to conceptualise the slip between Pompeian and Victorian in the **Model** and the ideas they suggested about how the 'bots behaviour might help reinforce the difference.

ii. Undergraduates

(we were unable to work with this group as it was the exam period).

iii. Researchers

Feedback was solicited from 15 researchers of classical receptions at the Oxford symposium where SH presented the **Model** and **Collection**. The feedback was particularly encouraging both in terms of the positive response to the intellectual concept of the **Model** and its potential as an engagement tool.

iv. Community & Heritage

We took the opportunity of the Crystal Palace Arts Festival event to update representatives of local groups (Joseph Paxton Society, Norwood History Society) of our progress. We also solicited feedback from the public in the form of a brief questionnaire. As this was self-selecting it's perhaps not surprising that the response was incredibly encouraging (see Appendix B). A key issue for locals, for whom the sense of the place of the Crystal Palace is so strong, was where the **Collection** should be accessible: the majority wanted the **Model** available somewhere on site.

3. Summative Evaluation (September 2009)

September's evaluation involved allowing small groups of volunteers from each user group to have a go at navigating the **Model**, accessing the metadata and completing the learning activities. We also selected 2 undergraduates to test the **Model** and **Website** for standards and accessibility compliance as well as to check all the links working etc.

i. School Teachers & Students

Both Mr Psarros and his GCSE class from Clifton High School and Mrs Nesbit's Bristol Grammar School Year 8s wish to take part in this next stage of evaluation and both teachers have emphasised the value to the students of being involved with a university research project. As the Grammar School group was so large, the plan is to bring a small sample of volunteers across to our computer suite on campus) to spend a lunch hour trialling the activities and navigating the model. We will observe how they get on and ask them to answer questions about their experience at the end.

Our initial plan was to conduct these evaluations before the JISC phase ended and while our campus was quiet before term started. Unfortunately, due to a sudden bereavement suffered by one of the team in the penultimate week of the project, we had to postpone these at the last minute: we are currently re-negotiating times and dates that will coincide with the schools' timetable, with room bookings and our own post-project work schedules. Our aim is to have conducted these by the half term break or in the week immediately after. Reports will appear on the blog.

In the meantime, however, we have tested the **Model** on a Key Stage 2 (year 6) student. Rather than get her to complete the formal learning activities (which are designed for group use), we asked her to explore our SL island and experiment with using the avatar (moving around, communicating via it etc). Whilst the response of one student can hardly be termed a scientific study, it was a very useful exercise to observe how easily our volunteer took to working with an avatar and how engaged she was with the virtual environment – particularly with the opportunity to acquire 'free' things, such as objects, costumes, notecards etc and to 'do' things (for example, being able to jump in the bath). She enjoyed the method of accessing the metadata and liked the audio but she did often ask 'how long will this go on for?' once the audio started. In truth the clips are all very brief (none longer than 40 seconds) but this was useful insight into how we have to let users know exactly how things work in the **Model** so that they feel confident in each part of it and know what to expect.

ii. Undergraduates

We have called again on our previous group of volunteers and invited those who were around before term started to come in to try the **Model**, focussing on their observations on the quality of the **Collection** metadata and of their responses to the virtual environment. Our term starts next week and we will get them together to take a look then and post reflections of their response on the blog.

We also made a link with Liverpool to practise distant communication through the **Model** and to discuss uses in taught units there. SH met with Dr Joanna Paul from the School of Classics and Archaeology in the last week of the project. She was very interested in using the **Model** to take her students 'out' of their familiar environment in order to discuss issues of 'otherness' at Pompeii and of allowing her students to work 'live' with students at Bristol. There were some reservations about the difficulties of co-ordination, so the key to success will be technical support in advance of the event. As the classes that most closely coincide between both our teaching schedules are in the second semester, the session will take place after Christmas. A report will be posted on our blog.

iii. Researchers

We invited a small number of interested researchers at Bristol (and our Birkbeck and Liverpool volunteers) to try out the **Model** and report on potential. They enjoyed the environment and the creative presentation of metadata. They had some suggestions for extending the information currently provided and also wanted the longer texts to be searchable by key terms, which they are currently not. They did question how many times they would want to return to this environment for research in terms of source gathering (once the evidence was gathered why would they come back?) but were interested in taking part in research activities and collaboration in the **Model**. For one, the real interest lay in observing others in the **Model** – so the resource will come into its own when we have launched and advertised its presence.

iv. Community & Heritage

We travelled to London to meet the Joseph Paxton Society during the final week of September: we gave them the opportunity to try out the avatars, discussed the content of the **Collection** and gathered responses to the **Model's** veracity. The mood was very positive and we gained support for the decisions we had made in presenting the material, particularly for the decision to go for recreating moods and concepts rather than painstaking accuracy. Most interest was in how to 'imply' the rest of the Palace on the island and in the interaction and involvement afforded by avatars. They recognise the **Model's** potential as an engagement tool and suggest that we arrange to showcase the **Model** in the local library and the Crystal Palace Museum. We agreed to take part in 2010's Crystal Palace Arts Festival and also discussed plans for collaboration on an event to mark the centenary of the Festival of Empire (June 2011), for which they plan to erect a scale model of the Palace on site. Ongoing work with this group seems the best route for ongoing cross-sector dissemination especially until such a time as the London Development Agency decide whether or not to go forward with their plans for park development.

C. Dissemination

This phase of the project was to ensure that awareness of the project and of the knowledge and experience arising from it were communicated to our key stakeholders.

1. The Web

i. Website

The **Website** is our principal dissemination tool to all our Stakeholder Groups and the public at large. The site aims to promote the aims and objectives of the project, to provide information on its Pompeian and Victorian content and to record our Evaluation and Dissemination activities.

ii. Second Life

All through the building process, our SL island has been open to all comers. In addition we have travelled to other islands to build contacts with other Victorian and Roman projects. This has allowed us to spread awareness of the content of our island but also to share ideas about the value and problems of reconstruction and on strategies for mixing entertainment and education.

iii. Posting on discipline specific mail lists

Postings on email lists reach target groups internationally. For example, the Classics UK list reaches an international audience and an announcement on the list will raise awareness of the completion of the Model at the end of the project. We intend to post similar announcements to other lists and discussion fora, for example the Non-profit Organizations in Second Life list.

2. Competition

The competition was advertised on our **Website**, through word of mouth, flyers at events we attended and advertisement inserts in three key educational magazines: *Journal of the Joint Association of Classics Teachers*, *Iris* and *Primary History*. The aim of the competition was to engage school students nationwide with the project and with questions arising about the display of material from the Roman world and also to generate ideas and possible content for the learning activities. Schools were asked to design an activity which would help others learn about the content of the **Collection**. We had aimed as target 50 entries: in fact we had almost three times that, representing the work of around 200 students.



A communal collage of Pompeian life: a winning entry to the competition

3. Presentations

i. University Court, University of Bristol, December 2008

Audience: University of Bristol senior management, council, senate and lay members.

This presentation was the first chance to raise awareness of the project to the wider university community. In particular, we were able to stress the role of the project in enhancing public engagement.

ii. Teaching and Learning Exhibition, University of Bristol, January 2009

Audience: Lecturers throughout university, senior administrators, university education support staff and learning technologists.

This annual event allows members of the university to showcase upcoming projects and to share ideas across faculties.

iii. *Innovative Uses of Teaching and Learning Space in History, Classics & Archaeology Workshop* organised by the Subject Centre for History, Classics and Archaeology, University of Warwick [20].

Audience: HE teachers of the covered disciplines interested in sharing ideas on innovative use of teaching and learning environments.

This was an opportunity to introduce the project to the Humanities community and to build a link with our subject centre, a key dissemination tool. The event turned out to be very useful for contextualising our project with other investigations into innovative teaching and learning techniques. Not all of these turned out to be technological: Prof. Philip Sabin from KCL spoke about his use of simulation through war games in teaching and assessment. Like our project, his interest in the learning advantages of gaming were allied with the insights these techniques also afforded his research.

iv. Classical Association conference, University of Glasgow.

Audience: Classics researchers, teachers, postgraduates and enthusiasts.

This conference is the most well attended national conference for Classics. As SH was at the Roman Archaeology Conference in Michigan (a chance to raise awareness of the project in the States), we presented a poster detailing our aims, promoting the competition and inviting people to take part in evaluation.

v. Crystal Palace Arts Festival, Crystal Palace Park, June 2009

Audience: Local heritage and community groups, local community.

Our virtual Pompeian Court returned to the site of the Crystal Palace for one day only as part of the opening events of the Crystal Palace Festival of Arts. It was a great day, though rain affected turn out. Our stand included lots of information about the **Model** and its Victorian and Pompeian prototypes. We met lots of people and gathered some very useful and supportive feedback as well as new images of the Court held in private collections. We will attend next year to demonstrate the completed project.



Our stand at the Crystal Palace Arts Festival

vi. JISC Digitisation conference, Cotswold Water Park, July 2009 [21]

Audience: JISC projects, people involved with collections in HE (librarians, technologists, academics). This was a big event and offered us the chance to present some of our preliminary findings about the role of virtual worlds in digitisation projects. Although time pressures and troublesome internet connections caused us rather to undersell our project, it was good to be presenting at a JISC event, especially in a panel dedicated to future technologies.

vi. *Electronic Visualisation in the Arts* Conference, British Computing Centre, London 2009 [22].

Audience: Arts & Humanities academics, artists, museum staff, computing experts.

This conference was not part of our original project plan but offered a chance to extend awareness of our project to a new, interdisciplinary audience that was too good to miss. It allowed us to view the state of play in this field in the art, museum, heritage and education sectors. It was good to see that our project plugged into many current issues and it was very useful to meet people marketing projects very similar to ours. We had supportive reviews of our abstract from the organisers. They seemed to be principally interested in the ways we are intertwining Victorian and modern approaches to visualisation and in our methods of evaluating the project.

vii. *Antiquity in the Public Imagination* Seminar, Oxford University, July 2009.

Audience: academics and postgraduate researchers specialising in modern receptions of classical antiquity.

The fact that SH was invited to speak about the project here was an indication of the way in which word was spreading about our project. It was an opportunity to raise awareness of the project but also to discuss its intellectual context and to discuss ways in which such projects and their contents could be accepted into mainstream classics research practices, meeting the responsibilities of university researchers to promote their material to audiences beyond HE.

viii. ALT-C, Manchester, September 2009

Learning Technologists across the country.

The Alt-C is the national conference for learning technologists, the prime opportunity to raise awareness of the project and to reflect on our strategies for mixing entertainment and education. NE's paper had a very positive response as a positive and innovative use of SL and also stimulated a debate about the pedagogical value of teaching through this medium.

ix. Digital Resources for the Humanities and Arts Conference, September 2009

Audience: JISC projects, Arts & Humanities academics, library and information services professionals, learning technologists.

This was the final JISC event of the project year, at which all projects made a very short presentation. It was a chance to promote the finished project, raise awareness of our future intentions and reflect on the outcomes.

x. Final Event

Audience: user group representatives, university colleagues, Project Steering Group, JISC projects, Second Life community.

This event, to be held within the virtual space of the **Model**, to which our JISC programme manager will be invited, will offer a chance for final reflection. It will showcase the finished **Model**, review the project, share the results of our evaluation and present the competition winners' work.

This event was first scheduled for 24th September in a computer suite on campus. Unfortunately, due to the bereavement, this had to be postponed. We are currently trying to book the suite (more difficult at the beginning of term) to reschedule for a date in October.

Outputs and Results

The three tangible outputs of our project are:

1. The Collection

The project has involved gathering from a variety of sources, both public and private, a full archive of the Pompeian Court of the Crystal Palace. It includes a virtual collection of the paintings and contents of the Court, which draws on the photographs, illustrations, daguerreotypes and stereoscopes made of the Palace as well as a collection of guidebooks to the Court, reviews and articles from the press. The material is delivered by digital proxy and is not, by and large, a direct replication of the real thing (for example, only one of the panel paintings is reproduced directly from a photograph of the lost Court).

2. The Model

The **Model** sits on the SL island surrounded various information areas. It serves as both a navigable, interactive reconstruction of the Pompeii Court and its collection and as a full archive of relevant Crystal Palace Company Literature (data). It also contains information regarding the Pompeian origin of each object (metadata) and an explanation of the process of building the reconstruction (paradata). In addition, it provides an opportunity to explore the potential of media rich online multi-user environments and to evaluate strategies of innovative teaching techniques in virtual space. Eventually also accessible via the **Website**, the **Model** will provide a lasting resource for those researching both the Crystal Palace and the classical pasts it tried to reconstruct, whilst also allowing the team to study the role of immersive environments and reconstruction in twenty first century contexts.

3. The Website

The **Website** contains an overview of the project, its aims and objectives and pages for different user groups. It also contains the project blog and, by the close of the project, will feature links to the digitised guidebooks and to papers we have delivered. The **Website** also houses video fly-throughs of the **Model** for those who cannot access SL. The **Website** acts as both a dissemination and evaluation tool. It has communicated the progress of the project to a wider audience and visitors have been invited to offer their responses by leaving comments on the site. The competition (see Dissemination) was launched on the **Website**. After the project, the **Model** and associated meta and paradata will be permanently accessible through the **Website**.

Outcomes

Aims:

1. to make accessible to the public knowledge of the Crystal Palace and its collections.

We have done this through hosting the **Model** on an essentially democratic (if demographically biased) platform (SL) and on the **Website**, to which we have applied access standards. Ongoing dissemination will continue to raise the profile of the **Collection**. Migration from SL, whether to an open source virtual world such as Open Sim or to CD, via a platform like Unity, will ensure that what is accessible in principle becomes more accessible in practice.

2. to increase awareness of and stimulate research into the Crystal Palace and to broaden our understanding of the place and perception of Classics in the nineteenth century beyond the universities and museums by reconstructing the collection and display techniques of a private speculative enterprise that shaped and reflected mid century ideas of classical taste.

As well as stimulating our own research, we have presented research papers at several events where we have been able to add to discussions with classical reception specialists and researchers into the Crystal Palace. We continue to give papers beyond the end of the project and are involved in a variety of forthcoming events and publications on both the Crystal Palace itself and the reception of Pompeian houses in the nineteenth century. We have also built links with other research clusters and interest groups in the research, SL and local communities. A further outcome is that researching and building the Court has led to us to understand more thoroughly how the Victorians built the Court and the decisions they made in arranging and interpreting their collection of paintings. Our findings have informed the metadata and will be the subject of formal research papers in the future.

3. through dissemination and evaluation of our project to stimulate new approaches to teaching & learning, to encourage dialogue between academic institutions and the wider community and to encourage the increasing use of digital technology within the Arts and Humanities to reach its full, interactive potential.

The evaluation activities we have undertaken have helped us to articulate the successes of our project and have given us material to develop and to disseminate. Our strategy of targeting different audiences with different dissemination events has allowed us to cascade our findings and encouraged us to work in and draw on a variety of disciplinary areas. It is too early to measure the impact of our work but the fact that a number of our school and university teachers want to pursue the use of the **Model**, is a good indicator that the project has inspired people to experiment with new approaches to teaching and learning about the past.

Objectives:

1. to develop and digitise at the University of Bristol a **Collection** of material of the Pompeii Court of the Crystal Palace in order to increase access to up until now scattered and vulnerable but rich resources for use in teaching, learning and research.

We successfully completed this objective, bringing together the digitised **Collection** from visual and textual data in national archives, local libraries and private collections. We are not aware, for example, that the Talbot photographs have ever been published before.

2. to make that **Collection** useful and engaging to a range of different user groups across UK education sectors, research communities and heritage industry through an interactive, online **Virtual Model**, presented in the popular virtual platform Second Life, and a **Website**.

The evaluation we carried out has helped us achieve this objective. We have modified our plans and prioritised areas for which the user groups showed most enthusiasm and have tried to address any concerns or doubts by planning successors to the SL **Model**. The majority of groups enjoyed the online location of the **Collection** and the school groups in particular enjoyed the social interaction with other visitors whilst all groups valued the interaction with the material itself. As suggested in response to aim 3, the fact that we are experiencing longer term interest in the **Model** suggests that it was felt to be genuinely engaging.

This response has given us a better understanding of the potential value of digitising collections in an imaginative and interactive manner using VR technology.

3. through developing a number of innovative, interface techniques within Second Life to help different user groups engage with the material in the **Model**.

As a result of initial evaluation data, we privileged the development of the virtual world HUD and the robot avatars as our main interface techniques. The HUD, a standard tool in virtual worlds, is valuable for its flexibility: offering different kinds of information to different audiences. It also grants the visitor the power to decide what audience he/she wants to be and to move across different information levels. The 'bots, the most innovative aspect of our project, work both as characters to interact with school students but also, more subtly, the tourist 'bots offer clues to all visitors as to how to use the **Model**.

Research and consultation with our user groups have convinced us that our project's use of engagement techniques based on social interaction has the potential to lead the way not only within Classics but also the learning technology and heritage sector. We have learned that the really crucial aspect of our project in this regard is exploiting the ontological and social aspects of avatars and 'bots (automated avatars) as a means of delivering information and guiding visitors round exhibition space.

When we started the project, we thought we were interested primarily in reconstruction and mapping differences between Victorian and modern techniques, but actually our interest has come to be much more about ways of inhabiting the past. This realisation has helped us refocus our ideas for new projects we hope to launch through the **Model**. The 'bots have assumed a new importance and we would like to build on work into the possible uses of these [23]. Within the scope of this project, we have only made very limited use of them but we will definitely be exploring them further. We are particularly interested in how the 'ghostly' or 'uncanny' experience of inhabiting virtual space and interacting through avatars [24] intersects with historical experiences of inhabiting the past.

Conclusions

One of the main aims of our project was to ascertain whether virtual environments like Second Life really could enhance people's use of and engagement with collections. We are very excited that our preliminary evaluations and consultations suggest that our approach to the use of virtual reality is both innovative and meets definite perceived needs, particularly in the heritage and school sectors.

Our findings suggest that there is an alternative to the traditional database in presenting collections but that format and mode of delivery must be relevant to content. Environments like Second Life, for example, work best when they are used to visualise objects that are impossible to experience in reality or hard to conceptualise (such as the inside of an atom) and also allow exploration of collections through spatial movement and social interaction. This is not a model that would necessarily suit a giant collection of digitised poems, for example.

We also learned that SL is probably not the best virtual world platform for further development of educational resources or digital collections. As well as the obvious problems with age restrictions and the cost of tenancy, we also faced problems with enforced client software updates (an issue if they happen during class time), poor rendering engines which limit the atmospheres that can be created within the **Model** and the inability to administer temporary log in accounts.

Implications

Our project has implications in several areas:

1. Virtual Collections

We hope our project will help encourage the emergent drive to present online collections in innovative and creative ways that enhance the material and users' engagement with it. The strength of our project was definitely the links between the content of the **Collection** and the mode of its delivery.

However, if the virtual environment is to become a more useful or sustainable medium for such projects, more work needs to be done to develop and support a Virtual World system that is more suitable than SL for the use of UK education sectors (at all levels). It should be free (or available at low cost), safe for the use of under 18s and support cross-institutional user networks that can generate and share content and expertises. Such a system would provide an excellent environment for the development of innovative and engaging educational resources.

2. Crystal Palace

Our **Model** creates a relatively low cost solution to ongoing debates about how the Crystal Palace might be remembered. We hope that our template may be transferable to other parts of the Crystal Palace collection and may lead to a truly interdisciplinary virtual collection embracing natural, art and industrial history as well as ethnography, geology and social history.

We intend to apply for further funding (the Mellon Foundation has been suggested) to expand the collection and explore further its presentation (in particular with regard to polychromy – a central issue of the Fine Arts Courts and one we have not yet been able to develop here). We will use a proposed international Crystal Palace conference to network with possible future collaborators.

3. Engagement

We intend to pursue our use of robot technology and its role in personal engagement. Further experimentation with and evaluation of our 'bots and of role play and narrative scenario activities will lead to the establishment of principles for devising engaging and wide ranging learning activities for schools.

The use of robot avatars is probably the most innovative aspect of our project and met with high approval ratings in our evaluations. However, the creation of such avatars is probably beyond the means of the majority of interested users. The development of a 'bot system framework that could be used by non technical people to create robot avatars to support engaging learning activities would make these innovations accessible to a much wider audience.

We also found a lack of comprehensive, useful educator resource packs for Virtual Worlds. Such packs (building on JISC's own guide to teaching in virtual worlds), which could contain starter guides, in world presentation screens, avatars, different costumes etc would all help encourage teachers and lecturers to engage with virtual reality. They would help overcome the fear factor and also reduce considerably the time it takes to grapple with these environments in order to get up and running.

4. Virtual Reality in the Humanities

We hope that our project begins to tackle some of the perceived failings of the use of VR identified in the Humanities, especially Archaeology and related historical disciplines [see 7], particularly in its prioritisation of virtual presence over virtual reality. The research papers arising from our work on this project are intended to promote the use of virtual reality as a field for conducting research rather than simply presenting material.



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Appendix A

Survey of 120 Year 7 Latin students at Bristol Grammar School, June 15 2009.

The students were each given a voting tablet to record their votes (which they could see instantly on the screen) but were encouraged to discuss the options with the neighbours. After each vote, we chatted with them about the results and explored the reasons for answers (for example, what those who voted 'Other' had in mind).

1. How do you prefer to access information about history/the classical world? (choose up to 3 options)

- i. Watching factual documentaries – 15%
- ii. Searching websites – 11%
- iii. Researching & writing essays – 8%
- iv. Reading factual books – 9%
- v. Consulting images – 13%
- vi. Going to museums or sites – 16%
- vii. Reading fiction or watching films or TV dramas – 7%
- viii. Talking to knowledgeable people – 12%

2. What is your experience of Second Life/Teen Grid?

- i. I use it regularly – 13%
- ii. I have used it on occasion – 4%
- iii. I have seen it used – 4%
- iv. I have heard of it – 16%
- v. I have never heard of it – 63%

3. What would you like to know about the Pompeian house? (choose up to 2 options)

- i. The different members of the household and their roles – 17%
- ii. What the house was used for – 14%
- iii. What private life was like – 22%
- iv. How the house was decorated and what the decorations meant – 15%
- v. The architecture and layout – 17%
- vi. Other – 15%

4. What would you expect to do in a virtual world? (choose up to 3 options)

- i. See a highly detailed replica of a Pompeian house – 8%
- ii. Access information on Pompeian houses and lifestyle – 7%
- iii. Meet and socialise with other people – 16%
- iv. Complete set activities/play games – 20%
- v. Meet and interact with Roman characters – 16%
- vi. Explore the space freely – 15%
- vii. Add your own content or messages – 11%
- viii. Other – 7%

5. Would you prefer to work

- i. Individually? – 11%
- ii. In small groups with your classmates? – 34%
- iii. With other avatars in the model who might not be somebody you know? – 14%
- iv. With robotic avatars that are programmed to respond to you? – 25%
- v. As a class with your teacher in charge? – 16%

6. Do you think you would feel confident using a virtual model?

- i. yes, I am confident to use it wither in the classroom or at home – 49%
 - ii. I would feel confident if I was in a classroom with the teacher/my class in case I got stuck – 23%
 - iii. No, I'm not very confident that I would be able to work it all out – 28%
- (N.B. These students had not had the chance to play in SL themselves)

7. Do you think using the model in the ways we have discussed today would be an enjoyable and effective way to learn?

i. Yes, it would be enjoyable and effective – 20%

ii. It would be effective but not very enjoyable – 13%

iii. It would be enjoyable but I don't think I would learn much – 8%

iv. No, it's a hideous idea – 54% (this high result is void – it was a joke played by the group of the most engaged students who loved the phrasing of this response! Unfortunately we didn't have time to do a revote. However, their reactions suggested that if they had voted properly the lead of i. over ii, iii and v. would have been significantly greater and several came up at the end to confirm this)

v. I'm not sure – 5%

Appendix B:

Questionnaire used at Crystal Palace Arts Festival, May 2009 with percentage responses added & a range of the received general comments

REBUILDING THE POMPEIAN COURT IN THE CRYSTAL PALACE COMMENTS PLEASE!

We're working hard to make sure that the Model, the information held in it and the way visitors can access it is as engaging and useful and we can only do this by gathering feedback from everybody we meet. If you would like to leave us any comments or suggestions, then please feel free:

General Comments:

Great display – when can we see the other courts?

Wow! This is fantastic. Well done!

A highly evocative and fascinating project. Seeing the development of the project at the actual site of the palace served to heighten the resonance of the material. Excellent!

Great idea, as I had a similar idea myself with all of the Palace to be visited virtually. Keep going & well done.

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Feedback Questions (Please tick all the options that apply):

Would you rather access the Model **in Second Life (11%) / on a Website (33%) / on DVD (22%) / on site in the Crystal Palace Park (34%)?**

Would you rather visit the Model **alone (62%) / with other friends or colleagues online (38%) / with other online visitors who you may not know (0%)?**

Which of these factors would be most important to you: **accuracy of the Model (25%) / fine detail of the Model (17%) / access to archival material (13%) / background information (e.g. history of the Court, the origins of the paintings etc) (33%) / possibility of contributing yourself (8%) / social interaction with other visitors (4%)?**

We're always looking for volunteers to take part in the project. If you're over 18 and would be interested in spending an hour or so of your time evaluating the Model with us at the end of the project, please leave your name and email address below.

Name:.....

Email Address:.....

Thanks for taking the time to fill in this form. We appreciate your feedback.