Interweaving Digital Narratives with Dynamic Archaeological Databases for the Public Presentation of Cultural Heritage

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Abstract

This paper describes a project that is currently being carried out in collaboration with the Interactive University of UC Berkeley in which a relational database comprising the contexts, materials, observations, and interpretations in visual, numerical and textual format from Neolithic excavations in Turkey (Çatalhöyük) and Yugoslavia (Opovo) provides the basic architecture for a series of hyperlinked "vignettes". The vignettes comprise an interface on the Internet through which a multi-generational and multivocal public can explore and respect and contribute to cultural heritage. They are guided through the exploration of real data and can contribute dynamically with their own interpretations. The emphasis here is on multiscalar interpretations including those at an intimate scale, which are followed through and evaluated through the fictional narrative genre. The aim of the project is to create an interface, that seamlessly guides, and provides access to, primary archaeological data in a way which is neither intimidating nor mystifying, but which engages the user and encourages critical enquiry, responsibility and the use of the imagination in the creation of heritage places by lifelong learners.

The Dig OpChats project is a collaborative enterprise at the University of California, Berkeley between the Archaeological Research Facility, the Interactive University (outreach initiative) and the Multimedia Authoring Center for Teaching in Anthropology (MACTiA)[1]. The project began in 2002, but was the outcome of a previous collaboration in 1999 in which we had designed teaching modules for 6th graders around primary research data at Çatalhöyük for 6th graders (12 year-olds) and an after-school project in digital storytelling and archaeology.

The Challenge

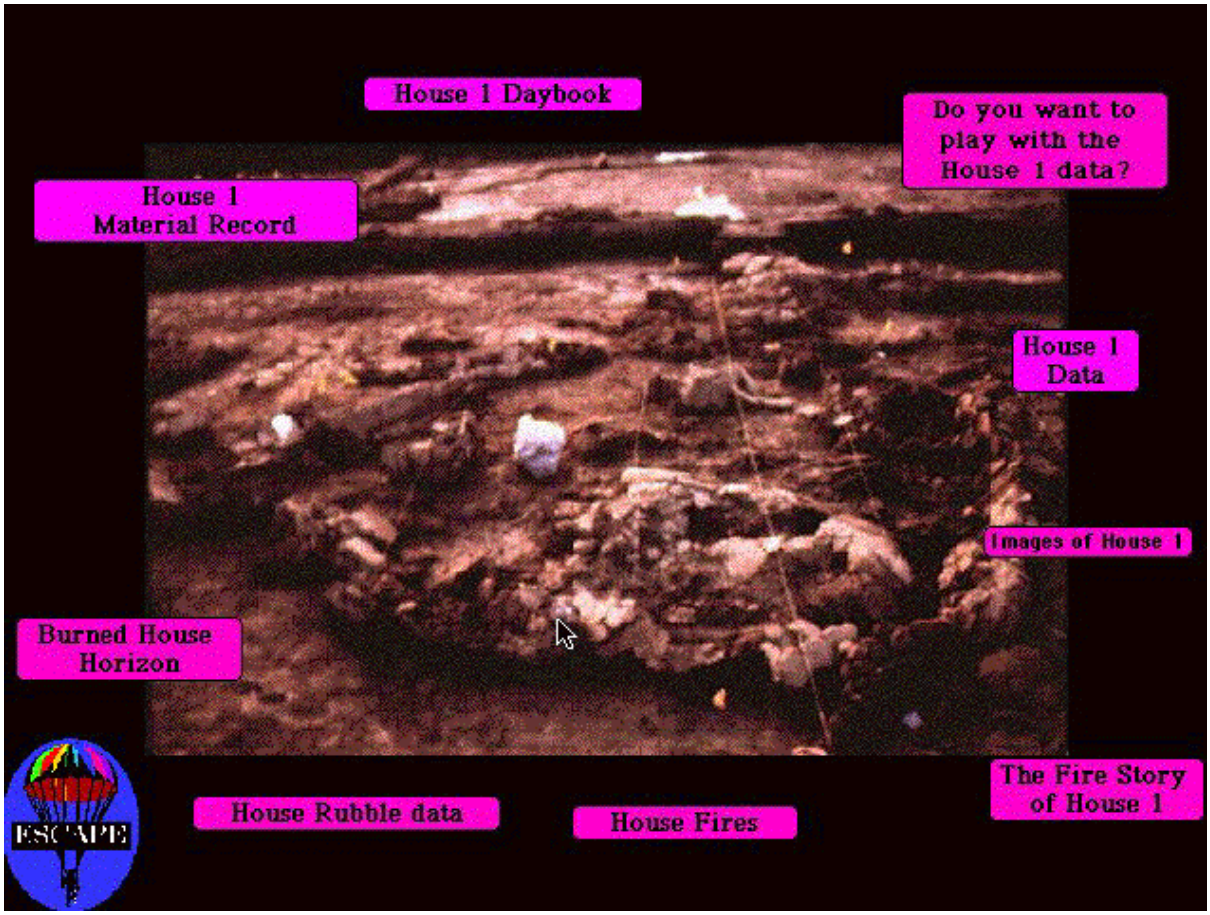
The project focuses on the creation of interactive digital learning objects from two archaeological sites that are both sites where I have conducted excavations: Çatalhöyük and Opovo. Both are Neolithic, that is, early agricultural settlements. Opovo is a 6,000-year-old village in Yugoslavia distinguished by burned wattle-and daub houses (figure 1). I directed archaeological excavations here in the 1980s (Tringham et al. 1992). During the early 1990s the data were digitized post-excavation, from which was created the Chimera Web (Wolle and Tringham 2000).

“figure 1 - Collage of the Archaeological Project at the Neolithic site of Opovo, Yugoslavia (from *Dead Women Do Tell Tales*)”

The Chimera Web (figure 2) is a hypermedia web that was designed to be a public interface and guide to the primary data (figure 3) but - until the current project - never succeeded in this aim.

“figure 2 – main portal for the Chimera Web”

The problem was in the underlying architecture of the archaeological data archive which was in a variety of formats, including 4th Dimension, which at that time were difficult for an amateur like myself to integrate with a dynamic web interface. And I did not have the resources - or even desire -to farm the problem out to specialists in Silicon Valley.

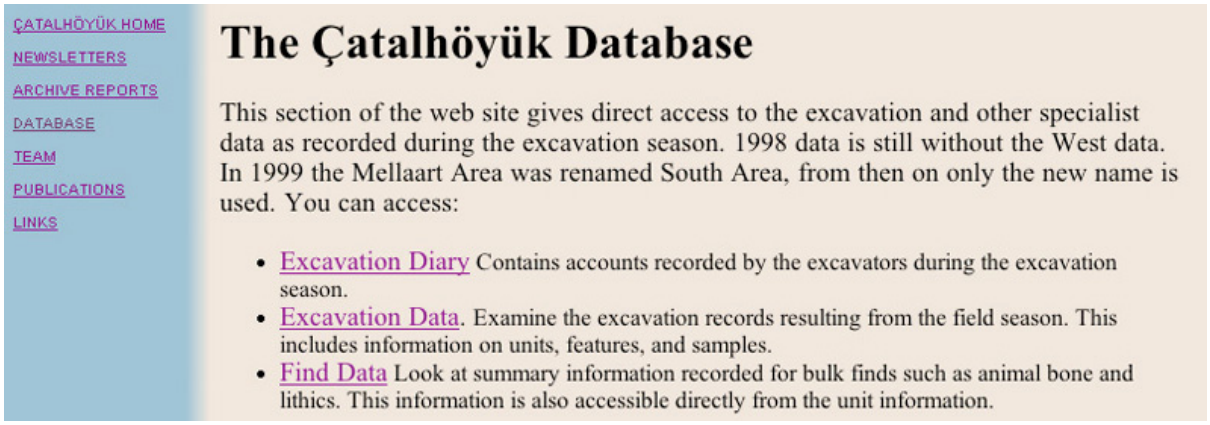


"figure 3 – Portal to the databases of the Opovo Archaeological Project from the Chimera Web"

The second site, - Çatalhöyük - is 9,000 years old and characterized by mud-brick houses, some with painted plaster walls, with burials under the floor (figure 4) (Hodder 2000). The houses were rebuilt one on top of the other so that their debris accumulated to form a mound. Since 1997, I have been directing the BACH team (Berkeley Archaeologists at Çatalhöyük) in the Çatalhöyük project (http://www.mactia.berkeley.edu/catal/default.html), whose overall director is Ian Hodder (http://catal.arch.cam.ac.uk/catal/).

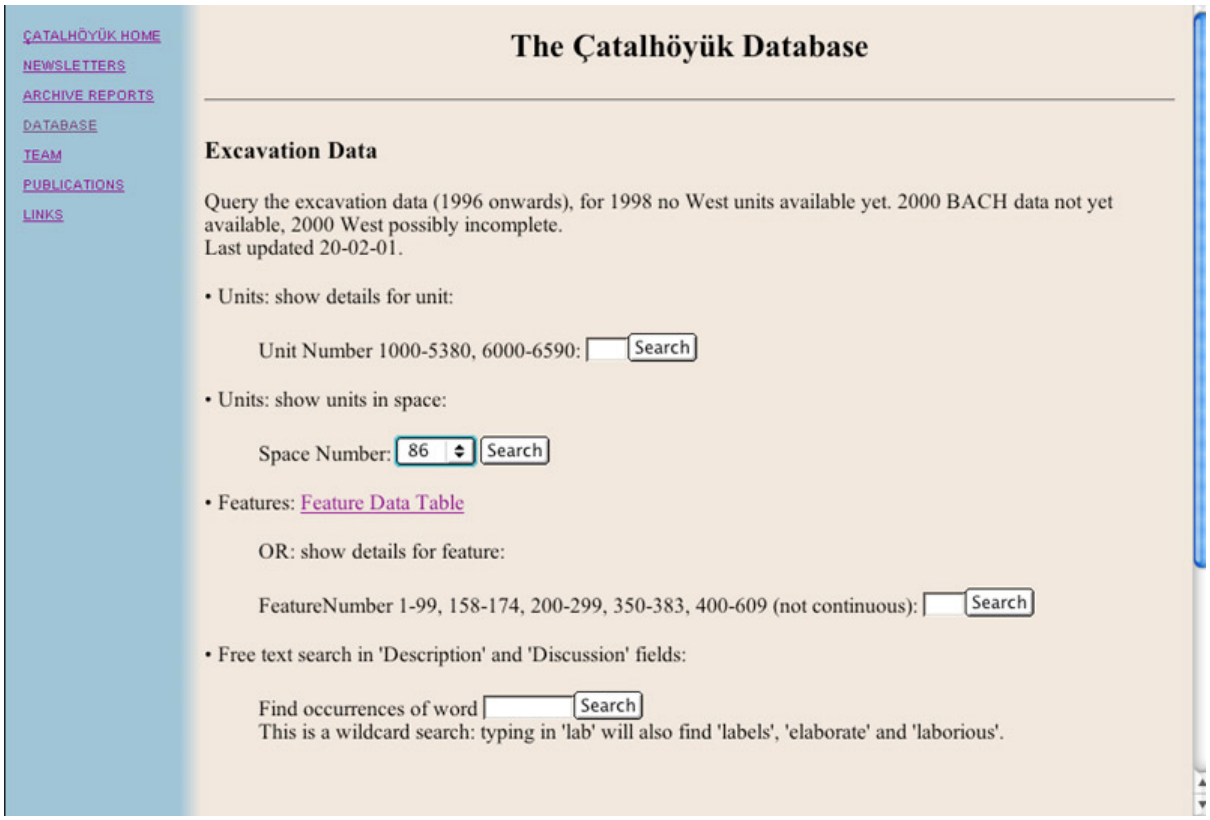
”figure 4 – Collage of the Neolithic site of Çatalhöyük (from *Dead Women Do Tell Tales*)”

Along with the reflexive methodology, we have advocated open access to the primary data of the excavations through the Internet (figure 5) (Wolle and Tringham 2000). In practice “open access” has been conceived of as sharing data with other archaeologists. If you look at the Çatalhöyük database on the web-site (http://catal.arch.cam.ac.uk/catal/database/main.html, you will see that this is not exactly user-friendly).



“figure 5 – Web portal for the Çatalhöyük database”

The user needs to know what to search for in the database in terms of Building, Feature or Unit number (figure 6). There is no guide on line that links to this database.



”figure 6 – Initial search interface for the Çatalhöyük database”

A more public and popular interface for Çatalhöyük was developed through the Science Museum of Minnesota Mysteries of Çatalhöyük web site (http://www.smm.org/visitorinfo/nowshowing/Mysteries.html), but this is not directly linked to the archaeological database (figure 7).

"figure 7 – Home page of the "Mysteries of Çatalhöyük" website"

The challenge in both cases, therefore, has been to give the public access to the raw data of archaeological excavations in a way that neither overwhelms with the amount of data nor mystifies with the hidden meaning of the data, yet does not simplify the complexities of the data and their interpretation.

The Dig OpChats Project

The goals of the Interactive University in the collaborative Dig OpChats Project were very different - and in many ways much more ambitious - than ours had been in the previous public interfaces of the Çatal and Opovo projects. The Interactive University were interested in taking our[2] experience with public web-based interfaces of archaeological research to another level of dissemination and to use it as a pilot for the dissemination and archiving of university faculty research to the public. Their primary interest was K-12 and higher education audiences - hence the heavy use of education language in the project. We have since become more inclusive to reach public audiences in museums, continuing (lifelong) education, and other contexts, because it is politically a wise thing to do (the aging of the American public) and (for us as archaeologists) because we hope it encourages the larger public to take responsibility for cultural heritage.

The initial goals of the project were:

- To explore the process of transforming faculty research into learning materials for K-12 and other public audiences
- To record the process so that it seems less intimidating and mystified to the content creators

(faculty researchers) who should participate actively in creating the digital archive and its interfaces

- To safeguard the data for sustainable long-term re-use and archiving

In the last goal – the safeguarding the data for sustainable long-term re-use and archiving - I have been especially inspired by a couple of recent articles that stress strategies to ensure the long-term sustainability and survival of the databases. The first is by Julian Richards (Richards 2003), who stressed the importance of open source access to ensure the use and re-use of digitized primary archaeological data for archiving and for keeping the data alive. *Thinking about dissemination is as important as thinking about digitizing.* The second is by Stephen Downes (2003), who has advocated for a distributed network of learning objects and their metadata - open access rather than the "silo model". Both these authors recognize the importance of a flexible networking dissemination of digitized data rather than a centralized silo that stores the data. They also both advocate the interoperability of different systems of database architecture, rather than reliance on proprietary architecture created for specific sets of content.

With this in mind, the technical goals of the Dig OpChats project included

- Embracing the technical dimensions of database interoperability (ensuring the framework is ODBC compliant)
- Striving for open architecture in the project framework
- Exploring the conversion from FilemakerPro-XML (the Dig OpChats database system software) to additional learning standards in XML formats (e.g. METS/IMS) enabled by the Scholar's Box (see below).

In our first understanding of the project, this meant in practice that we would build web-ready interfaces based on archaeological data from my research at Opovo and Çatalhöyük The interfaces that we created would be designed to give multiple audiences access to real-world archaeological databases, and they would be open-ended to the extent that they would encourage an expandable web of investigation taking the learner in many different directions as well as provide opportunities for public feedback.

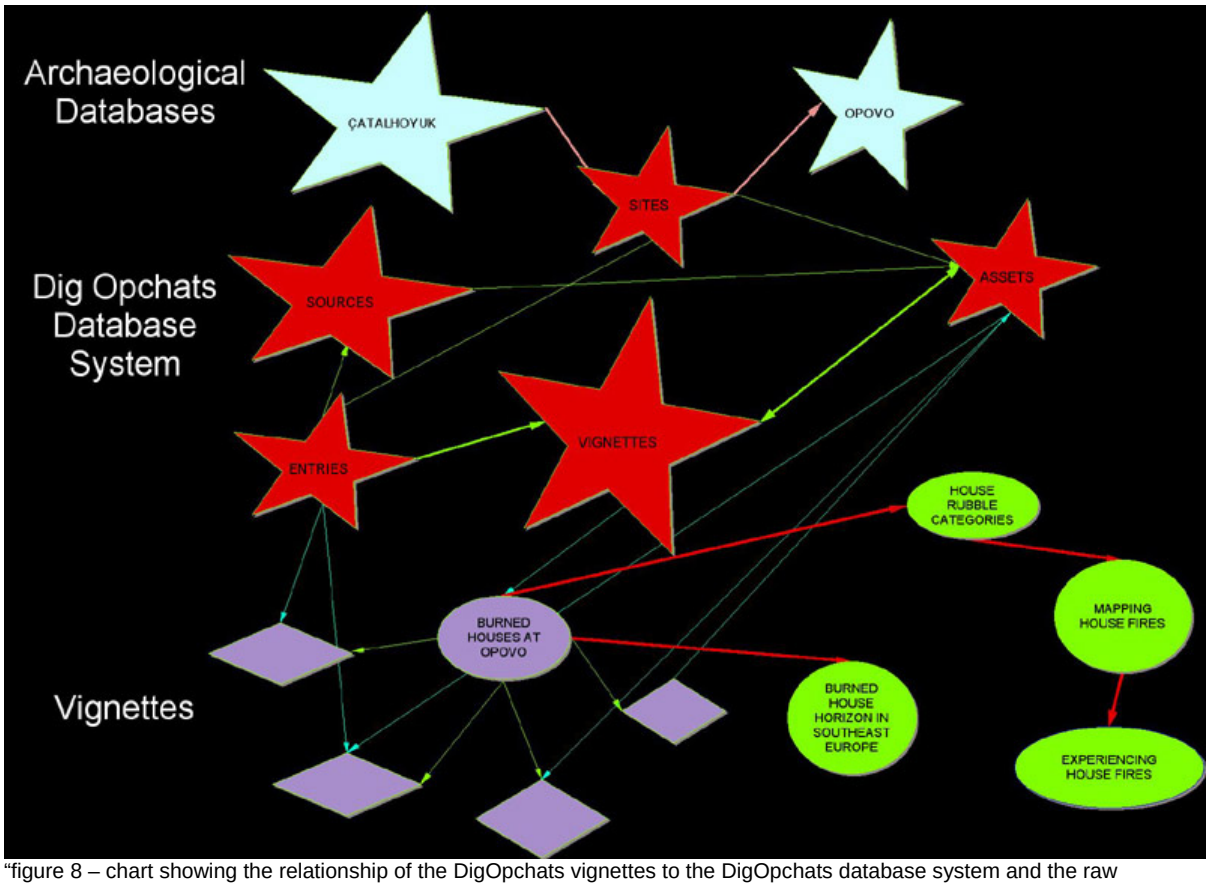
In order to make this project feasible, we have focused on a couple of the enormous array of possible themes suggested by the data. These are themes that could bring both sites together and are both of current interest in my own research - an important motivation if you are to get faculty researchers to do this kind of work (Tringham 2000). Most researchers - like myself - are not enamored of the kind of work that enters into the realm of textbook writing. And I believe that specific research themes can be of interest to public audiences and do not have to be shared only with professional audiences. In addition, it is a pleasure to think of ways to express your current research to non-professional audiences. And the results and feedback can be extraordinarily constructive. The two themes that were chosen are

- How history and historical places are constructed in the modern and post-modern world

- How the material world and ritual performance (especially around domestic architecture) is used - and was used in the past - to create a sense of place and its continuity

Much of the research at Çatalhöyük focuses on the burial of the dead under the houses as a way of creating a continuous place. One interpretation of the Opovo burned houses suggests that this was done deliberately as a means to creating a continuity of place.

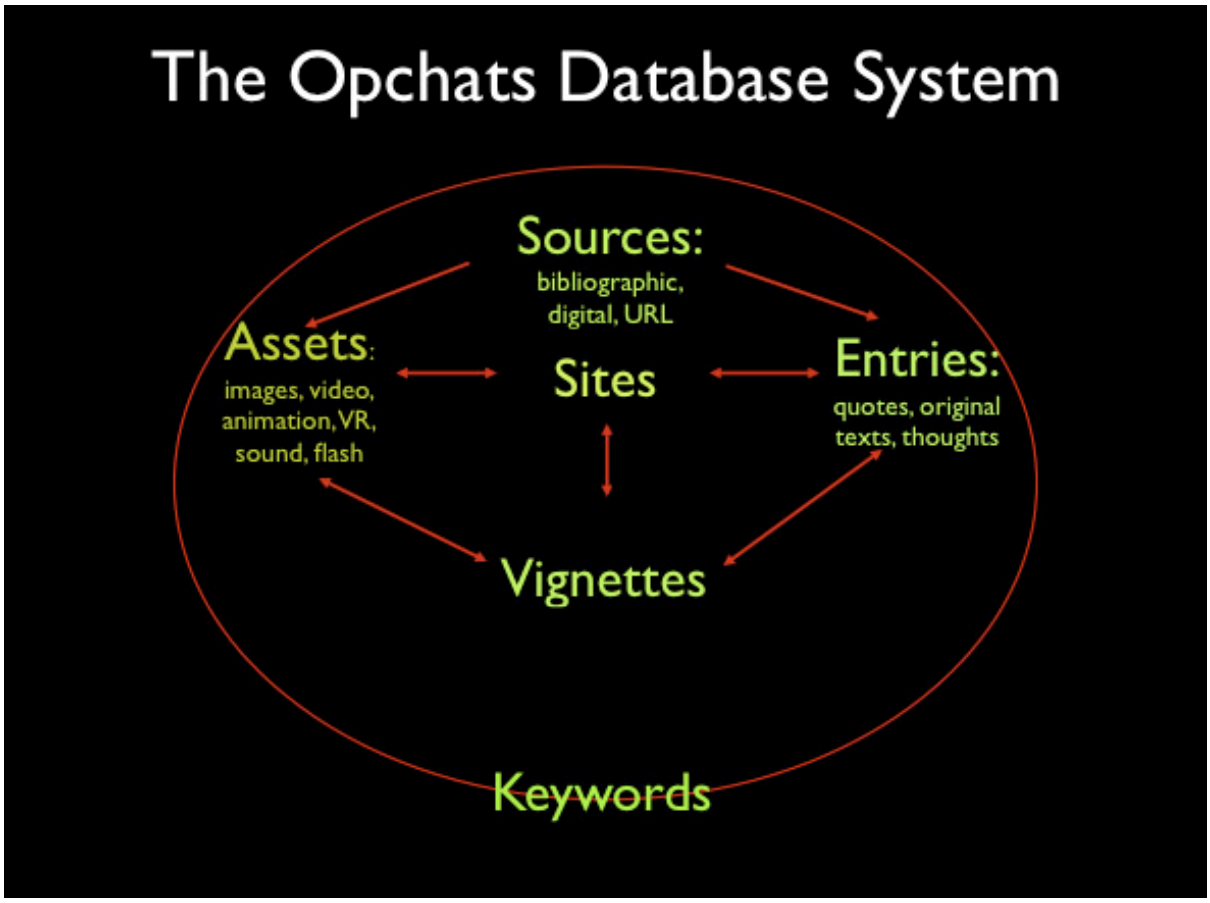
The progress of the project starting in April 2002 may seem to have been straightforward but it was very much a non-linear process. We started with the problem of the public interfaces, because that had always seemed to me the primary importance - how to present what we do to the public. We focused on creating the interface as vignettes as our initial "deliverables". A "vignette" was defined as a "web-based presentation, similar to "learning artifacts" or "learning objects" comprising media plus text to illustrate a point, a concept, a lesson - a 1-2 minute non-linear narrative, linked to other vignettes around a theme and/or site. You could think of it as a kind of postcard. Vignettes have metadata associated with them (for indexing, searching, and transferability across digital environments). But the same problem that I had faced in the Chimera Project started to emerge: how in practice were we going to link the interface to the database? It was halfway through the year that it became clear we had this the wrong way round. Rather than developing interfaces that would be "linked" to the databases, the interfaces needed to *grow out of a* database architecture that was designed for them, that would act as a bridge to the archaeological project databases that were designed for professional "in-house" exploration of the data (figure 8).



"figure 8 – chart showing the relationship of the DigOpchats vignettes to the DigOpchats database system and the raw archaeological Opovo and Çatalhöyük databases"

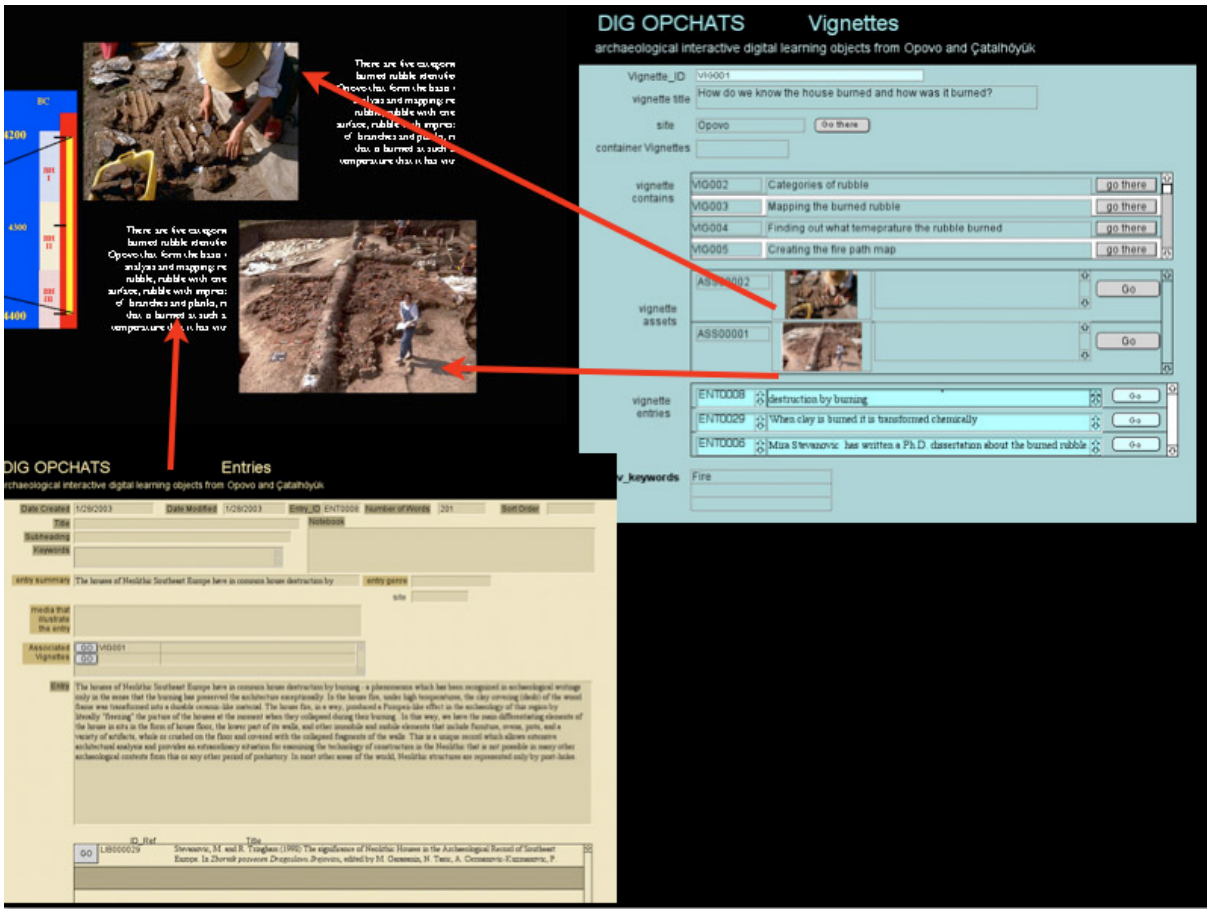
The Vignette Guides

Thus from August 2002 we started to focus on creating the Dig OpChats database system that would form this bridge and make the archaeological databases more accessible. Using FilemakerPro 6, there have been several iterations of the logical and technical structure of the interoperable Dig OpChats database system (figure 9).



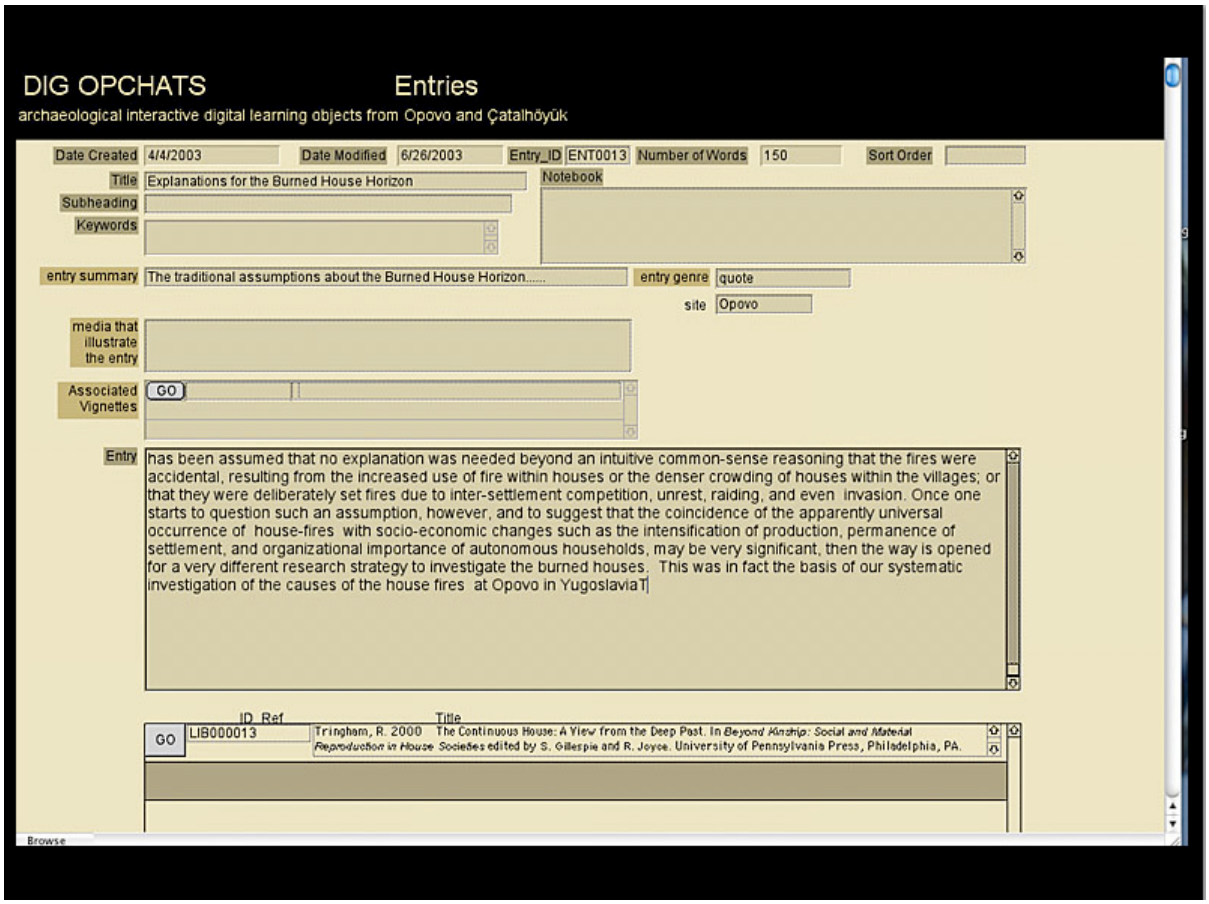
"figure 9 – the structure of the Dig OpChats database system"

The vignettes comprise an interpretive expression that is *built* from assets (various forms of media), texts, and numerical data that reside within the Dig OpChats database system. Keywords and other metadata (including the source of the media and texts) are used to categorize the vignettes and link them to their related data, and to other Dig OpChats vignettes. The figures below demonstrate the embedding in vignettes of assets and entries from the Dig OpChats database system.



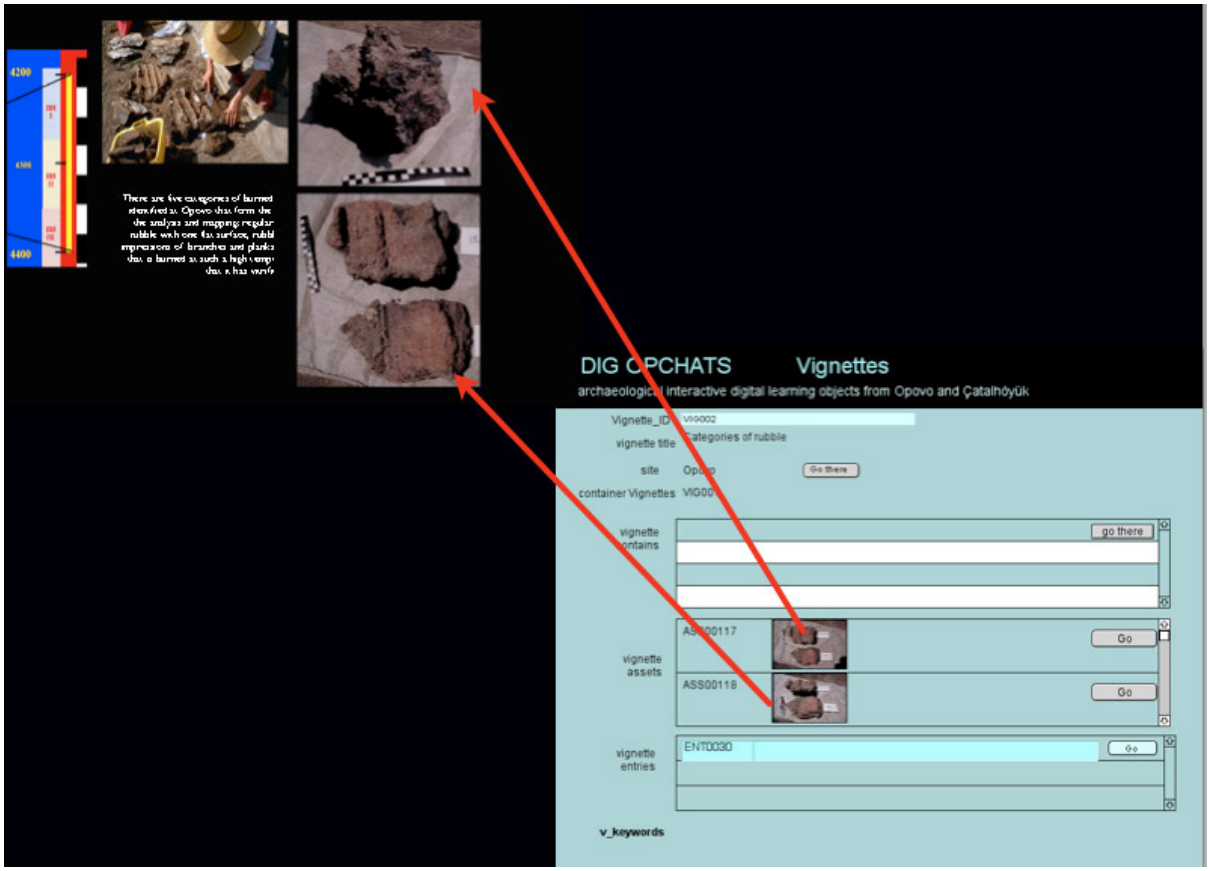
“figure 10 – Illustration to show the Dig OpChats database system as the source of the images and text embedded in a vignette”

In figure 10, the vignette about burned houses at Opovo is created by embedding text and images from the Dig OpChats “entries” and “assets” databases (figures 11 and 14). These are collected together in the “vignettes” database (figures 12 and 13).



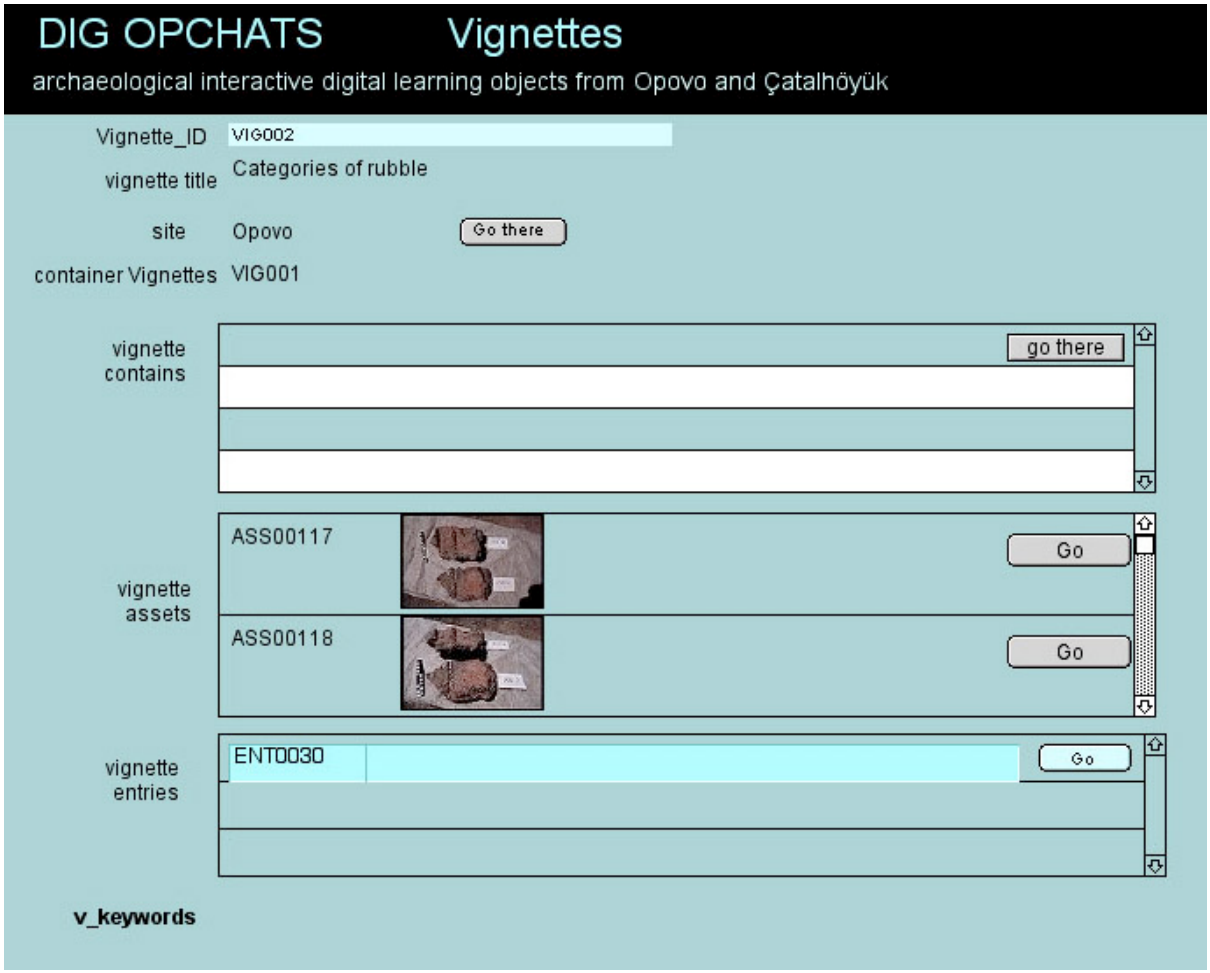
“figure 11 – Illustration to show the Dig OpChats “entries” database”

The text is added from “entries” database (figure 11) that contains both the text, the source, keywords, and which vignettes have used it.



“figure 12 – Illustration to show the Dig OpChats vignettes database as the source of the images and text embedded in a vignette”

Figure 12 also shows that the images used in the vignette about burned rubble categories are embedded from the “assets” database via the “vignettes” database (figures 12 and 13).



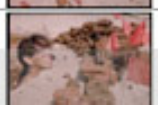
"figure 13 –The Dig OpChats vignette database"

“figure 14 – Detail from the Dig OpChats “assets” database”

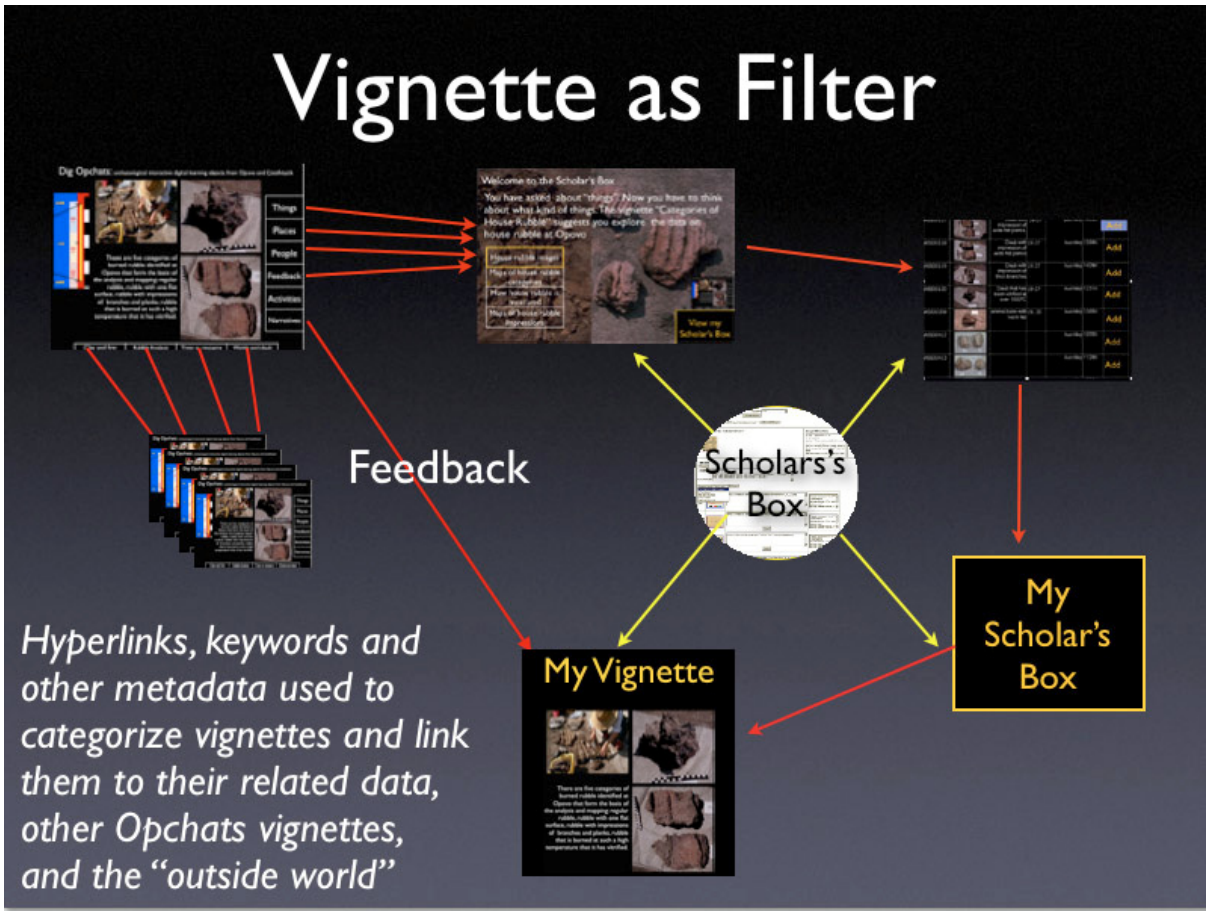
The assets database (figure 14) contains details of context, source and technical components. This image is selected from the number of related images of burned clay rubble at Opovo (figure 15).

DIG OPCHATS Assets

archaeological interactive digital learning objects from Opovo and Çatalhöyük

Asset_ID	Thumbnail	Year	Feature	Unit_Locus	Material category	Description
ASS00417		1985			kucnilep	
ASS00418		1985			kucnilep	
ASS00419		1987			kucnilep	decorated kucni lep
ASS00421		1987			kucnilep	decorated K.L.
ASS00422		1987			kucnilep	zgura-clay slag
ASS00423		1987		1525	kucnilep	F. 19-27
ASS00424		1987		1281	kucnilep	F. 19-27
ASS00425		1987		1281	kucnilep	
ASS00426		1987	19		kucnilep	painted K.L.
ASS00427		1988	30		kucnilep	Manuel - kucni lep
ASS00428		1988			kucnilep	Manuel - kucni lep

“figure 15 – List view of house rubble (“kucnilep”) images in the Dig OpChats “assets” database”



"figure 16 –The path from the Dig OpChats vignettes to searches using the "Scholar's Box" , to other vignettes, and to the creation of user-vignettes"

The Scholar's Box that has been developed by Raymond Yee of the Interactive University has become the pivot for multiple users to search not only the Dig OpChats database but any accessible interoperable database (such as the California Digital Library). The search starts with the vignette (which becomes essentially *a guide* to the search), and ends with the re-use of the components in a contribution that is fed back into the database by the user (figure 16) (http://interactiveu.berkeley.edu:8000/IU/News#continued).

The vignettes illustrated in this publication (figures 17-21) focus on the Neolithic site of Opovo. Below I present a selection of vignette interfaces to illustrate the relationship of one vignette to another, as well as the database components that create the vignettes. Each vignette (figure 17) has a contextual multiscalar timeline down its left side and – at the bottom of the interface - a contextual menu that leads the user to other related vignette-guides.

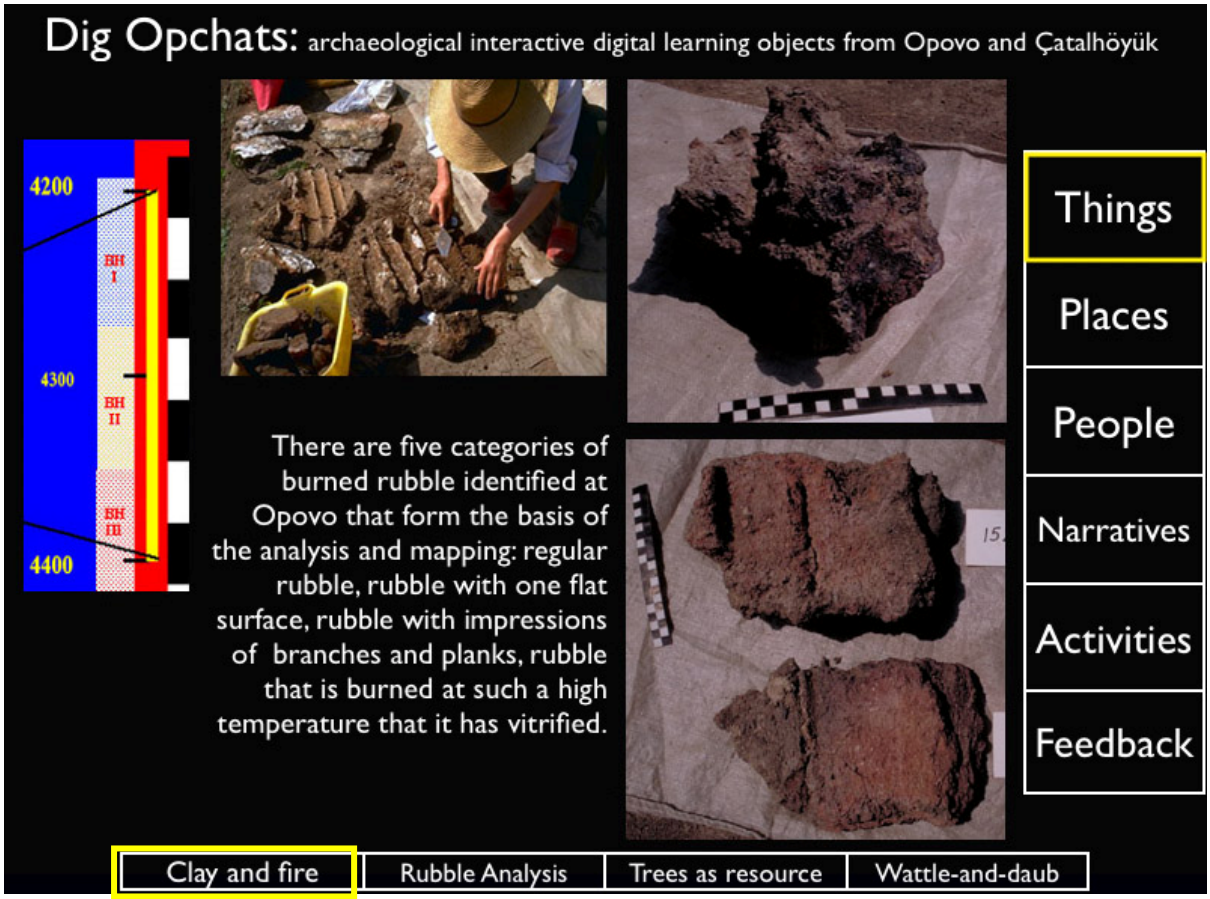
"figure 17 –The Dig OpChats vignette about burned houses at Opovo showing the various constant and contextual menus and elements"

Each vignette also has a fixed menu that leads directly to the Scholar's Box where the user may select and add to their own "Scholar's Box" images, texts, videos, sources and so on (figures 16 and 17):

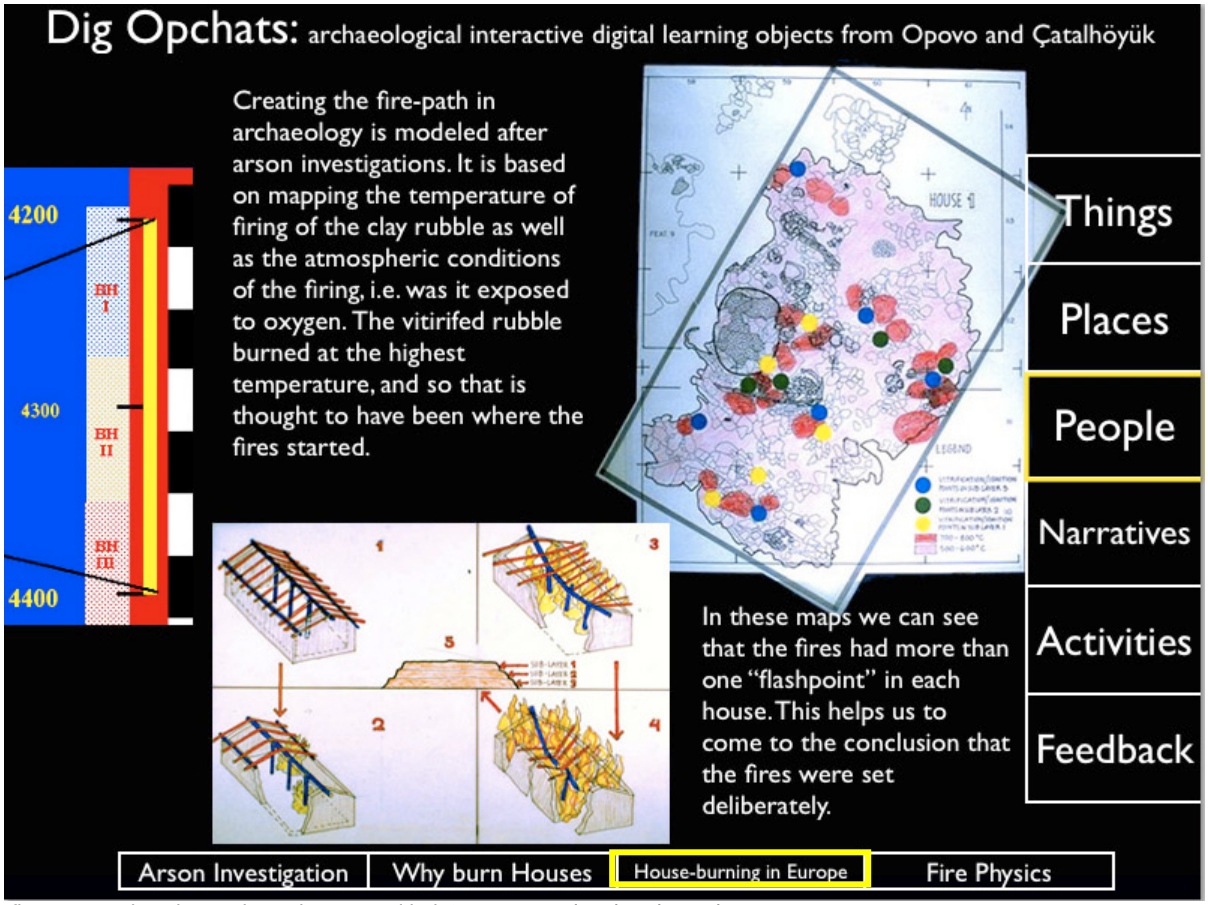
- **"***Things***"** leads to different categories of materials we excavate, how they are recorded and examined: images, VR movies, numerical data, reports on material analyses, links to materials, use-life of things, ethnographic analogies.
- **"***Places***"** leads to large places, the sites and their landscape context; and about more intimate places from the individual houses whose histories we investigate to pieces of furniture (features) inside the house. It leads to images and movies, Quicktime VR, landscape reconstructions, GIS data, provenience records, Harris matrices.
- **"***People***"** leads to the archaeologists, to tourists**,** to imagined prehistoric people, including the individuals we excavate as burials and many others. It leads to audio and video interviews with archaeologists, images and movies about excavating, recording, interpreting and analyzing, team organization, special jobs, diaries, how we get to where we work, where we come from.
- "*Narratives*" are the macroscale narratives that archaeologists write about (pre)history as well as more intimate interpretations of objects and places, and fictional narratives; narratives take the form of published texts, diaries, stories, reports, syntheses, quotes, thoughts.

- "*Activities*" are exercises, classroom assessment techniques, assignments, quizzes, role-playing games related to the vignette. One of these might be like the "Archaeology and the Goddess" assignment designed for the Introduction to Archaeology course at UC Berkeley around the clay figurines found in and outside the burned houses of Opovo (http://www.mactia.berkeley.edu/tringham/GoddessSite_1201/index.html). Another activity might be a 6th grade role-playing exercise such as the one we devised for use in Oakland Schools around life in a Neolithic house at Çatalhöyük (http://www.mactia.berkeley.edu/aop/modules/NeolI_module/default.html).
- "Feedback" is a crucial link in the chain of re-usability that I shall discuss below

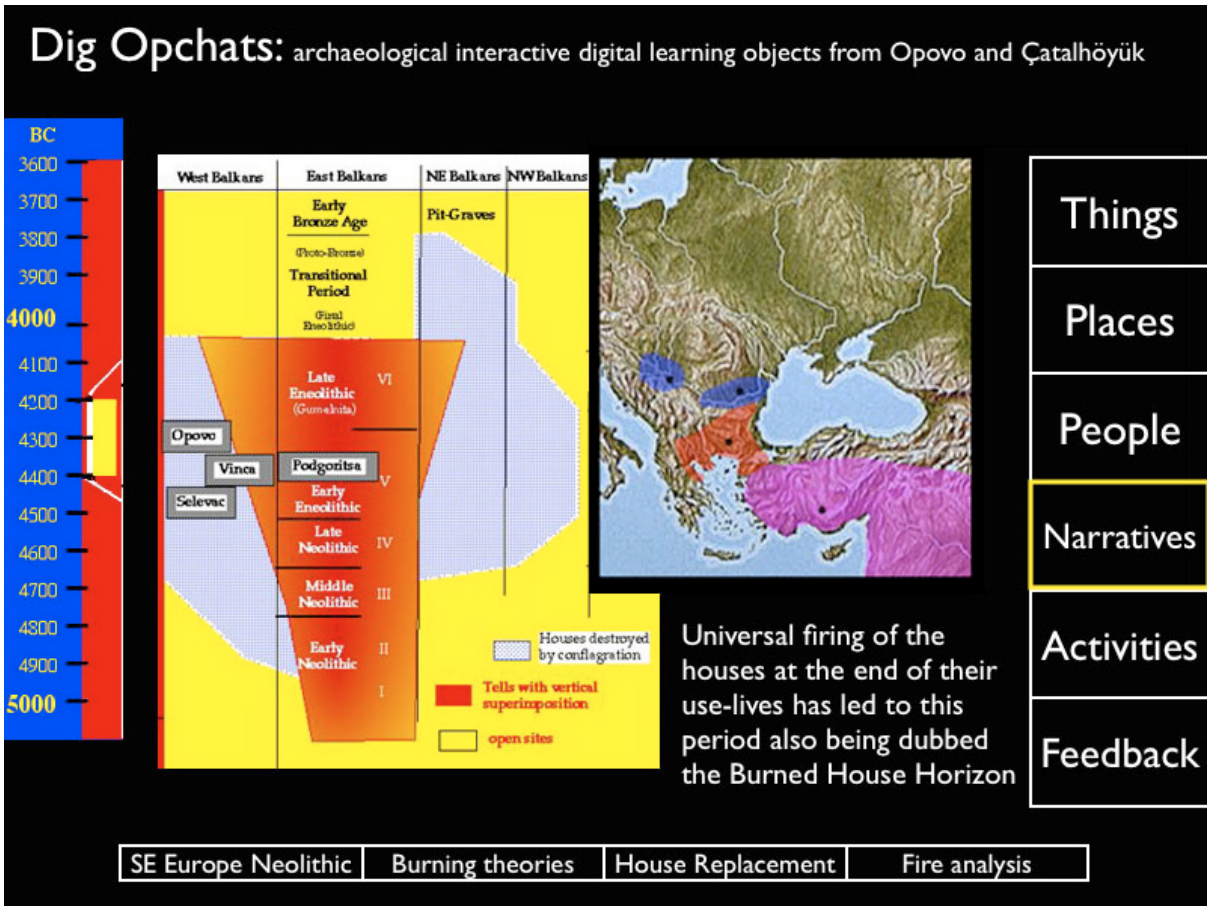
The contextual menu at the bottom of the interface leads the user to other related vignette-guides



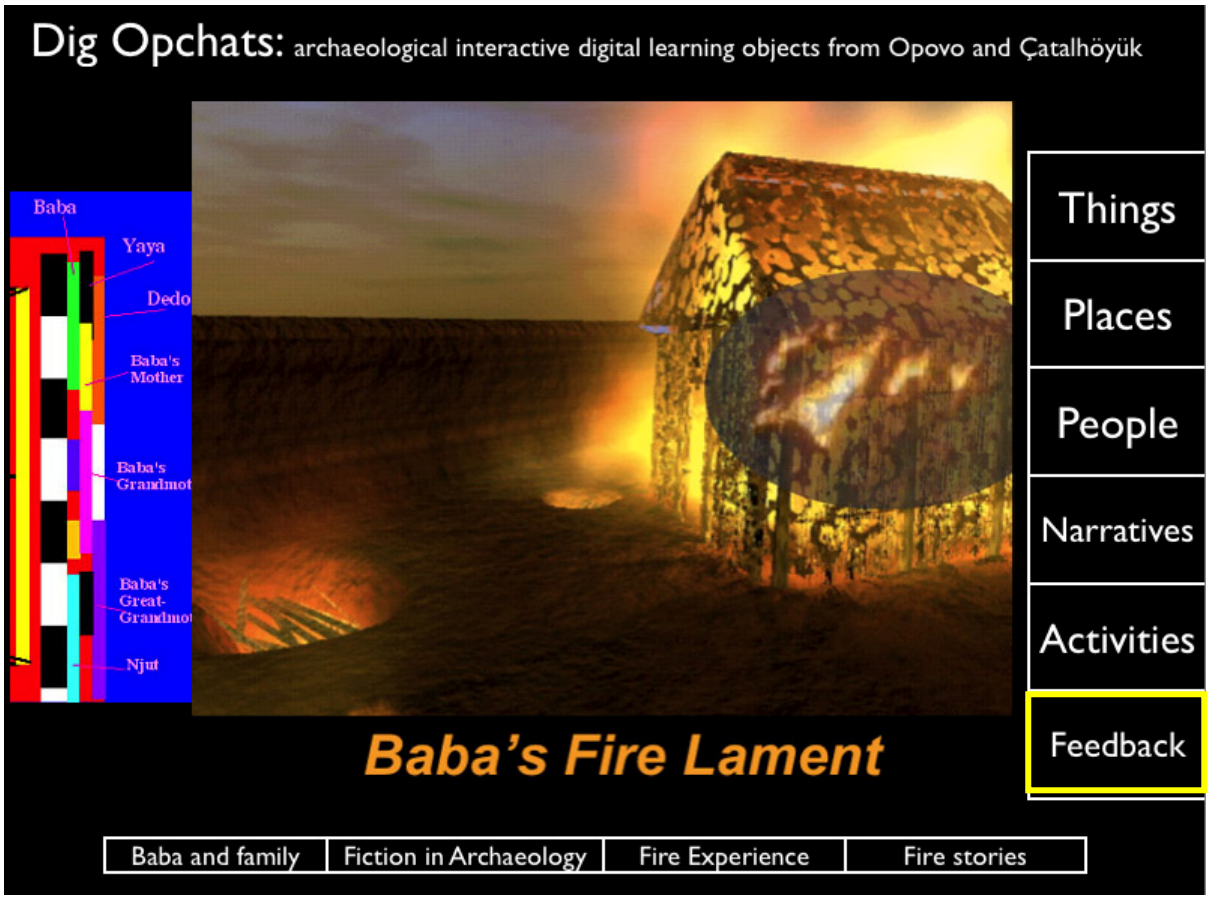
"figure 18 – The Dig OpChats vignette entitled *Opovo: categories of burned rubble* "



"figure 19 – The Dig OpChats vignette entitled *Opovo: Mapping the Fire path*"



"figure 20 – The Dig OpChats vignette entitled *Opovo: Burning Houses in Southeast Europe: the Burned House Horizon*"

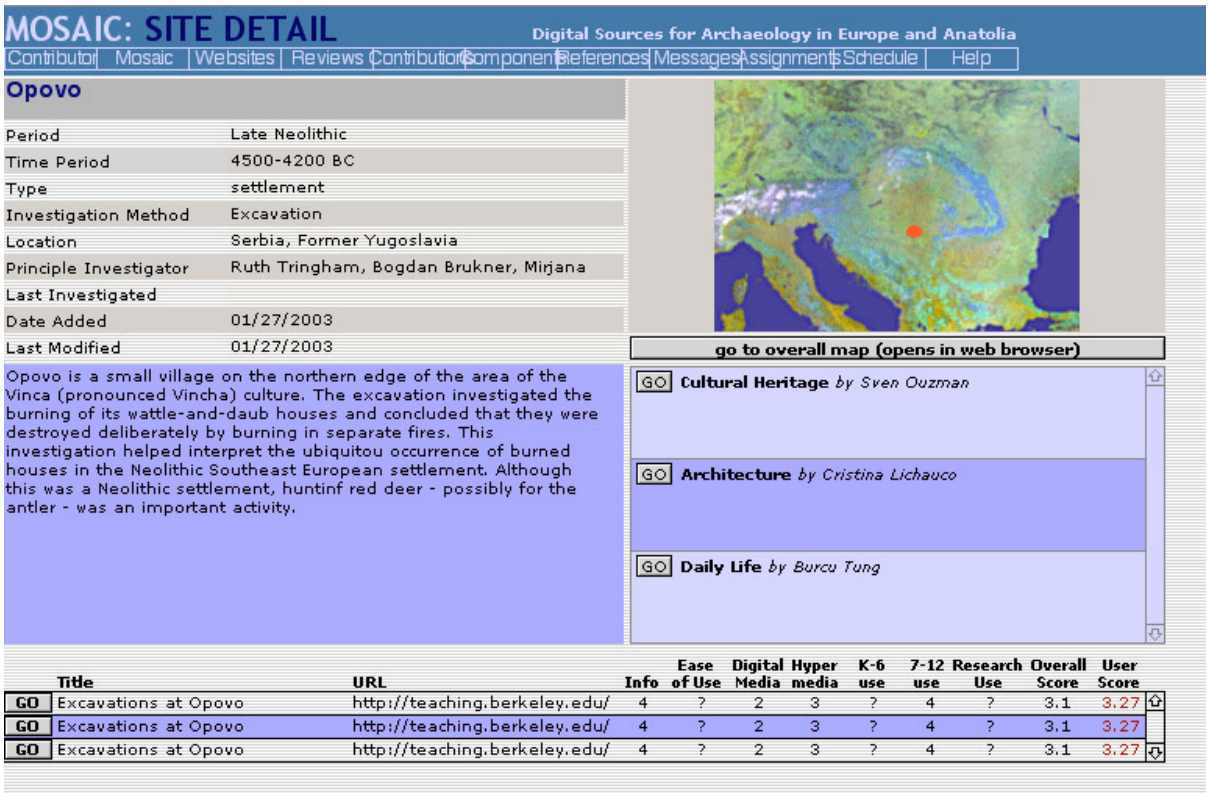


"figure 21 – The Dig OpChats vignette entitled *Opovo: Experiencing House Fires in Prehistory*"

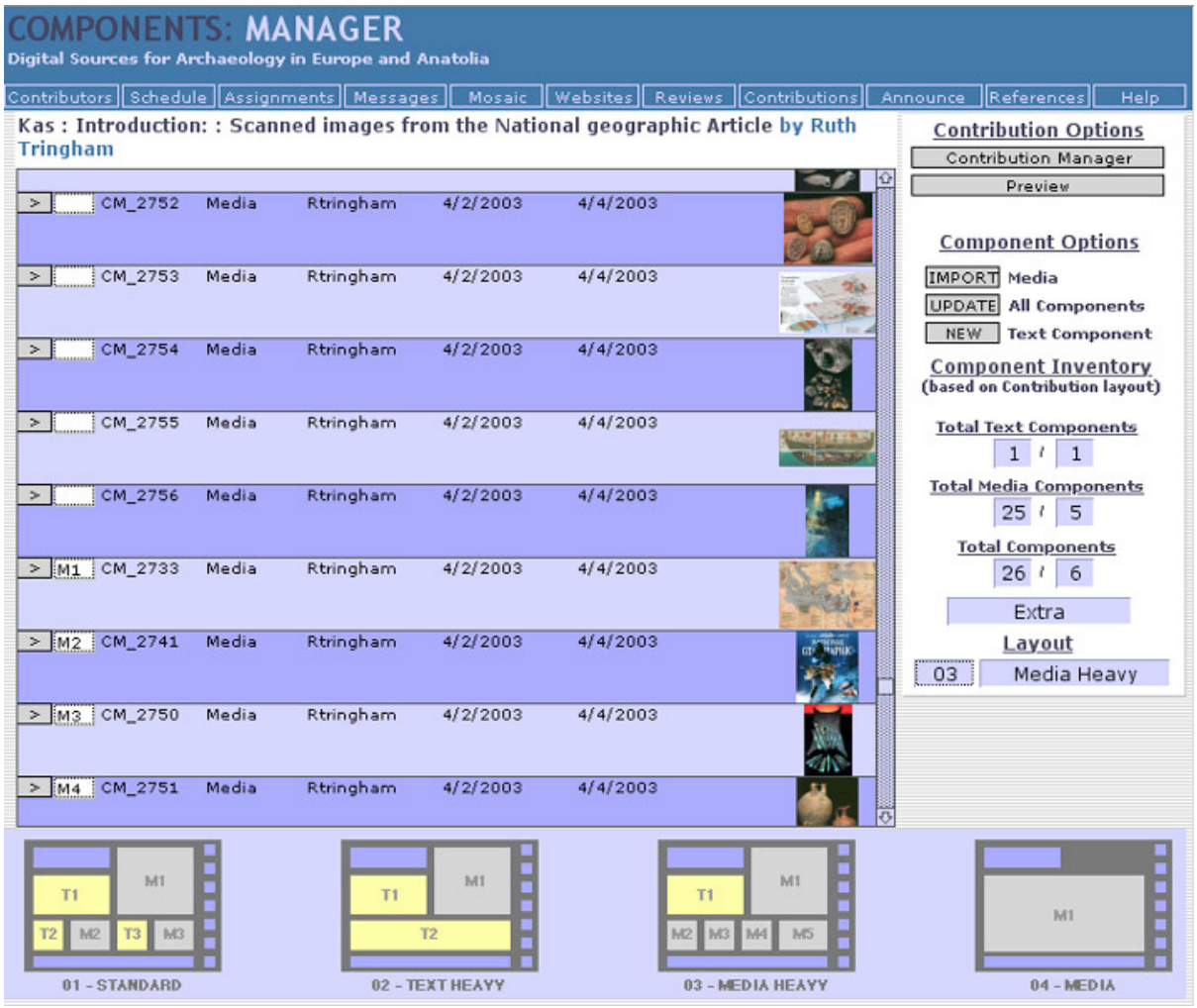
In each of these figures you can note the changing contextual timeline and related vignette menu and selection.

Getting the User to Contribute

The prompt "*Feedback*" leads to a significant aspect of the Scholar's Box/Dig Opchats Project – the idea of vignettes inspired or related to a Dig OpChats vignette can be created by the user and added to the Dig OpChats database (figure 16). The model for such user contributions to a database was recently piloted at the University of California, Berkeley in a course on European Archaeology, that was taught in Spring 2003 in the Multimedia Authoring at the Multimedia Authoring Center for Teaching in Anthropology (MACTiA) (http://www.mactia.berkeley.edu). In this course many of the ideas of re-usability of data and feedback and user-contribution that will become part of the Dig Opchats interface has been piloted. A FilemakerPro database of archaeological sites with associated images is the starting point for student contributions (figure 22).



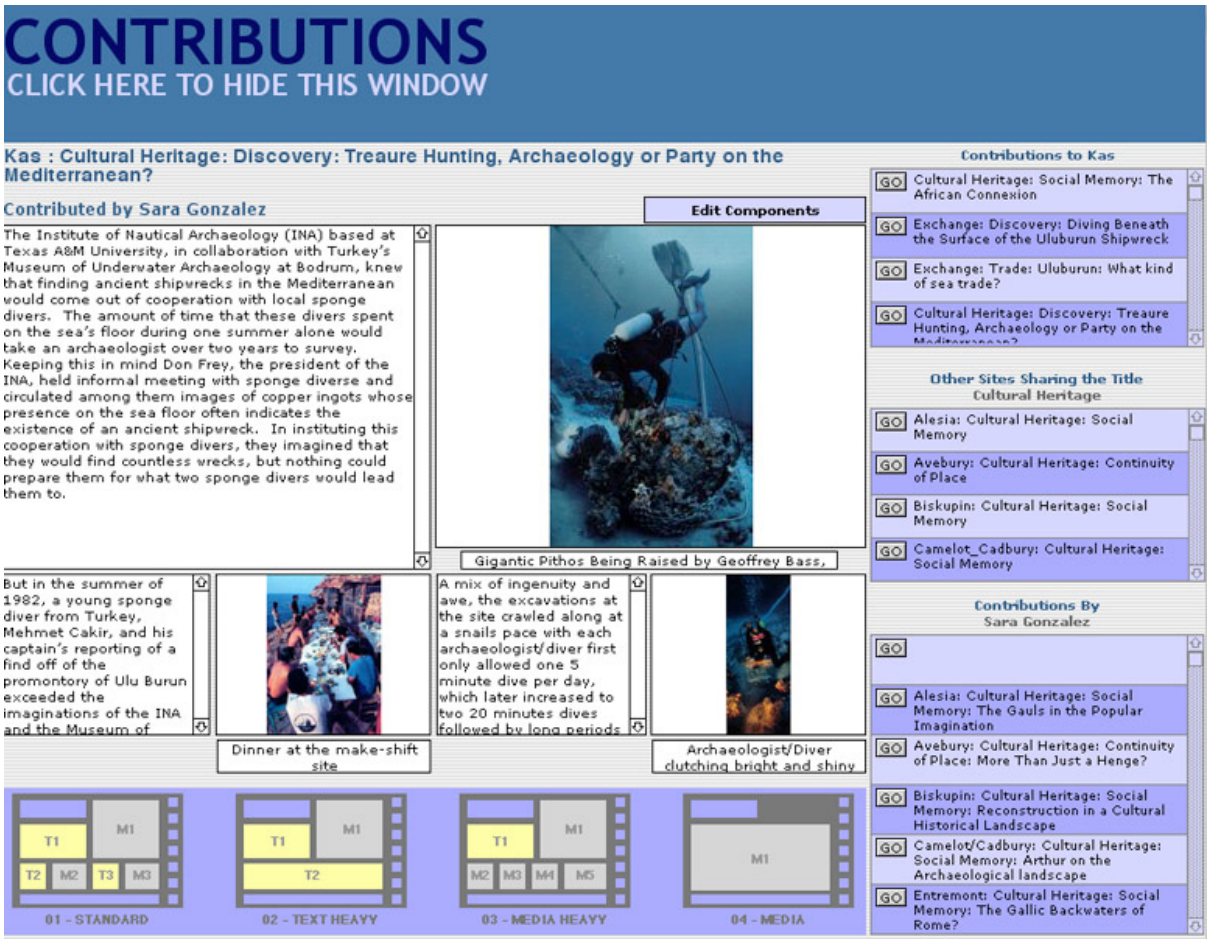
“figure 22 – The Opovo site in the “Mosaic” database of the UC Berkeley course Anthropology 134b (Spring 2003)”



"figure 23 – Images for selection from Kas site in the Mosaic" database of the UC Berkeley course Anthropology 134b (Spring 2003)

They do research from suggested sources in the library and Internet and then select images from the database and write text that draws together the images into a specific theme (such as "cultural heritage") (figure 23). Their contribution is created using a variety of possible templates, media-rich, text-rich, equal media and text) (figure 25). In fact I used selections from the same image database in my on-line information guide on Kas[3] (figure 24).

"figure 24 – Images from the Kas site in the "Mosaic" database of the UC Berkeley course Anthropology 134b (Spring 2003) re-used in the instructor's on-line information guide"



"figure 25 – A student contribution about Kas in the "Mosaic" database of the UC Berkeley course Anthropology 134b (Spring 2003) created using template #1 (3 text blocks and 3 images)"

The student contributions are similar to the vignettes of the Dig OpChats project (figure 25). Links along the right side lead to other student contributions about the same theme, or site, or by the same author. This is how we envisage the "Feedback" part of the Dig OpChats Project.

It is this aspect of the Dig OpChats Project will ensure the re-usability of archaeological data and the engagement of users in its re-interpretation and re-configuration that, we believe, will keep archaeological places, things and people alive in a global and local society.

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[1] The project team comprises Professor Ruth Tringham (ARF): the creative director, archaeological content provider, Isaac Mankita (IU): the producer and administrator, Michael Ashley-Lopez (MACTiA): archaeological database designer and media director, Raymond Yee (IU): technical director and developer of the Scholar's Box, with David Greenbaum (IU director).

[2] In using the word "our" and "we" in this paper, I am not referring to myself as the professorial "we", but mean essentially myself in collaboration with my archaeological colleagues at UC Berkeley, including Margaret Conkey and Rosemary Joyce, and especially Michael Ashley-Lopez.

[3] The images for the Kas site are from (Bass 1987).