

Burton Acres Shell Midden: Visualizing its History

Introduction

An enormous amount of data is generated by archaeologists when working at a field site. Material is excavated, screened, and sorted. From this process a variety of different kinds of objects are uncovered including bones from fish, birds, and animals, shells and shell fragments from various kinds of shellfish, stone tools, and so on. Once an object is found, it is identified and carefully documented. Among the things recorded are: type of object, location, weight, whether it is burned or not, and other information. Over a period of several months, archaeologists might document tens of thousands of objects.

This raw data is extremely valuable—once a site is excavated the data is all that remains. The data allows specialists to analyze the contents of the site, to form hypotheses and draw conclusions about who used the site, over what periods of time, and for what purposes. For non-specialists, the data can be used to rediscover the site and to better appreciate how cultures and the natural world have changed over time. The data, in short, can tell a story about people and can complement ethnographic accounts and oral histories.

In this project, you will have an opportunity to develop a system for visualizing archaeological data. This project has been developed in cooperation with Peter Lape, Laura Phillips, and Diane Quinn of the Burke Museum. The Puyallup Tribe of Indians has also been notified of this project.

The Burke is particularly interested in your solutions. Interested students with strong projects may have an opportunity to further develop their work in collaboration with the Burke Museum and we expect that some teams will present posters of their work at the Undergraduate Research Symposium in the spring.

Background

The *Burton Acres Shell Midden* is a site of historical significance on Vashon Island in Southern Puget Sound. Archaeological evidence shows that from around 1000 AD to 1930s people visited the site to catch and process fish and shellfish.

A *midden* is a refuse dump, typically containing domestic waste from day-to-day life such as bones, shells, broken pottery, and so on. Middens often build up layers over many generations of use. Studying the objects found in layers within the ground provides a lens on to a culture and how it changed over time.

Project: Burton Acres Shell Midden

Worth: 30%

In the summer of 1996, the *Burton Acres Shell Midden* was excavated in a public education project. This work generated thousands of objects within these categories:

- Historical artifacts
- Lithic artifacts (stone tools)
- Bone and antler artifacts
- Mammal and bird bones
- Fish bones
- Shells

The location of the each of the objects is documented as well as other attributes that are specific to the type of object. The data set contains approximately 3,000 objects.

A short description and summary of *Burton Acres Shell Midden* is available on the course website.

Vision

Your objective is to design, implement, and evaluate a system for visualizing the *Burton Acres Shell Midden* data set. Your system should allow people to:

Appreciate the history of the *Burton Acres Shell Midden*
By **Exploring** and **Searching** the data set

Scenarios of use

Here is a possible scenario of use. You are free to use this scenario. Or, you may choose to revise this scenario or propose another.

Charlie is a 9th grade student in a local high school. He wants to learn about the foods that ingenious peoples of the Puget Sound once ate and to compare that diet with the foods that are available at the local supermarket. He comes to the *Archaeology Site Visualizer* and selects a button that shows the locations of all food items found in *Burton Acres Shell Midden*. Colors are used to show the different types of food. The scientific and everyday names of the food items are shown and Charlie is able to click on a link to learn more about these animals at the Burke Museum website.

The objects can also be shown by age. Noticing a possible trend, she selects some sliders so that only shellfish and stone tools are shown on the display. She notices that one kind of shellfish seems to frequently occur in the presence of a particular kind of stone tool. This prompts Charlie to pose a more specific query to show only shellfish of a particular kind.

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Requirements

You are free to develop any kind of visualization, subject to these constraints:

1. Your system allows people to browse and search
2. You use the *Burton Acres Shell Midden* data set.

You may either implement a system of your own design or you may use an existing tool. With either approach, however, you must:

1. Conduct a task analysis that identifies the specific tasks that your system will support;
2. Describe the visualization techniques employed and critically discuss how the prototype supports users in completing the tasks;
3. Evaluate your system with participants from outside the class;
4. Critically discuss the merits of the prototype as a tool for visualizing archaeology data.

If you choose to use an existing tool, your evaluation is expected to involve 4–8 people and be quite thorough. If you build a prototype, the evaluation component can be less thorough so that more time is available for development work.

Deliverables

P1: Project Topic and Team Members (Due: Oct 20)

In this one page report you should outline project goals and plan. The report should contain the following information:

1. The list of team members and the name of your team
2. The URL for your team's website
3. A list of 5 – 10 questions that you have about this project.

Your project team should **consist of 4 members** (one or two teams may consist of fewer members).

P2: Project Description and Plan (Due: Nov 11)

In this short report (less than 4 pages + appendices), you should describe the objective of your project and your plan for obtaining the objective. You should:

1. Name the project and describe the project vision
2. Describe a user scenario and outline the tasks that users will be able to complete with the prototype
3. Describe how you will build and evaluate the prototype
4. Document any risks to the completion of the project
5. Include an appendix showing your design ideas/sketches for the project
6. Include an appendix containing peer review feedback.

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Please note: You must have another person or team review your project. This feedback must be included in an appendix. (Reviewing a project report is an excellent way to gain participation credits in the class.)

P3: Class Poster Presentation (Due: Nov 28 – Dec 2)

You will present a poster on your project and give a demonstration of your prototype to the class. The presentation is to be an informal technical review.

Please note: You may not use PowerPoint for the presentation. Rather, you should create a poster to review the main ideas of your work and use the time to present a demonstration of your system. To support your presentation, you may choose to give the class a handout.

P4: Final Report (Due: Dec 8)

The final report should be less than 10 pages and be a revision and expansion of the earlier report. The report, together with your website, should document your project and address the requirements given above.

The suggested outline of the report:

1. Title page
2. Introduction and vision
3. User scenario and tasks
4. The Prototype
5. User Evaluation
6. Discussion & Next steps
7. Appendix A: Team reflection on project
8. Appendix B: Design sketches

In Appendix A, please include a statement on what you learned in the project, what worked well, and what you would do differently if you could repeat the project.

In Appendix B, please include a record of your design ideas and sketches that contributed to the final solution.

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Worth: 30%

Fair Use Statement

Data from the Burton Acres Shell Midden Project

1. Information gathered during the archaeological excavations and analysis of the Burton Acres Shell Midden is available for use for educational purposes to help us understand archaeology and past and present culture.
2. This information and any products resulting from the use of this information should be used, displayed and distributed with respect for this region's Native Americans and their ancestors who left a record of their lives in the shell midden at Burton Acres.

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Worth: 30%

Grading Criteria

General

- The objectives are stated clearly;
- Assumptions are made explicit and justified;
- The solutions are elegant *and* simple;
- Relevant work is cited;
- The merits of solutions are critically discussed;
- The writing is clear, concise, and interesting.

Problem and User Needs & Tasks (30%)

- A narrow, interesting problem is found and described;
- User needs are situated within the *knowledge crystallization framework*;
- User tasks are well-defined.

Prototype (50%)

- A linkage between the user tasks and the prototype is established;
- The prototype is well-executed technically;
- The prototype is evaluated with users;
- Appropriate conclusions are drawn.

Report & Presentation (20%)

- The writing meets the *iSchool Performance Outcomes for Student Writing*
- The reading is a high quality peer-reviewed paper appropriate for the class
- The presentation is well-organized and engaging (more criteria to be discussed)

(All team members will receive the same grade except in extraordinary circumstances.)