

What Is Missing Matters

Heritage Lens, Epistemic Responsibility, and the Boundaries of AI in Cultural Heritage Research

Larissa Terranova, Anthropologist and Digital Humanities Researcher

Heritage Lens

Gemini Notebook

Table of Contents

What Is Missing Matters

Questions
Connections
Evidence
Absence

Heritage Lens, Epistemic Responsibility, and the Boundaries of AI in Cultural Heritage Research

1 **The Research Problem**
History is found through connections



2 **Heritage Lens Evolves**
From multimodal retrieval to an expanding corpus



3 **Interrogating the Corpus**
Four questions, uneven evidence



4 **Epistemic Responsibility**
Absence, bias, uncertainty and boundaries



5 **Where the Answer Ends**
What remains unresolved







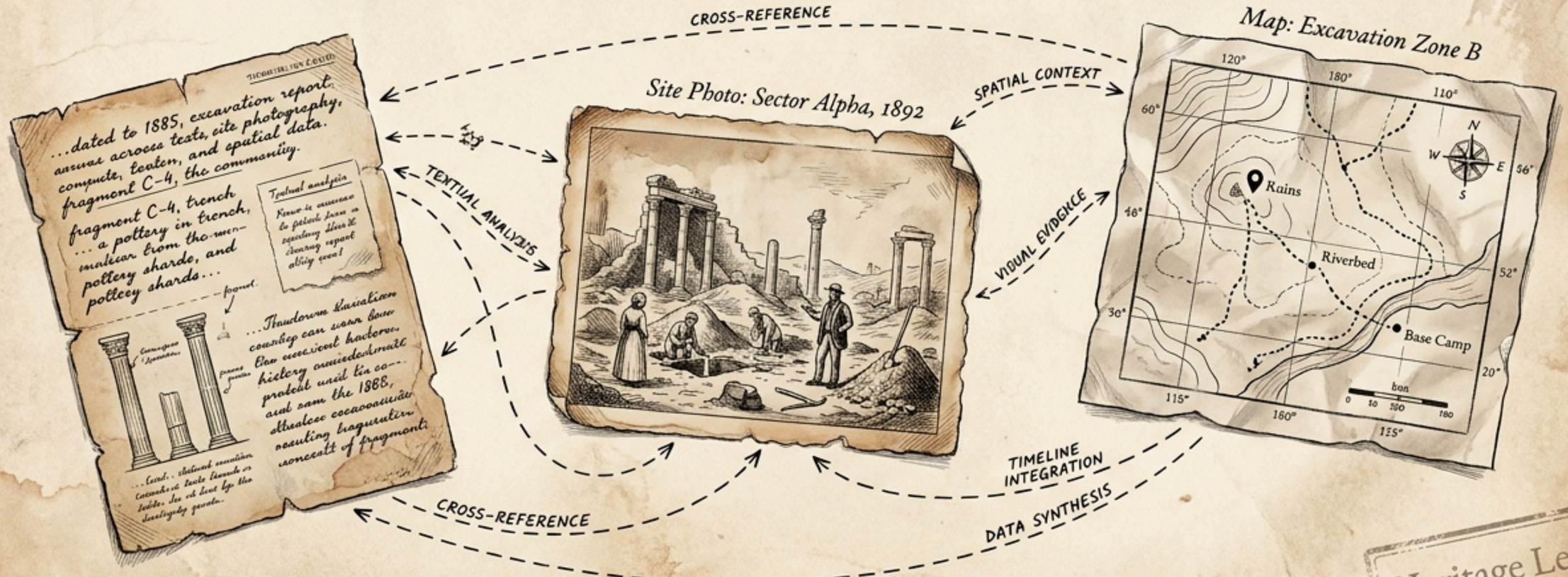
"The past is never complete, but its silences still speak."

Heritage Lens

Nottingham 2026

The Original Research Problem

Archaeological knowledge is scattered across texts, site photography, and spatial data. History is found through their connections.



Gemini Notebook

How Heritage Lens Works

A retrieval pipeline designed for archaeological research

1. Understand



Search your question across texts by meaning, not just keywords.

2. Connect



Find relevant images and documents that relate to the question.

3. Diversify



Select a balanced set of different types of evidence, not just more of the same.

4. Evaluate



Check the quality and relevance of sources to support a reliable answer.

5. Ground



Generate an answer that stays connected to its sources, which you can trace.



Your Answer with Sources

- See the evidence
- Understand the connections
- Know what the system cannot establish

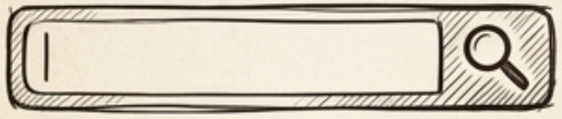


Technology in service of interpretation.

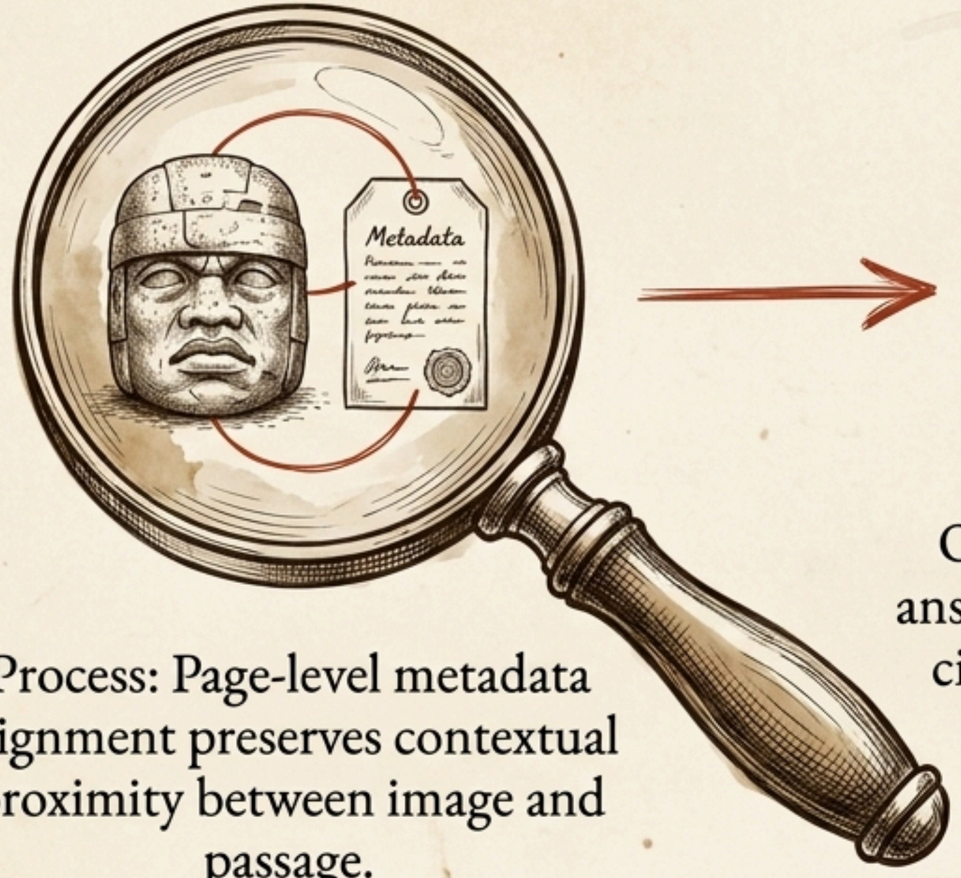
Heritage Lens does not replace the slow work of analysis;
it reorganises the conditions under which that work becomes possible.



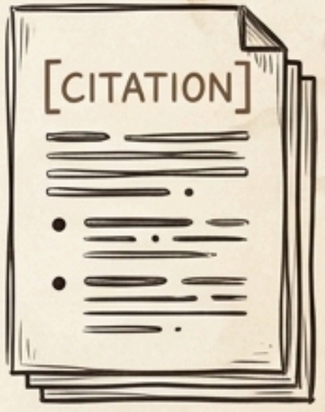
The Logic of the Prototype: Search, Retrieve, Explain



Query: Navigating the dense, heterogeneous Olmec archive.



Process: Page-level metadata alignment preserves contextual proximity between image and passage.



Output: Generated answers with grounded citation traceability.

The system does not replace the slow work of analysis; it reorganises the conditions under which that work becomes possible.

No Gemini Notebook

One Year of Development

As the system matured across global research contexts, its limitations became the primary focus of the research.



Gemini Notebook

The Corpus Grows

Expanding the system to include multiple scholarly voices introduces conflicting assumptions. Fluent AI synthesis risks erasing this vital disagreement.



Heritage Lens

Gemini Notebook

The Olmec Case

A civilisation whose record is fundamentally incomplete. When evidence is contested, incomplete knowledge can dangerously begin to look complete.



Gemini Notebook

Interrogating the Corpus

Four questions occupying completely different evidential ground.
The focus is not the answer, but the limitations identified behind it.

1. What can you tell me about the Olmec cosmogony?
2. Tell me about the obsidian trade in Mesoamerica.
3. Tell me about La Venta.
4. Tell me about Chalcatzingo.



Heritage Lens

Gemini Notebook

Fork

Research Context

Target Corpus: Heritage Lens Agent PDFs

Diagnostics - DB: 19.6 MB | ZIP: 10.2 MB

This agent actively retrieves information from the curated corpus to ensure epistemic transparency.

Heritage Lens Agent

KXSB AR26 — MISSION 4

Search Archive Video Evaluator

What can you tell me about the Olmec cosmogony?

Search

User types research question here and clicks Search

THE ANSWER



SOURCES

MESOAMERICA TRA SEGNO E SIGNIFICATO, Romolo Santoni, Page 56, Book, Centro Studi Americanistici - Circolo Amerindiano

Formazione della Citta in Mesoamerica, Larissa Terranova, Page 60, Thesis, Italian University Press

WHAT THE SYSTEM DOESN'T KNOW

⚠ SOURCE BIAS

All sources are from western academic perspectives, which may influence the interpretation of Olmec cosmogony through a specific cultural lens

Uneven Evidence

Generative AI masks uneven evidence with fluent prose. Finding information is not the same as establishing what that information can support.



Heritage Lens

Gemini Notebook

The Epistemic Agent

Supporting responsible answers in scholarly AI.



1. Report Absence

Explicitly state what information is missing from the archaeological record.



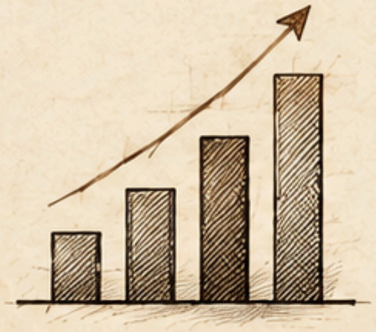
2. Identify Bias

Identify possible colonial, institutional, or historical biases in the sources retrieved.



3. Define Limits

Define the boundaries of what the evidence can reasonably support.



4. Show Confidence

Communicate how certain we can reasonably be, based on the quality of evidence.

Not just what the system found — but what it can and cannot know.

A Shift in Purpose

Knowing the source is no longer enough. We must acknowledge what kind of evidence it is, and what may be absent.

Source Transparency	Epistemic Responsibility
Here is where this answer came from.	Here is where this answer becomes uncertain.

Heritage Lens

Gemini Notebook

The Boundaries of Available Knowledge



A missing object or incomplete context is meaningful evidence.
A fluent AI answer can make these critical gaps remarkably easy to forget.

No Gemini Notebook

What Is Missing Matters

In archaeology, absence is meaningful. We must preserve uncertainty where uncertainty belongs to the knowledge itself.

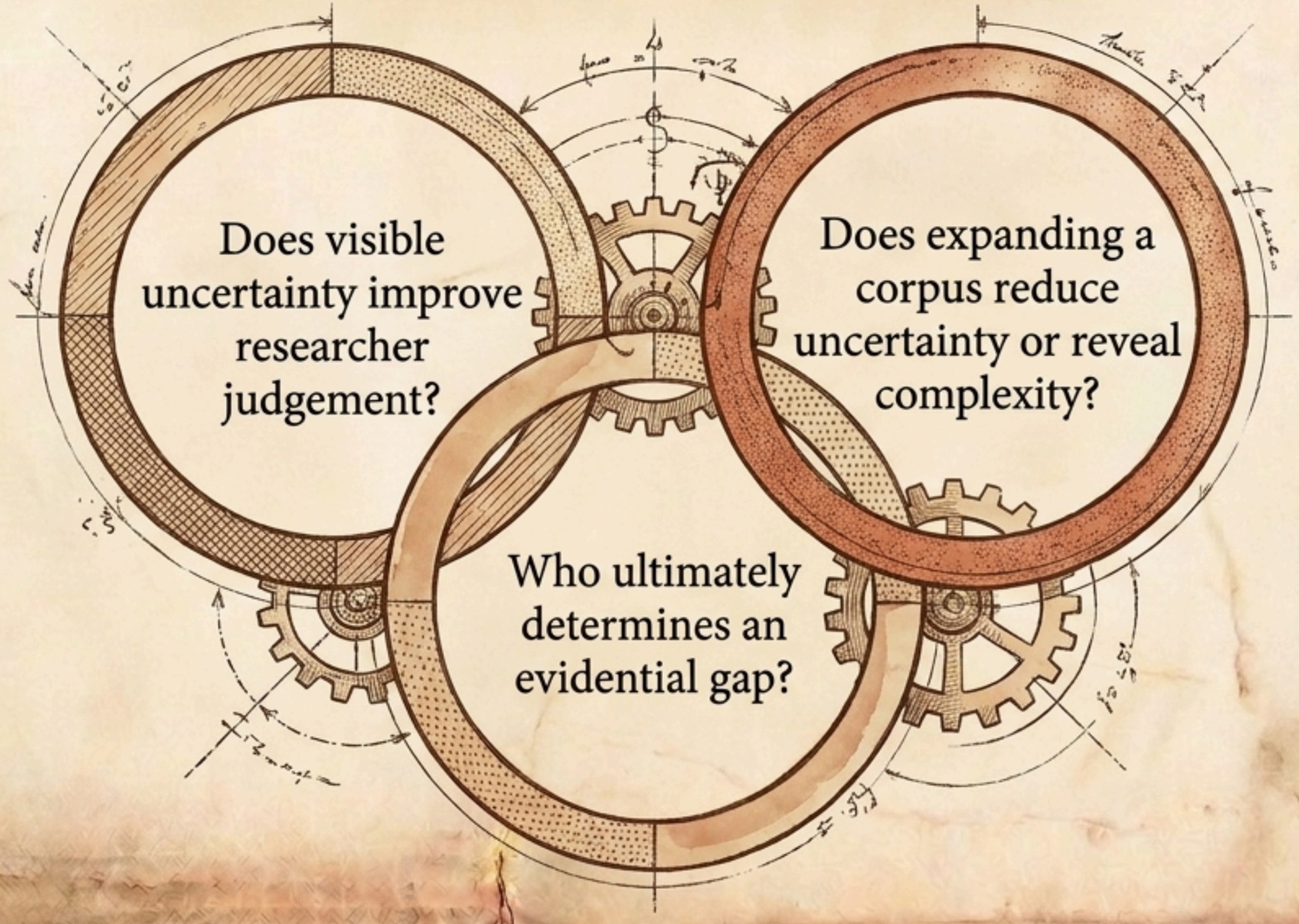


Heritage Lens

Gemini Notebook

Deliberately Unresolved

Epistemic responsibility requires honesty about the limits of the project itself.



Heritage Lens

Gemini Notebook

Where the Answer Ends

The goal is not to build a system that always has an answer. It is to build systems capable of showing us where the answer ends.



Gemini Notebook

Questions & Discussion

Feedback Form

https://heritagelensagent.streamlit.app/



Larissa Terranova
Centro Studi Americanistici
“Circolo Amerindiano”, Perugia

Thank you.

The Heritage Lens Architecture



1. Semantic Text Retrieval: Vector-based similarity matching.

2. CLIP-Based Image Alignment: Cross-modal similarity matching.

3. Diversity-Aware Ranking (MMR): Ensuring heterogeneous evidence.

4. LLM-as-a-Judge Evaluation: Assessing response fidelity and relevance.

5. Grounded Source Traceability: Connecting generated responses to retrieved archival evidence.

Gemini Notebook