

NeMO - NeDiMAH Methods Ontology

Use Case Papadopoulos:

3D Visualisation and Reconstruction of a Neolithic House
in Central Greece (5500 BCE)

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Author: Costas Papadopoulos,
University of Maynooth

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Aiming to imprint the research process on the NeDiMAH Methods Ontology, this document presents the scope and description of a case study of humanities research. This use case was provided by Costas Papadopoulos in the context of his participation at the NeDiMAH Methods Ontology Workshop held in the Hague in December 2014.

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Costas Papadopoulos work is primarily related to 3D compute simulation and digital reconstruction. His example is based on a digital reconstruction project for Building 1 at the Neolithic site Koutroulou Magoula in Central Greece dated to 5500 BCE. The data required for this work were gathered during the 2010/11/12 summer field seasons, while the building itself was excavated in 2001 and 2002.

The purpose of this project was not to reconstruct the building at its original condition. In most cases, and especially for prehistoric material, this is practically impossible since the surviving evidence is rarely sufficient for a single and definite reconstruction. Regarding the architecture of the building, the team tried to use evidence from different sources (e.g. excavation photographs and drawings, field notes, archaeological and ethnographic parallels, interviews with experts, photogrammetry, laser scanning and so forth) and produce alternative reconstructions reflecting all possible interpretations. 30 variations of the building's structure were modelled, for example a roof with a rectangular opening, a roof with a circular opening, and a roof without an opening. Some of the structural models were more certain than others. The type, position and amount of small finds recorded in the field notes (e.g. figurines, stone tools, pottery etc.) were incorporated in the models, also with the help of other case studies. The alternative structural models were the starting point in order to simulate the impact of sunlight in this environment and try to understand how people perceived and used that space. At another level, these 3D models were an interesting heuristic source for all members of the project, as a means to experiment with different ideas about Neolithic life as well as to understand the role of 3D visualisation and reconstruction in problematic or incomplete archaeological evidence. For this reason, after the completion of the first reconstructions, an online survey was implemented to evaluate staff members and students' views on issues related to knowledge production, sense of place, three-dimensionality, as well as the modelling process. Their responses were used to amend the first models and construct new ones that reflected their opinions and ideas.

The whole modelling process, which started with the excavation itself and continued with literature reviews, observations, discussions with fellow archaeologists and the production of 3D models in graphics software, demonstrated that three-dimensional visualisations are

another layer in the palimpsest of archaeologists' cultural production. This project evaluated to what extent such processes can augment the already known and produce new understandings about Greek Neolithic space not only for the modellers but also for the people actively involved in knowledge-making. It also demonstrated the power of this approach as an inseparable element of any fieldwork project, as well as its transformative impact on archaeological sense-making.

List of questions:

1. Are there cultural heritage institutions in Greece that work on 3D visualisations of archaeological sites/finds?
2. Are there any guidelines regarding the documentation of 3D visualisation projects?
3. What are the usual outcomes of such projects?
4. What steps have to be followed in order to produce 3D visualisations of archaeological sites or artefacts?
5. What techniques are available in cultural heritage for recording 3D data?
6. What analogue/digital resources – primary data were used in this project?
7. Which models/reconstructions were more certain than others? Is there a way to define the level of certainty?
8. Are there any other case studies from a similar spatial and temporal context?
9. Which software platforms were employed during the process of visualisation? Was the software sufficient for the variables usually required in archaeology and cultural heritage?
10. How many people participated in the interviews? Did their background influence the results?
11. To what extent the topic of light has been discussed in European and American archaeology and anthropology?