

# Documenting, Interpreting, Publishing, Re-using.

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## Introduction and aims

Data management plays a key role in the archaeological process. The technological advances and the active integration of traditional and innovative 3D practices have increased the accuracy of documentation, enabling richer and more complete recording and allowing the reflexive engagement of the archaeologist in the interpretation process (Berggren et al. 2015).

The diffusion of daily 3D documentation of the stratigraphy, which has become quite common in many archaeological excavations, has resulted also in the production of even a huger amount of data than before. This plenty of multimedia data, composed of 3D models, images, videos, texts, tables, and so on, led to new opportunities and issues, connected mainly to the need for handling massive dataset, both in time and space.

All data format produced within an excavation hence need a proper archive and management, after being homogenized, georeferenced and catalogued. They also need to be enriched by metadata, to be physically stored, and finally to be published. Thus, it appears that simply storing data can be useful but limited. Archaeologists lack a comprehensive archival system realized keeping in mind the chance of re-using that very same data also for other scientific purposes, interpretation and publication, as well as dissemination.

The dissertation project describes some of the methods and procedures employed by the Department of Archeology at Lund University to deal with these matters.

The research aims to investigate how the application of targeted technologies could contribute to standardizing and optimizing the archaeological data management and online publication work. It will be done through the design, development and experimentation of new forms of excavation report and publication.

Some case studies where these new data management forms are applied will be used to answer the following research questions: "How do we efficiently publish these new data in order to increase re-use? Can we define a web 3D visualization system capable of contextualizing the single 3D data in the frame of the excavation narrative?"

## Proposal

An innovative way to manage material 3D data collation and online publication, in order to open up to interpretation as it happens and to its re-evaluation, as appealed by Hodder (2003), will be proposed.

To do that a (new) 3D web-based system will be designed, shaped and tested on different archaeological contexts. It will allow to explore the way technologies could be employed to address current archaeologists' current needs for documenting, interpreting, publishing and reusing wide-ranging excavation data, through the construction of interactive and dynamic excavation reports.

## Methodology and system design

Despite the widespread use of innovative 3D data storage and dynamic management tools, such as the 3D GIS system which offers archaeologists a more reflexive approach, as proved by Dell'Unto (2016), textual reports are still the main source of information on archaeological research (Lucas 2012). And it is quite difficult to access this kind of information by means different from the conventional and traditional one.

For this reason, and to find a sustainable way for archaeological contents management and publication, a web-based tool for generating an Interactive Report System of archaeological excavation was conceived, using the textual report as a reference and exploiting the available technologies to design it.

The objective is to build a dynamic working tool for archaeologists that could be employed both for data collection, post-processing and interpretation. It should allow obtaining an interactive narrative outcome, with the chance of customizing it according to the very specific needs of each kind of field-research.

It was a relevant task identifying and defining a suitable way for data visualization, as to allow researchers to access and easily retrieve the excavation data. After analysing plenty of reports, we identified recurring elements to be used as a base for the reporting system structure and visualization scheme.

The main elements kept for the digital conception of the report are (i) the presentation of data starting with a global description of the project goals and (ii) the annual subdivision of the report and (iii) the following account of one trench at a time, in (iv) a diachronic presentation realized through (v) the text-and-image description of the contents. A comfy dynamic navigation among multiple excavation areas and several excavation campaigns were considered crucial for the system to be developed.

The Three-Dimensional Heritage Online Presenter (3DHOP) is the platform chosen for developing the so designed reporting system, as it can manage high-resolution 3D models, with the possibility to be deeply customized and personalized (Potenziani et al. 2015, Potenziani, Callieri and Scopigno 2018).

## Project advancement

The first case study of the proposed project is the four-year excavation carried out at the Mesolithic site of Kämpinge, south Sweden. A system where the data interactive publication follows the structure of the standard written reports currently used was designed

The Interactive Reporting System has a modular structure, suitable to present the abundant and varied archaeological information and data in the same way of a traditional report, and it was built around the concepts of nodes and connections.

The (excavation) node consists of a webpage containing a section of the report referred to a proper excavation area in a specific excavation campaign. Every node is connectable to the others through space and time links.

Through the reporting panels, in the excavation node, it is possible to upload contents, organize them and then writing and navigating the report in the form of blocks (Fig.1). Thus the excavation node structure is made of blocks of report and each block contains text, images, documents and a specific view on the 3Dmodels. The archaeologist writes the report, one block at a time, using 2D and 3D contents already present in the system.

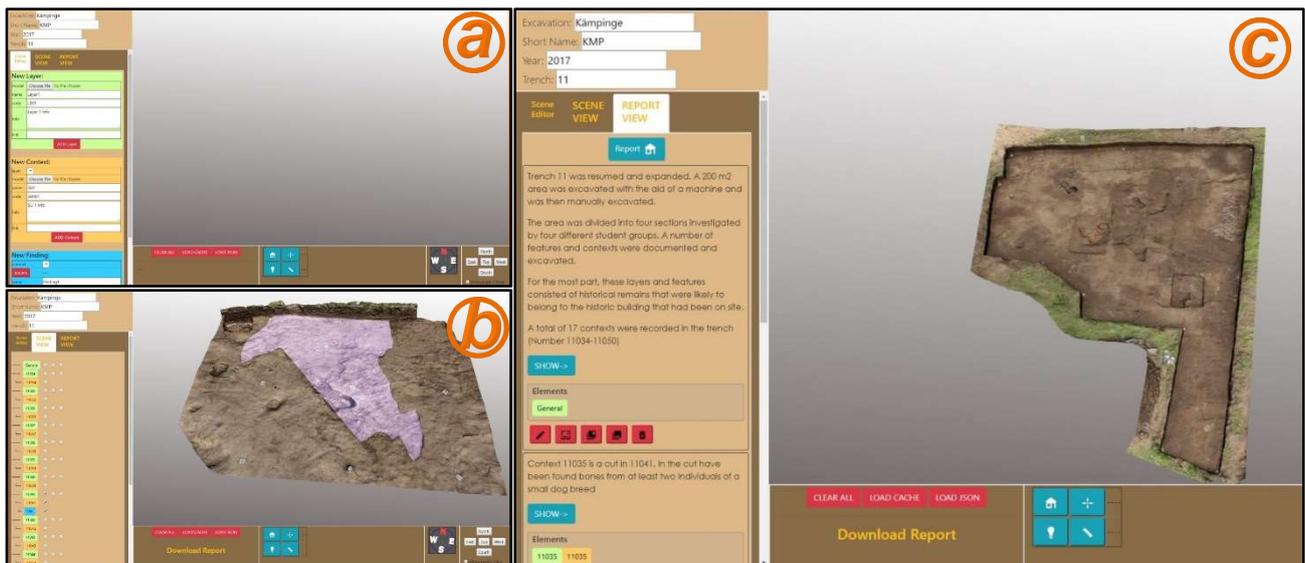


Fig. 1 Node excavation reporting panels: Scene editor (a), for contents uploading, Scene View (b), for data visualization and settings, and Report View (c), for report writing and navigating (© Paola Derudas, Lunds Universitets).

This system, built around the structure of the archaeological report, is fully customisable, according to the excavation's characteristics: any project indeed can take place on one or more excavation areas, and can last for one or more excavation campaigns.

Through this web-based presentation framework, archaeological data from the Kämpinge research project have been made open and accessible.

## Future development

The proposed platform, even if developed on a Scandinavian case-study, could be employed to manage and publish data from any other archaeological excavation, just because its full customizability.

Moreover, the core of the proposed research could be further extended and developed exploiting the possibility of existing online archives, such as the Swedish National Data Service (SND), whose primary role is to support the accessibility, conservation and reuse of data and related materials.

The Bronze Age layer in the famous Neolithic flint mine site of Södra Sallerup (Skåne, southwestern Sweden), the underwater shipwreck Gribshunden, in the southern Baltic sea and the central place of Västra Vång (Blekinge, southeastern Sweden) have been chosen to address new research questions and to further develop the presented platform, according to different needs and research goals.

Another important step forward to ensure public and open archaeology could be the development of systems for 3D interactive visualization and archaeological narration dedicated to the public and to children.

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