

REVELATION: PRACTICE, TECHNOLOGY, DISSEMINATION AND THE DESIGN OF A FIELD RECORDING SYSTEM

ABSTRACT

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On site computer recording of archaeological information has been a reality for 30 years and yet it is still seen as an experimental or at least innovative approach. Why? While most archaeologists use computers in some aspects of life, field recording is still done largely on paper. What is the challenge in field recording that makes it resistant to change? The issues may be as much cultural - to do with the way in which we see 'the field' in relation to the rest of our work, our colleagues and our audiences - as they are technological. The Revelation project has undertaken a comprehensive review of information systems at the English Heritage Centre for Archaeology in the context of the broader profession. Our aim has been to understand how we use data throughout the life of an archaeological project so that we can design a field recording system that is used by the majority of our field teams. In the process of this assessment we have had the chance to reconsider how our working practice feeds our understanding and how it can be supported and improved by better designed systems. This paper presents the results of the assessment and plans for implementation.

INTRODUCTION

Revelation is a Centre for Archaeology (CfA) project to provide a coherent digital information system that will make the capture, analysis and dissemination of CfA research faster and more effective. The project team expects that this will include on-site digital recording based around spatial data as well as complete integration between site data and off-site data. We are not trying to build a single system that meets all the needs of archaeologists since the needs of archaeologists can be remarkably variable. The CfA need a system which:

- allows for flexible and powerful access to the broadest range of data from any investigation.
- facilitates integrated working between dispersed teams of specialists, all of whom have responsibilities to their sub-disciplines as well as to the team.
- builds a manageable data library for the work of the CfA, particularly enhancing the understanding of those sites we have statutory or commercial responsibility for.
- allows for broad scale comparative work examining detailed research questions on the condition of the archaeological resource for issues such as agricultural damage, erosion and climate change.
- speeds up extended work programmes where individual member's input varies and key people's time is limited.

BACKGROUND- THE NEED FOR REVELATION

The Revelation project has recently completed a review of CfA systems. It shows that the CfA and its predecessors over the last 30 years have developed at least 83 separate computer information systems. Development began in the mid seventies with the creation of one computerised system for fieldwork data (Delilah) and slightly later a computerised system for collections management (Labfile). These two systems provided the main computer records up until the early nineties. With the advent of more user-friendly soft-

ware, there has been a proliferation of small systems developed in increasing numbers over the last ten years. The reasons for this vary according to the complexity of the systems. Most common is the growing expectation of users for more functionality from a system, which results in frustration with inevitably ageing software and hardware. Another factor is the growing level of user skills and familiarity. A further significant reason is the increasing availability of better technology that allows more people to consider developing their own mini-systems. Time and again when users were asked about the main strengths of their systems, the recurring reply came back that "it does what I need", but with far less regard to the possible needs of others.

Although archaeological research is a collaborative exercise it is conducted by a disparate group of individuals. Some of these people work quite closely together during or immediately after fieldwork, but over the many years typically pass between fieldwork and publication, people on the project team have many different needs and requirements. It appears that as software becomes more user-friendly, many of the users decide to develop systems to meet those needs as they go along. The challenge therefore that faces the CfA is not a simple case that we haven't got enough IS, but rather more complexly that the current systems are 'organic'. Each time a person runs across a new problem, they develop (or in rare cases ask someone to develop) a solution for that problem.

There are some advantages to this approach, which is why it has gone on for so long. The most immediate is that it provides a quick and usually workable solution for the individual - or in some cases project - concerned. If the primary concern is to complete work to a fixed timetable this can often become an over-riding factor. But there are longer-term disadvantages. Most of these systems don't speak to each other. As more of them develop the fragmentation of information increases. The individual systems will often replicate the data that is held in others and this may lead to a further duplica-

tion in analysis work. Worse still it serves to preserve, if not encourage, the sense of isolation that is the nemesis of collaborative interdisciplinary work.

The aim of the Revelation project is to identify and address the longer-term requirements for archaeological projects. But, as already suggested, getting such requirements from archaeologists can prove remarkably difficult. The approach that Revelation has adopted is to undertake a major assessment prior to the design phase.

As the first element in this assessment the Revelation team have looked at the existing systems described above, to establish what functions they serve and to learn the lessons from previous developments. Since drawing (as opposed to spatial recording) is at the heart of the current process, we needed to scope the difficulties attending it. On-site digital drawing trials were our second step in research. Thirdly, we held workshops with fieldwork project teams to establish what projects need from systems and will back this up with a comprehensive questionnaire. Finally, we are conducting a review of sectoral practice - both through a literature review and through talking with other people implementing systems. Initially the interviews and hence the results presented below, have all been within Britain. We now hope, through the presentation of papers at conferences such as CAA, to take in experience from other archaeological organisations that have developed digital systems for archaeological recording, analysis and dissemination & archiving in recent years.

EXISTING PRACTICE

Looking at the British experience, including CfA, we see many systems that aim to have a digital record before finishing fieldwork, but generally they still rely on some, or all, of the recording being done on paper and transcribed during the excavation (Roskams 2001:275). While such systems are an advance on the delay involved in digitising during post-excavation work, they have drawbacks. Not only are there time costs to the continued double handling, but it also leaves the door open to transcription errors. More fundamentally, however, such an approach separates the process of analysis from the process of recording and overlooks the advantages of digital systems over paper for recording.

The principle advantages of paper recording are seen to be flexibility and transparency. The flexibility is largely required because, during excavation, we may not fully understand what we are doing and so we like to keep our options open. However, this flexibility of a paper record can become meaningless if the data is entered for analysis into a digital system that cannot cope with it. If the data is going into a digital system at some point, that system should be designed to take the whole data set, in the manner it is recorded. Also on closer examination the transparency of the paper record is often somewhat murkier. In reality the paper record, while having room for authorship, has no room for multi-vocal and dynamic representations of the recording process because everything gets put on one sheet and annotation, if it happens at all, may not be attributed. Often even changes made many months later are simply inserted into a sheet without comment.

In the face of these concerns, digital systems can make recording easier and better - which is why commercial companies in many domains use such systems for all sorts of complex work practice. Digital systems provide immediate validation and quality checking. They can also provide feedback to the recorder about the quality of the record they are creating and about how a record contributes to broader research questions and the overall interpretation of the site (Andrews et al. 2000). A digital system can act as crib sheet, checker, and reference manual. Waiting until after the record is created before using a digital system means you are always dealing with legacy data which may have quality problems and which may then need to be shoehorned into a system that is not designed to deal with it.

IDENTIFYING THE REQUIREMENTS - REVEALING THE ARCHAEOLOGICAL PROCESSES

The word Revelation means "knowledge disclosed" or more straightforwardly, "revealing some fact". There is also a sense in the word of the intervention of some divine or supernatural power that reveals this knowledge or fact. This is the 'black box', which describes the view held by many archaeologists of how a computer delivers information to their desktop (Hugget 2000). The 'black box' might also be a metaphor for the processes required to transform the action of an excavator's trowel on a piece of soil into the publication of a monograph about the archaeology of a site and the landscape within which it exists.

People working with archaeological Information Systems (Stewart 1997) often describe the archaeological process in a linear fashion. The following stages are commonly identified from a data driven perspective:

- data collection,
- data management
- data manipulation and analysis and finally
- dissemination (of both data and interpretation)

But this sequence rather quickly glosses over the core of the process and the most important element in the design of the system - data manipulation and analysis. Contemporary archaeological theory is less keen on linear processes than earlier incarnations and most archaeologists accept that interpretation and analysis are also part of data collection (Hodder 1999).

An alternative model might propose five recurring analytical tasks, present at all stages of research from trowel to monograph and beyond, which need to be supported by an IS.

- Atomisation - the construction of the units of analysis, is a choice, a process that often takes place before data collection begins, although repeated through analysis. Key elements in atomisation are the data structure itself, controlled vocabulary, and the spatial definition of boundaries.
- Quantification - can be as simple as measuring the diameter of a posthole or more complex as in estimating the mean level of a particular element in an assemblage of slag.
- Ordering - this may include classification, categorisation and sequencing.

- Integration - regrouping, also bringing together different classes of data (and interpretation).
- Explanation - where the other processes are incorporated with broader understandings and belief.

The key difference in the second model is that the processes are iterative rather than linear. Data isn't atomised, or explained, or subjected to any other process only once and therefore the IS needs to be able to track or audit these processes and their more complex relationship(s) to each other.

SUPPORTING EXISTING PRACTICE

Existing practice in archaeology has developed over the last 150 years and has many elements that are work-arounds for the technology we've been using. Some people have been expecting that the Revelation project will recommend a revolution in existing practice - opting for 3D recording, for the replacement of plans with photos, for the replacement of the 'Cranbourne Chase model'. While some or all of these developments may well take place in the next few years - and we need to take these directions into account - the requirement to produce a useful system (one that is used) must be the prime focus rather than any "technopolistic imperative" for innovation (Huggett 2000:19).

Our approach has been to identify current good practice that needs to be supported with better systems, rather than simply an attempt to create new practice. We have produced workflow diagrams of our existing archaeological practice and will use these to build upon the elements that are strong and need supporting while also identifying the gaps and problem areas that need improving.

On most English excavations a single person is responsible for the excavation, drawn record, text record and to a degree the photographic record of each individually identified context. This approach is seen as the best way to get the most integrated record and maximises the excavator's engagement in the recording and analysis process, thereby increasing both the quality of the record and the excavator's skills and experience.

One possible implication of maintaining this practice is that it will require tools for digital drawing on site, rather than off-site digitisation of the pencil plans or remote survey drawings created using a total station. For this reason we have already carried out some preliminary testing of digital field drawing systems to examine the viability of digital drawing in the field more closely. Our testing of digital drawing with pen computers demonstrated that it is clearly feasible to draw scaled drawings directly on a pen computer. Further, this achieves the same levels of accuracy of depiction as achieved by drawing on paper and digitising later, which is the method that the CfA and many other units currently use.

IMPROVING EXISTING PRACTICE

One area that can be improved by a well-designed system is the feedback given to people recording on site. With existing paper-based systems, people who complete context sheets in the field are very rarely involved in the later analysis or interpretive work using the information they have recorded. If people do not understand why they are being asked to record a piece of information they either do not record it correctly, or simply do not record it at all. A typical example is that excavators are asked to give sedimentological descriptions of each deposit but they never find out what the geoarchaeologist does with the information. Hence they have little idea of why they are recording it and many people are very lax about entering this information. A similar lack of feedback mechanisms occurs with finds and sampling information, and indeed with most information on the context sheet. Information about the future use of data can be presented in context sensitive help files on a digital system. Further, the front-loading of analysis into the excavation season allows site staff to understand the process better (Andrews et al. 2000). These improvements rely on the integration of project team and on having in-house specialists involved in the design of the system.

CONCLUSION

The Revelation project assessment is a product in itself. Most archaeological units have neither the money nor the scope to conduct this kind of assessment, which can mean that systems are developed in a piecemeal manner. When this stage is complete, further consultation will be needed on technical aspects. We are already planning work with a European consortium called SEMKOS to look at issues of cross-domain mapping and 'future proofing' our work through the use of XML and the Semantic Web.

The final outcome of the assessment will be a plan for implementation. This will probably be modular and involve adoption of modules from other systems where appropriate. The key aim is to provide something where all aspects of the project, from start to finish, are managed together and that all project team members have access to each others work.

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