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Developing Archaeological Excavation Data Management

An Archaeological Viewpoint of a Local Case Example

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Abstract: Typically, even a single digital data collection (i.e., a report) recorded in an archaeological excavation consists of various kinds of processed data, which is either digitised or digital-born data. The original paper-based documents and non-processed digital data are rarely available. The collected data represents the archaeological site using verbal, numerical or visual media and uses different techniques such as printed reports, databases and digital images. These diverse (re)presentation modes are a synthesis of the archaeological fieldwork and the related research and interpretation. When the understanding of the archaeological excavation process and the details of the collected data are needed, one needs to be able to utilise the digital data collection as a whole. If the amount of data is considerable and dispersed in separate documents or files, the utilisation of the data is likely to be difficult, even when the content is organised. The local case example in question is part of ongoing dissertation research. The examination has three aims: (1) to collect and synthesise the preconditions, recommendations and experiences related to digital archaeological excavation data from various sources; (2) to study and analyse a free and open source archaeological data management software; and (3) to analyse a local and mostly digitised archaeological data collection in the light of the synthesised generic requirements and the data management software analysed, and vice versa (i.e., the requirements the local digital data collection sets to the software). In the article, general results of the previous examination are discussed. Overall, an organised digital data collection is a basic component necessary in the development of archaeological digital infrastructures. Therefore, the nature of archaeological local data collections needs to be studied.

Keywords: digital data management, software products, excavation

Introduction

International archaeological publications such as scientific articles, edited books and newsletters often state that archaeological data collections are complex and challenging due to the varying country-specific set-ups, the used methods and interpretative nature of archaeological research. Therefore, for example, data organisation and management can prove to be difficult. This affects scenarios when the aim is to enhance the interoperability, preservation, accessibility, sharing and re-use capabilities of data collections for the future both in paper-based and in digital format (see e.g., CARROLL, 2010; DUNN, 2009, 2011; KANSA, WHITCHER KANSA & WATRALL, 2011; MCMANAMON & KINTIGH, 2010; MCMANAMON, STOUT & BARNES, 2010; RICHARDS, 2010; RICHARDS, NIVEN & JEFFREY, 2013; SNOW et al., 2006; THWAITES, 2013). Previous research has found the practices related to archaeological information problematic also in Finland (HUVILA, 2006; UOTILA, & HUVILA 2012). Furthermore, the complexity of local archaeological data

collections have proven to be true during this ongoing dissertation research (OIKARINEN & KORTELAINEN, 2013) focused on developing the production of digital data collections in Finland, especially in the context of historical archaeological excavations. It is relevant to research these kinds of data collections and practices because the amount of rescue excavations and related data collections in Finland has increased in historical valuable city centres in the last fifteen years. This is due to the inventory project of the national archaeological authority in Finland, the National Board of Antiquities (NBA) (Museovirasto, N/D), and I have experienced this overall progress while working as a field manager in several rescue excavation projects for the NBA (see e.g., OIKARINEN, 2009; 2011).

Database management systems are used to organise, archive and publish archaeological data collections (LABRADOR, 2012, p. 236). However, today archaeological requirements for these systems are constantly changing and becoming more complex due to the increasing use of technologies, software products, the amount of digital data and the possibilities for access and openness created by the Internet. This is especially the case when the goals of an organisation go beyond data collection (see e.g., BECK & NEYLON, 2012; DUNN, 2011; KANSA, WHITCHER KANSA & WATRALL, 2011; LABRADOR, 2012; LAKE 2012; MORGAN & EVE, 2012; RICHARDS, NIVEN & JEFFREY, 2013). This article focuses on the processing and organisation of digital data collections, which may include both born-digital or digitised data sets. The term “archaeological data collection” refers to digital data collection of the previous kinds.

To demonstrate and compare the peculiarities, conventions and challenges in current archaeological digital data production in excavations in one local context with one established example in a global context, I have examined free and open source software products (i.e., in which the source code of the software is also available to developers (OPEN SOURCE INITIATIVE, N/D). These products are mainly used for managing and disseminating UK-based archaeological data collections. I have compared these software products in general to Finnish data collections and their guidelines. My aim was to search for free software products for the processing and management of archaeological digital data collections, which are used for organising data collections in which stratigraphic relationships of strata and archaeological remains are documented according to HARRIS’s 1979 method (1989). This is also the general excavation method used in documenting in the context of historical archaeological excavations in Finland. The aim was to have an overview of software products (from an archaeologist’s viewpoint) and to examine whether the examined software solutions could be deployed (out-of-the-box) in the local excavation context.

The general results of the comparison may be used to consider challenges in developing both archaeological country-specific and further multi-national infrastructures, such as various methods and traditions in digital data collecting, processing and data managing practises. Local digital data collections demonstrate their context-dependencies, which should be acknowledged when researching the nature of data collections for different purposes. Ultimately, an organised digital data collection is a basic necessary component in the development of archaeological digital infrastructures. Therefore, the nature of archaeological local data collections needs to be studied. The content of this article is organised as follows: in the next section, I will describe the research approach and context. Then, I will discuss the aim of the overview and the current international guidelines for and experiences of archaeological digital data management. Next, I will outline the examination of software products, its results and the comparison of the local principles of data collections. Finally, I will consider certain activities needed to develop local digital data related practices.

Research Approach

To describe the used approach briefly, the field of archaeology is examined by using interdisciplinary approaches that are based on the theories and concepts from the following: socio-technical information systems research (ISR) (TILSON, LYYTINEN & SØRELSEN, 2010) and science and technology studies (STS) (STAR LEIGH & RUHDELER, 1994; 1996; EDWARDS et al., 2007). The analysis also takes into consideration the information-oriented perspective at a general level; however, an archaeological viewpoint is combined with previous approaches. The general focus of the study is on archaeological (digital) data collections as local and global processes specifically in the context of archaeological excavation. The research examines the relation between archaeological practices and data at the beginning of eScience era (OIKARINEN, 2013). This development has been noted in the field of archaeology (e.g., GIDDING et al., 2011; PETROVIC et al., 2011).

Jim Gray (2007) described eScience as a fourth paradigm for scientific research (HEY, TANSLEY & TOLLE, 2009), in which "data-intensivity" and digital "data deluge" has been a dynamic force in new scientific findings (HEY & TREFETHEN, 2003). The reason for this change is an increasing amount of low-cost technologies (and software products) and digital data itself. In humanities and social sciences in the US, eScience is understood as a cyberinfrastructure, which is:

> *The layer of information, expertise, standards, policies, tools, and services that are shared broadly across communities of inquiry but developed for specific scholarly purposes (ACLS 2006, p. 1).*

It has, therefore, a basis on existent research infrastructures and practices of scholarship developed by scholars over centuries. Today, it has been extended and analogued "in the digital realm" (ACLS 2014). The basis for these large-scale and long-term efforts in cooperation between researchers and diverse data at a global level is enhanced by the Internet. Depending on the context, the used concept varies but the definition of socio-technical information infrastructure is derived from STAR LEIGH and RUHDELER (1994; 1996), which has been lately verbalised as an evolution of digital infrastructures in ISR (TILSON, LYYTINEN & SØRELSEN, 2010). Recent overviews of the evolution of research infrastructures in archaeology are offered by GAFFNEY (2008), HUGHES (2008) and RICHARDS, NIVEN and JEFFREY (2013), as well as many presentations in the session on The Cultural Heritage and New Technologies Conference 18 in Vienna 2013, which was organised by the European Archaeological Infrastructure Project ARIADNE (2012).

Infrastructure projects and their requirements and evolution in archaeology have some characteristics in line with the concept of "local universality" described in TIMMERMANS and BERG (1997). According to TIMMERMANS and BERG (1997, p. 273-297), the shared procedures and goals have the capability to evolve to ever-evolving recommendations or even standards that originate from the practices of diverse groups, existing institutions, infrastructures and material relations—from diversity, which can be even chaotic. Moreover, this kind of complex network questions itself, negotiates diverse interests and re-creates itself; it is never controlled (TIMMERMANS & BERG, 1997, p. 273-297). Also, the developments of archaeological practices as shared guidelines must be based on the local practices to be accepted (EITELJORG, 2004 cited in DUNN, 2011, p. 97). Simultaneously, these developments usually share some wide, or even universal, archaeological goals. In archaeology, there are no global standards related to digital data collections yet. Instead, characteristics of local universality can be recognised in shared archaeological

guidelines, in the evolution of archaeological infrastructures, or in cultural heritage documentation standards, which are used also to some extent in archaeology such as Cidoc Conceptual Reference Model (2013).

Aims of the Case Example

Research excavations represent the fieldwork that uses the most modern technologies and software products (such as data collecting, processing, organisation, analysis and management systems) (LEVY et al., 2010; CH'NG et al., 2011). Furthermore, the production of digital and digitised archaeological data is ongoing all the time. For these reasons, it is necessary to know how these systems can be made available or adjustable to all archaeologists. Thus, the case example presented here is actually a part of development or design process at the most initial level in the development of local (Finnish) archaeological excavation digital data-related practises.

The main purpose of this research work is the examination of free and open source software products (in which the source code of the software is available to and open for developers) (OPEN SOURCE INITIATIVE, N/D), which are mainly used for managing and disseminating UK-based archaeological data collections, and the comparison of these software products with Finnish data collection methods and their guidelines. The software products represent an example of applications that are in active use in the UK, and they can be seen as an existing or a potential component for evolving digital infrastructures in the UK (and abroad).

Local research processes in archaeology need organisation at a grass roots level because one needs to be able to utilise the digital data collection as a whole to understand the excavation process and the details of the collected data. If the amount of data is considerable and dispersed in separate documents or files, the utilisation of the data is likely to be difficult, even when the content is organised. Moreover, access to digital data collections is a challenge. Consequently, the nature of local data collections, excavation (work) practices and the related archaeological interpretation process during the post-processing of data collections need to be analysed and to be un-black-boxed. These can be influenced by the technical and content requirements set by software products used for data processing and management (LABRADOR, 2012). The organisation of data in turn will create a basis for archaeological infrastructures. These use, for example, the technologies of conceptual solutions such as ontologies and related web-based technologies to generate machine-readable data used in web-based technological solutions (e.g., LABRADOR, 2012). Organisation of data at a local level is, however, a question to be solved on the basis of local needs and context. Nonetheless, examples given by existing digital practices and solutions for data organisation of data collections may support this process. However, generalisation of archaeological excavation practices and describing how data collections in these are formed is difficult. CANNATA (2011, p. 11, 32) has described archaeological tasks as non-routine tasks, a definition that derives from the uncertainty in excavation activities and from the fact that the division between data and information is not evident in excavations.

Recommendations for Digital Practices in Archaeological Excavations

To my knowledge, for the English-speaking archaeologists, there is currently only one set of guidelines for digital practices by the Archaeological Data Service in the UK and the Digital Antiquity in the US. The “Guides to Good Practice” (ADS & tDAR, 2013), expresses the fundamental principle:

> *Any digital data produced from archaeological investigation should be managed and archived in a digital format…digital archiving also preserves the functionality of complex datasets* (ADS & tDAR, 2013).

However, digital data collections exist alongside paper-based data and artefact collections (ADS & tDAR, 2013). Previous guidelines concentrate on the principles of digital archiving and the preceding processes and necessities to guarantee its requirements, i.e., creating, managing and documenting digital data collections and preserving and guaranteeing access to digital collections. They do not focus on the digitizing of paper-based documents. The guidelines have a basis on their country-specific archaeological contexts, but the aim of the guidelines has been to provide globally suited instructions. Moreover, the guides to good practices introduce digital questions throughout the project's life cycle and continuing through to the demands of archiving (ADS & tDAR, 2013). In addition, project IANUS develops a national research data centre for archaeology and classical studies in Germany. The project has released a set of "recommendations for information technology" that address the exchange, long-term preservation, and reusability of digital research data (IANUS, 2014). Moreover, the IANUS website offers links to the guidelines from The German Archaeological Institute (DAI, 2011a, 2011b) and The Working Group Competence Center for Classical and Ancient Studies (ARBEITSGRUPPE KOMPETENZZENTRUM FÜR DIE ALTERTUMSWISSENSCHAFTEN, 2009) "for the application of information technology in archaeological research." Similar instructions may also exist in other languages. These kinds of pioneering guidelines could also be utilised when creating local digital guidelines to utilise the digital data collection as a whole, for the continuing curation and preservation processes and for improving accesses to the data collections. However, these guidelines do not give recommendations about software products suitable for collecting, processing and organising archaeological data collections.

Instead of repeating the digital and technical guidelines by ADS and tDAR (2013), or IANUS (2014), which are available on the websites, some collected experiences, recommendations and preconditions for digital archaeological excavation data are presented in this article. These are qualitative descriptions. Because of the limitations on space, I have selected just one group of them. A recent archaeological project focused on data practices, data-gathering, piloting of training and technical data management solutions in/for archaeology in the University of Southampton, UK using software products designed especially for and by archaeologists, and varieties of off-the-shelf software products (GRAEME, WHITE & WAKE, 2011). A previous project report provides relevant information on many aspects, and the shared experiences in it are suitable for many kinds of archaeological excavation projects using software products. The nature of archaeological research is described by GRAEME et al. (2011) as follows:

> *It mixes humanities and science research practices… includes very data-intensive research practices, producing large numbers of data objects, big data assets, and complex data transformations…commonly develops very complex i.e. 'short fat' rather than 'tall thin' data structures* (GRAEME et al., 2011, p. 1).

This remains true regardless of the size of the project. GRAEME et al. (2011, p. 2-9) share their notions of large-scale digital resource management and represent their synthesised recommendations and requirements, which could be utilised in planning other projects. In their experience, the flexibility and scalability of software product is necessary for archaeological processes. A single (monolithic) data

management infrastructure for archaeological excavations may constrain previous properties so they propose interlinking software solutions, which:

> *Offer[ed] flexibility with the accommodation of unforeseen needs and opportunities and enable[d] continuing development and adoption of new technologies, whilst allowing users to interact with data in ways that suited them and the tasks in hand*…and… *to integrate them alongside into a single flexible workflow* (GRAEME et al., 2011, p. 3).

They also recommend embracing the:

> *Freedom to employ both proprietary and open formats, and both commercial and open-source software* (GRAEME et al., 2011, p. 3).

GRAEME et al. emphasize the need for assured sustainability to use standards during every stage of a project and in setting up a digital repository. The use of metadata standards is necessary to create long-term access to data collections. They have produced their own three-layer metadata model, which covers both flexible and rigid software products, and they plan to create a strategy for metadata and a technological infrastructure for this specific institutional context (GRAEME et al., 2011, p. 3). Existent content management systems (such as ARK, IADB, Intrasis, EPrints, Sharepoint) are experienced as providing:

> *Well developed mechanisms for managing fieldwork information, but remain less well suited to the complex and heterogeneous asset archives that accompany and must interlink with them…*moreover…*the greatest challenge remains keeping track at a coarse level of data created in research practice and managing these resources for the long term*…and…*the ideal would be for all data to be seamlessly cross-referenceable (*GRAEME et al., 2011, p. 3-4).

When combining archaeological research and computers, the flexibility to experiment is crucial (GRAEME et al., 2011, p. 3). Previous experiences describe the continuous change and development of archaeological requirements for both practices and related software products and technologies. There is an ever-growing need for more suitable technologies and software solutions, which may have further effects on existing or evolution of local archaeological infrastructure(s). However, flexibility is needed in many types of excavations, although in research excavations digital practices have more possibilities to be developed.

An Overview of Software Products and Peculiarities of Local Archaeological Data Collections

I was interested to see what kinds of free software products are available for archaeological data management. Because of financial constraints, commercial or non-free/proprietary software products for the excavation management were not possible to examine. In this article the concept of commercial software is avoided because both free (open source source) and proprietary software products can be used for commercial purposes. Proprietary software products typically have licenced ownership and a closed source code. When searching for free software products, the available options were so-called free and open source software products (OPEN SOURCE INITIATIVE, N/D.) Previous concepts refer to software products, which are not just free to use, but also free to be modified and shared, i.e., the source code is open to be accessed and to be changed (for archaeology see e.g., DUCKE, 2012, p. 572-573). DUCKE (2012) highlights one the benefits of free and open source software for archaeological scientific practice, which is the transparency of

the source code. He also notes that free and open source software developer communities have produced successful software products, which are both commercially and voluntarily developed (DUCKE 2012, p. 573). According to NICHOLS and TWINDALE (2003) the reverse side is that open source software products are often complicated to use and developer skills are often necessary to set up and administer them. Other problems are the lack of maintenance, documentation or usability (NICHOLS & TWINDALE, 2003; see also NIELSEN, 1994). Moreover, open source software products can lead to costs if the user needs to pay for the set-up, customisation or maintenance. Therefore, for the average user, it may be reasonable to research costs of proprietary or tailored software products.

The aim of the analysis was to have an overview of the selected software products. This was done by setting up the software and studying the documentation and demos if available. These software products were: IADB (Integrated Archaeological Database), which is currently used by UK-based archaeological institutions research projects in the UK and abroad and developed by many people and institutions since the 1980s (IADB, 2011; LOCK, 2003, p. 78-123; RAINS, 2011); and ARK (Archaeological Recording Kit) (2013a) developed by L-P Archaeology (London), which is used in the UK and abroad. These software solutions can be broadly characterised as typical web-based information systems – relying on server relying on Internet technologies, hypertext principles and database backends – and aimed to be used through web browser interface instead of installing the system as a desktop application. Both systems were developed by archaeologists. As web-based systems, they have some technical similarities: both store data in a relational database. The source code of these applications is written by using PHP and JavaScript languages, and the server platform used is the free Apache web server (see technical specifications of ARK (2013a) and IADB (2011)). All of these technologies are widely used in the context of web applications. PHP (Hypertext Preprocessor) is a scripting language used for creating dynamic web pages from server-side (e.g., PHP GROUP, 2014). JavaScript is a scripting language used mainly for client-side web programming (e.g., MOZILLA DEVELOPER NETWORK, 2013). In addition to ARK and IADB, HEURIST (2014) developed at the Arts eResearch in the University of Sydney is a software product that can be used to create databases and interlink data collections for researchers in humanities. In 2014, the Heurist website informed users about plans to develop downloadable data models for archaeological and historical data. The potential of Heurist for organising existing local digital data collections could be further analysed in the future.
Both ARK and IADB were created to manage, disseminate, and archive data collections according to UK-based archaeological practices. The technological term used by IADB (2011) for these collections is “project resource”. A project resource consists of the data resources of a specific archaeological project and also the connections (links) between those data resources. Data resources and connections are stored in project-specific databases. IADB categorises data resources into finds, contexts, sets, groups, phases, objects, images, illustrations, structure diagrams, documents, and bibliographic references. These resources can be created either internally by the system or externally, in which case the resource files are uploaded to the system for viewing or data-editing (IADB, 2011). The aforementioned categorisation of the data resources is based on the methods of documentation of stratigraphic excavations in the UK (MUSEUM OF LONDON ARCHAEOLOGY (MOLAS, 1994)). However, both IADB and ARK are designed to be customised, which is an advantage if the context of use, for example organisational or national context, and consequently the

requirements for the system, are changed. The current IADB website contains a product demonstration and documentation about the IADB. I requested and obtained the setup file for this dissertation work. In addition to the demonstration and documentation about the IADB, the website offered enough information for a first-time setup. Of the two systems, ARK is very flexible and intended to be heavily customised. ARK can also be extended to various types of needs (ARK, 2013a), but preconfigured modules are available for excavation data management following the standards of MOLAS (1994) and a documenting method common in Italy (ARK, 2013b). Because ARK is designed to be customised, the setup and configuration of version 1.0 was challenging for the analysis as the aim was to get an overview of the system. In general, ARK has been used in excavation data management (e.g., MORGAN & EVE, 2012) and for the web-based dissemination of geographically dispersed data collections and archaeological projects (FASTI ONLINE, 2013). ARK has been customised by its original developers in both these cases, which is probably the most convenient way to utilise ARK because getting to know to the complex system is demanding and the guidelines do not always keep up with the latest developments. In the US, however, ARK has been developed further to meet the requirements of long-term preservation such as metadata to improve the access to managed digital data collections (WALLING & ESTEVA, 2011). The roughly pre-setup and pre-configured UK-module offered some information about its potential as a data management tool for a Finnish excavation context.

Based on testing, for software products to be effectively used for managing data in the compared local (i.e., Finnish), archaeological context, they would need extensive customisation. As a general rule, when the practices of a local context are implemented as an information system, the system is not likely to be optimally usable in other contexts, provided the practices are not identical. In the case presented here the major obstacle of using an UK-based information system in its default configuration in Finnish context lies in the fact that the methods of excavation and documentation in Finland (MUSEOVIRASTO, 2012; 2014) are different from the UK, and the documented archaeological units do not correspond to those, which are standard in the UK (MOLAS, 1994). The archaeological units used in the UK are heavily reflected in the design and user interfaces of both ARK and IADB. E.g., some of the data resource types required by IADB, such as contexts, sets, groups, phases and objects, do not exist (i.e., are not defined by the national guidelines (NBA, 2012; 2014)) in the Finnish context. In principle, both the systems analysed would allow a minimal use of storing simple (e.g., image and text) files, but because of the heavily interlinked nature of the archaeological data the non-existing types would prevent any kind of effective use. Further, even for those types that are common to both the UK and Finland there are various differences in the internal structures of the data resource types. These differences would require tailoring of both the database backend and the user interface (e.g., form fields). Moreover, IADB only supports the UK's coordinate system. Support of the Finnish system and resource types requires modification to both the PHP source code and the database content. As for the uploadable files, both the examined systems support the most common image and text file formats and PDF documents. However, some file formats commonly used in the Finnish context (e.g., Microsoft Access databases) are not directly supported by either ARK or IADB. Further context-dependent variations, such as user interface language and terminological differences related to archaeological material, also exist. It should also be noted, that the current Finnish archaeological units recorded during excavation projects are not only structured differently to the UK ones, but furthermore these units vary from excavation to excavation within Finland (see below).

The abovementioned tailoring of the systems would probably need the cooperation of the original developers. Several modifications to configuration files are needed before the actual setup so these applications do not work out of the box. The most important result of the testing is the increased understanding that the local deployment of these (or any) software solutions would require. This involves gathering the user requirements (and institutional requirements), obtaining more detailed information on current archaeological excavation and documenting practises as well as management of digital data collections. It is not clear how digital data collections are taking shape in the local context. In Finland, excavations are subjects to licencing by the NBA but national guidelines and qualitative criteria (MUSEOVIRASTO, 2012; 2014) for Finnish archaeological field studies do not yet take a detailed stance on the specific questions of digital data collections or the technologies and software products used in archaeology. If these kinds of practices were developed, a need for information on varying practices and related aids, such as excavation sheets would arise. It would then be possible to create for example metadata for archaeological practices. However, they should fulfil the requirements of flexibility and possibility to express exceptions (LABRADOR, 2012, p. 239-246).

The aforementioned complexity is heightened by the fact that in Finland there are at least two widely used and traditional documenting methods, one for prehistoric sites (i.e., the excavation of sites in spits or arbitrary levels) and one for urban archaeological sites (i.e., the excavation of sites in stratigraphic units), and there are different kinds of applications in these methods (e.g., MUSEOVIRASTO, 2014). In Finland, traditional archaeological documenting methods are used in combination with modern technologies. Data collections include both digitised data and born-digital data, but digitised documents probably prevail, at least in rescue excavations in the context of historical archaeology; the digital guidelines would need to consider both of these existent practices. Printed reports are also required. Therefore, local conventions have an effect on the formation of digital data collections and the utilisation of software products, for example, configuring web-based archaeological information systems that can be used to create a customised user interface for a database. A flexible approach (the combination of free and proprietary software products) such as recommended by GRAEME et al. (2011) could be a suitable option for this local context. However, implementing a flexible approach would require more detailed digital guidelines or standards. In Finland, an ongoing project, the Museum2015 led by the NBA (2013) aims to standardise practices and collection management in museums. The Museum2015 is cooperating the project National Digital Library that is developing interface for participating libraries, museum and archives and their collections (NBA, 2013). However, I do not know whether these projects will create guidelines for digital practices in archaeology or if previous questions are being developed in other current projects in Finland.

Conclusion

The brief analysis of selected free and open source archaeological software products, which in this case were web-based information systems, was carried out in order to examine their customisation possibilities and to understand how they could be used for organisation of digital data collections in a country-specific context of archaeological excavations. The aim of this article was also to consider the specific excavation-based country-specific questions of managing archaeological excavation data collections, which in turn, if

solved in the country-specific context, would create a basis for wider combining of disparate data collections and even multinational archaeological infrastructures.

The examined software products would need extensive customisation, if wanted to be deployed in the discussed country-specific and method-specific context. However, it is not clear how digital data collections are taking shape in the local context. Local-level digital data collections complexities, even when analysing a single data collection from software-oriented viewpoint, are all based on local archaeological practices. A shared local or contextualised “digital toolkit” for archaeologists would aid them in following current international recommendations in digital practices. That would also support the goal of combining diverse data collections by using web-based technologies. From an interdisciplinary infrastructure-oriented viewpoint, the field of archaeology has characteristics of local universality, i.e., archaeologists have shared global goals and methods that are sometimes practiced differently in different geographic locations. Therefore, archaeological digital data collections have the potential to become a part of larger digital infrastructures at both local and international levels if digital questions are discussed and practices are developed. Furthermore, there may be a need for advertisement of archaeological infrastructures among archaeologists. Archaeologists should be more aware of the reasons, purposes and possibilities of the organisation of digital data (i.e., how to share, access, preserve and re-use data), and of the “tools” such as metadata available for doing so. More education would help, particularly on digital data-related questions and IT-skills. In the Finnish context, there is a need for archaeological language specific terminological solutions, local specific digital guidelines and software products to organise data, which ideally would be easy to use and cost-efficient. Moreover, not all archaeologists have IT expertise; therefore, software solutions used for data management and customisation must be designed to be as user-friendly as possible. This requirement also applies to all the related solutions (technical or conceptual) needed to improve access to data collections.

The use of technology and software products varies from country to country and from archaeologist to archaeologist. Collected information and shared digital practices are necessary. It is not only tested and reliable tools, but also related experiences and practices regarding to organisation of archaeological data collections that need to be shared at local levels. Reliability and conformity to current practices, as well as user-friendliness, are also necessary in, for example, strictly scheduled rescue excavations, which need to be adjustable to quickly changing situations and conditions. All digital data collections should be able to respond to future needs. Digital technologies are not just about promises; they are also facing challenges both in the design and the use of them. Besides the existing goals and services heading to multinational infrastructures, current international digital knowledge is also valuable for archaeologists aiming to deploy software solutions or develop local organisation of data collections.

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