Digital Heritage & Archaeology in Practice

(co-)Creating a Sustainable Platform for Finland's Archaeological Chance Finds: The Story of SuALT

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Abstract

As is the case with several north and west European countries, Finland's legislation allows for the hobbyist discovery of archaeological material, most commonly through metal detecting. Following in the footsteps of such countries as England and Wales with the Portable Antiquities Scheme (PAS), the Netherlands with Portable Antiquities of the Netherlands (PAN), MEDEA in Flanders (Belgium), and DIME in Denmark, Finland is also developing a linked open data finds database to record and disseminate the archaeological information that comes from these non-professional activities. This approach is based upon philosophies of citizen science and participatory research, and considers the democratization of archaeology as a central goal.

The interdisciplinary and multi-organizational research team charged with building SuALT (*Suomen arkeologisten löytöjen linkitetty avoin tietokanta/ The Finnish Archaeological Finds Recording Linked Open Database*) face several challenges in their effort to create the database in an effective way. Firstly, it is essential that all potential users, from metal detecting enthusiasts through to academic researchers in Finland and abroad, have the chance to be heard throughout the development process, and that their hopes and concerns are confronted and solved wherever possible. Secondly, it is important that on an operational level the new database is compatible with existing digital archives and resources within Finland and across Europe. Thirdly, the team must be mindful of ethical considerations concerning how best to share the data without jeopardizing archaeological heritage or disregarding user wishes, such as the right to anonymity. Finally, the team – based across three different institutions and with varied disciplinary backgrounds – have had to find ways to work collaboratively and communicatively, even across ontological boundaries.

In this chapter we document the process of developing SuALT, paying particular attention to public and community engagement challenges, working with digital data, and professional ethics.

Introduction

In this chapter we document our experiences to date with the development of SuALT - the Finnish Archaeological Finds Recording Linked Open Database (in Finnish, *Suomen arkeologisten löytöjen linkitetty avoin tietokanta*). The project combines specialisms from different disciplines such as archaeology, semantic computing, cultural heritage studies and archaeological heritage management. Inspired by similar initiatives in other parts of northern Europe, such as the Portable Antiquities Scheme in England and Wales (PAS - https://finds.org.uk/), Portable Antiquities of the Netherlands (PAN - https://www.portable-antiquities.nl/pan/#/public), DIME in Denmark (https://www.metaldetektorfund.dk), and the MEDEA project in Flanders, Belgium (https://medea.weopendata.com/), SuALT nonetheless is not simply an 'off-the-shelf' replica of these other projects. For this still developing infrastructure to succeed and be sustainable, it must recognize and respond to conditions that are specific to Finnish cultural heritage and society. These include the legislative backdrop, but also the various different communities in Finland with an interest in the archaeological heritage and how it is managed.

SuALT is a collaborative project with funding from the Academy of Finland; Finland's main research council for academic research grants. SuALT is what is known in the Academy's funding categories as a consortium project, with project team members working in three sub-projects, each led by a different organization. Hence, the University of Helsinki's Department of Cultures is responsible for one part of the project, the Semantic Computing Group at Aalto University (http://seco.cs.aalto.fi) along with HELDIG - the Helsinki Centre for Digital Humanities, University of Helsinki (http://heldig.fi), for a second part, and the Finnish Heritage Agency (*Museovirasto* in Finnish) for the third component. As a whole, the team thus consists of specialists from a range of backgrounds including semantic computing, artefact curation, cultural heritage studies and archaeology.

Following a brief overview of the law and current procedures in Finland, we outline the challenges that SuALT faces in engaging different communities and the wider public (and how we are addressing these challenges). We reflect on the digital data with which the project works, and finally discuss the ethical issues and questions that SuALT brings to the fore. These professional ethics have implications not only for SuALT but for other projects that may try to cooperate with different interest groups, including those such as metal detectorists, that are still eyed with suspicion by some sectors of the professional archaeological community.

The heritage legislation of Finland can be described as 'liberal' (cf. Deckers et al 2018, 325-326) in the sense that public discovery of and physical interaction with removable archaeological artifacts is permitted, albeit with certain restrictions. As Wessman, Koivisto and Thomas outlined, the key regulations concerning in Finland can be described as follows:

> In Finland, the use of a metal detector is usually allowed without a separate permit provided that the detectorist does not interfere with a scheduled (protected)

> archaeological site or monument. It is regulated primarily by the Antiquities Act (1963), but also the Lost Property Act (1988) and the Nature Conservation Act (1996). As long as the detectorists have permission from the landowner they can detect on private land such as forests and fields. With the public right of access (Ministry of Environment 2013) in Finland, one is allowed to walk on private land but in order to actually dig one needs a permit from the landowner and where applicable also the tenant farmer.
>
> (Wessman, Koivisto and Thomas 2016, 86)

The key organization for heritage management in Finland, and the authority to whom detectorists and other finders of archaeological artifacts must report their discoveries, is the Finnish Heritage Agency. In some regions, in practice, provincial museums often act as mediators and will handle reported artefacts, especially if they have trained archaeologists among their staff (Wessman, Koivisto and Thomas 2016, 87). Finnish law forbids unauthorised metal detecting on known archaeological sites, and once an archaeological feature is discovered, it is automatically protected from interference or removal (Antiquities Act 295/1963).

Public and community engagement challenges

One of the most important challenges for SuALT is that it is successful in engaging the public in its work, especially hobbyist metal detectorists, who we anticipate will make the majority of reportable discoveries. Metal detecting is a growing hobby in Finland, and likely represents the majority of avocational hobbyists that are physically engaging with archaeological material. As in other countries, the relationship between archaeologists and metal detectorists in Finland has not been without its controversy. Occasional instances of site looting or other irresponsible behavior, such as the appearance of unprovenanced objects likely from cremation sites online in 2009 (Wessman 2010, 18), and incidences of illicit metal detecting at Iron Age hillforts such as Hakoinen and Rapola (Immonen and Kinnunen 2017, 168; see also Rohiola 2014, 18) have no doubt clouded the reputation of the metal detecting hobby for at least some archaeologists. The latest prominent case of illicit metal detecting, which happened at the medieval Raseborg Castle in southern Finland (see Knuutinen 2017), initiated police investigations and gained notable attention from the media. To avoid a risk of a false reputation put blame on the whole community, the Finnish Metal detecting Association (fi. Suomen Metallinetsijät ry.) started collecting a reward to offer to denunciation of felons (Ilta-Sanomat, 2.12.2017). In general, the recorded cases of looting or illicit trade of ancient objects is still low when compared to Finland's neighbouring countries (Maaranen 2016, 278).

Another important goal is to for the Finland's professional archaeological community to accept SuALT as both a repository of research-worthy data and as a place to guide public enquiries about reporting finds. Although the Finnish Heritage Agency will have primary responsibility for the resource once the project completes after 2021, it is important that SuALT is known to, and used by, archaeologists who are also based in other institutions such as university departments and museums, as well as independent researchers and freelancers. According to our surveys

and ongoing interviews, there is a lot of interest among archaeologists and researchers in this database but also an interest to participate in validating and interpreting finds (Wessman et al. forthcoming). The fact that the database will be in the hands of the Finnish Heritage Agency in the future might also affect how some of the metal detectorists use the database, since there is the risk that they might feel that it is first and foremost an administrative tool and perhaps not user-friendly enough. Hence, a lot of our work is focused on reaching out to this community, and on making sure even at prototype stages that we take on board feedback to ensure that the final resource is both user-friendly and trusted.

Figure 1: In Finland metal detecting happens on fields or pastoral land but it has become more common to search also in forested areas, which are seen as more undisturbed and thus valuable. Photo: Anna Wessman.

Metal detecting became a popular hobby during the 2010s in Finland (Rohiola 2014). There are probably several reasons for this, ranging from a common interest in prehistory and history among the community to a wish to help and work with archaeologists. For some, a motivation might also be an wish for economic gain (Thomas et al. 2015; Maaranen 2016; Immonen and Kinnunen 2017). However, it has been documented that people also get drawn into the hobby due to media attention of certain specific finds. Studies has shown that people become motivated to search for their local history after they learn that this is possible with the help of a technical device (Wessman forthcoming). In the SuALT project's 2018 questionnaire survey, the majority of the metal detectorist community respondents felt that the biggest motivation for taking the SuALT database into use is a need to 'do the right thing' by reporting their finds. They also frequently noted a wish to get feedback on their finds from the authorities. The social aspect of interaction with professional archaeologists is therefore a big motivational factor.

Some previous studies based on survey data have shown that there seems to be controversy between archaeologists and hobbyists concerning the scientific value of metal detector finds. While metal detectorists believe that they are rescuing history from the plough machines, and that their finds are in fact changing history, archaeologists often feel that the hobbyists are destroying the archaeological contexts by removing objects from their original locations (Maaranen 2016, 277). This might be true when it comes to finds discovered in untouched contexts, such as in the forested areas where metal detectorists may accidentally dig into inhumation burials for example, but until now the majority of finds come from cultivated areas where the contexts are already disturbed (see also Lewis 2016 for discussion of metal-detected finds from the plough-zone in England and Wales). Nonetheless, this an important controversy in the values held towards metal detecting as a prospecting method. It also reflects the limited knowledge amongst the archaeologist regarding the nature of this hobby (an issue elsewhere, not only Finland). Since Finland has not had a database like this before, and at present the information about the finds and their locations is still difficult to access, many archaeologist are not yet aware of the potential of these types of finds in scientific research, even though some research has already been conducted (cf. Wessman 2016; Hakamäki and Anttonen 2017). The Portable Antiquities Scheme in England and Wales has through the years proven with their over

600 research projects that metal detected objects are valuable also for archaeological research (Lewis 2007; Brindle 2013; Oksanen 2016).

Figure 2: A Viking Age round brooch (ca AD 1000) found by a metal detectorists in 2017. Photo: Anna Wessman.

Further challenges are related to the new archaeological sites, found by the metal detecting community. New-discovered reported through metal detecting sites are seldom excavated, which results in limited further information concerning their archaeological nature. This is an outcome of limited economic resources at the Finnish Heritage Agency and in Finnish local museums as a result of political decision making. Needless to say, this has provoked further complication between the archaeologists who often struggle with resourcing issues and would prefer some restrictions on the hobby on one hand, and the metal detecting community on the other hand, who according to our interviews might not understand that resourcing and research takes time, and thus may feel that the authorities are not responding fast enough to their demands.

Perhaps as a result of the issues above, metal detectorists do not currently report all their finds to the heritage authorities. The more recent objects, which are still over 100 years of age (and thus are legally required to be reported), are not reported because detectorists anticipate and believe that the Finnish Heritage Agency is not interested in these more modern finds. They are also aware of the fact that their hobby has resulted in the plast long queues for processing their finds at the Finnish Heritage Agency. As a result, the community of metal detectorists are self-censoring some of their finds in advance, assuming that they might not be of any interest to the researchers. This is of course not true and one reason for this behavior might actually be that the current way of reporting finds is seen as too time-consuming. It's probable that this problem will solve itself once SuALT is up and running, bringing with it a much more streamlined reporting process.

Another challenge for SuALT is that of expectations. SuALT is a four-year project, and in our original project proposal to the Academy of Finland we were very deliberate that each phase of development would be allocated plenty of time to iron out technical issues and check that the infrastructure remains fit for purpose. This entails liaison with other database managers, especially within the Finnish Heritage Agency. It also means that we would like potential future users - especially metal detectorists and archaeologists - to test out the software and give feedback at each stage to make sure that SuALT remains user-friendly and meets their expectations. However, our considered approach means that we are already failing one expectation - that of speed. We have already fielded queries from numerous metal detectorists hoping to see the database ready for use as soon as possible - with some expecting it to appear within weeks of hearing about it! In some ways this represents a 'teachable moment' to explain the research process and the care that is being put into 'getting it right', but we will inevitably also face disappointment that the project is taking so long - years, even.

As a partial remedy to this, we have an active blog and social media presence on Twitter and Facebook, through which we post research updates as well as sharing other relevant news, for example related to our 'cousin' projects elsewhere in Europe. We also give talks at different events aimed at diverse audiences, from archaeology students to metal detectorists, to digital humanists. In addition to a final project conference, we are discussing the possibility of having smaller public events in different parts of Finland at different points in the project, to allow people to hear about progress and to ask questions. Moreover, the project is currently interviewing future users of the database, in order to hear their opinions and wishes regarding the contents and privacy policy of the database and the functionalities of the user interface. In these discussions several opinions and views have come up, which the project can take into use already in this development phase.

The outcome of our SuALT questionnaire surveys and interviews so far, has resulted in a dilemma - whose wishes should we listen to and what should we do with suggestions that are not used or are in conflict with each other? This is a common issue for participatory approaches - that even communities with shared interests do not represent a homogenous group, with many contradictory opinions and values coming to the fore (see e.g. Dragouni, Fouseki and Georgantzis 2018 for discussion of these challenges in the context of participatory planning and heritage tourism). Even though we are a participatory project, we naturally also need to proceed with the developing phase of the database, which means that we have to make decisions that might not be pleasing to everyone. But if the outcome of the project is a database that is not accepted by our key stakeholders then there is a fear that it will not be used.

The solution to this dilemma lies in keeping up a constant dialogue with all the future users of the database throughout the development process, and in trying to acknowledge different opinions but also being honest about the fact that everybody's wishes might not come to fruition. Another possibility would be to persuade the, from the beginning, very active metal detectorist, who makes the majority of all finds in Finland, to get involved and record their finds into the SuALT scheme. Once these groups are using the database they will through their own actions also tempt other detectorists to use the database.

It's also important to acknowledge that metal detectorists might have different reasons for utilizing this database. For some, it might be a tool through which they can obtain status by exhibiting their own expertise in validating objects, while for others the social engagement through e.g. a chat forum is most valued. Therefore, the main question might be how much the metal detecting community will actually gain from joining the database and taking it into active use. If they feel that they do not gain anything new from this, then it might not be a tempting option and we risk that the do not record their finds data at all.

Working with digital data: SuALT Vision for Citizen Science

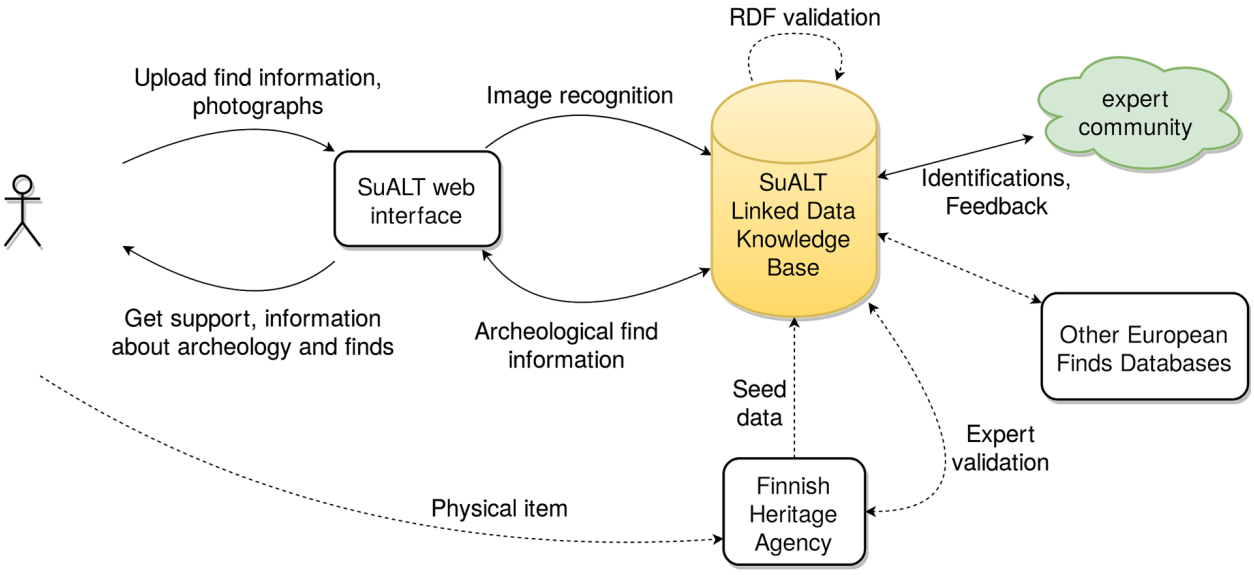

Figure 3 Overall process of reporting a find in SuALT. (use image file: figure_1.png)

In this section, we turn to the actual workflow of SuALT, and how its current development is progressing. The overall workflow of SuALT is depicted in Figure 3. The system facilitates the detectorist and other finders to upload finds both using a mobile at the site and afterwards using a PC. SuALT web interface is not only a passive web form to upload metadata about a find. Instead, it actively supports the user in this by actively suggesting annotations as well as information about archaeology and other objects in the linked finds databases. This includes not only different databases in Finland but also data repositories abroad through APIs and data linking on the web (Heath and Bizer, 2011). For example, there are finds related to Vikings in many databases in many countries from Britain to Nordic Countries.

Another novel idea within SuALT is that finds reporting should be part of a learning process about archaeology in citizen science. Our hypothesis, borne out by at least some of the survey and interview data is that learning will be a major motivator for the metal detectorists to use the system in the first place, and motivation is a key factor in getting the data collected since reporting is voluntary work (even if legislation requires it). By fostering learning, a major problem in this kind of citizen science systems, namely low quality of metadata, can also be addressed. This idea has been applied before, e.g., in the the field of collecting birding observations (Hyvönen et al., 2013).

The seed data in SuALT is the current finds database of the Finnish Heritage Agency. The project therefore started in a data-driven fashion by transforming the existing archaeological finds database of the Finnish Heritage Agency into Linked Data (Heath and Bizer, 2011). In order to get better view of the data available, the data was published in a SPARQL endpoint on top of which a semantic faceted search engine and browser was created using the Faceter tool (Koho et al., 2016). Figure 4 depicts the user interface of the system. The facets on the left are specification of find place, object type, municipality, province, time period, and main material (two first facet are visible in the screenshot). On the left, a hit list of objects corresponding to the

facet selection is shown. Each row corresponds to a find, whose images are seen on the last visible column on the right. After each filtering selection the hit numbers of categories in all facets are recalculated so that the user cannot not end up in making a filter selection leading to no hits.

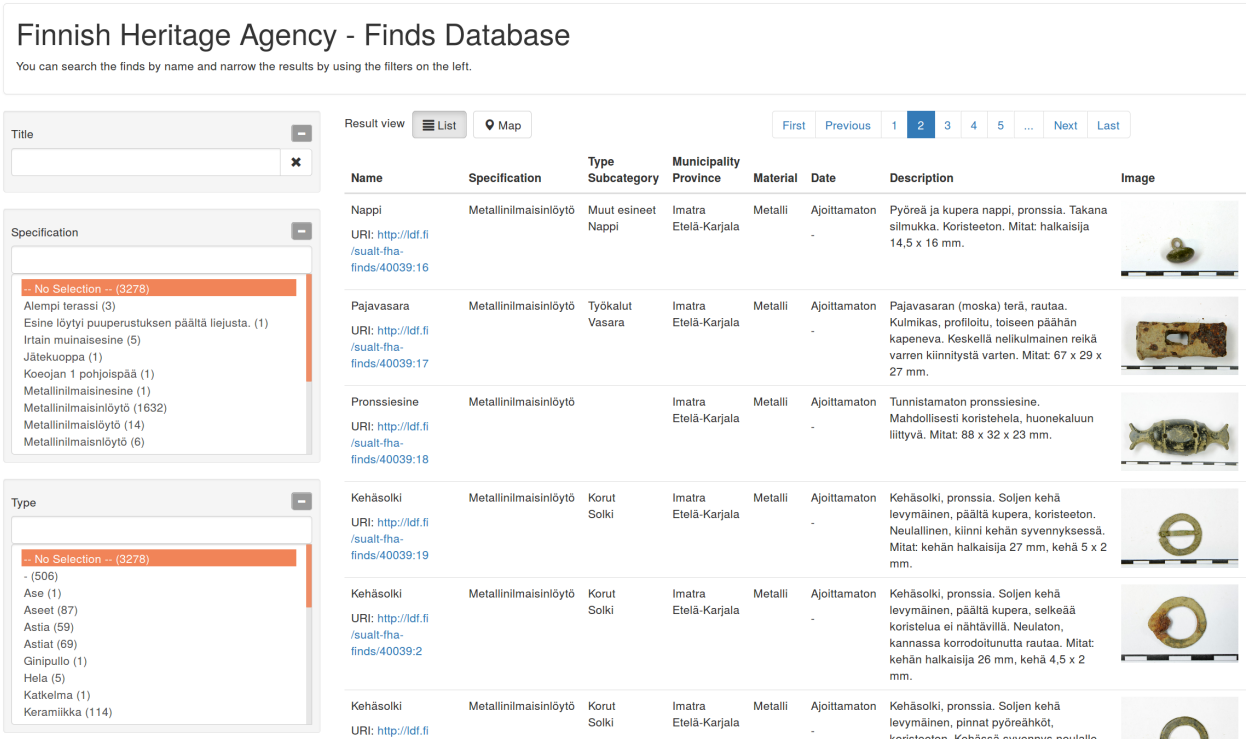

Figure 4. Faceted user interface of Finnish finds database. (use image file: figure_2.png)

The underlying data is essentially tabular, with a find in each row. The column values correspond to the facets (e.g., material and geographical municipality) with some additional attribute information about the find, such as the image. Each find is represented as an instance of the class Find, and each column value, such as material, is represented as an RDF property of the find instance.

Using this system makes studying the data possible in an easy way and the system also shows many challenges of the underlying metadata. For example, values in the facets show that different finds have not necessarily been described in a systematic way but different vocabularies have been used, possibly by different catalogers.

The filtered finds can also be visualized on maps in order to study their distribution (cf. Figure 5). By clicking on a marker, the finds from the corresponding place can be studied.

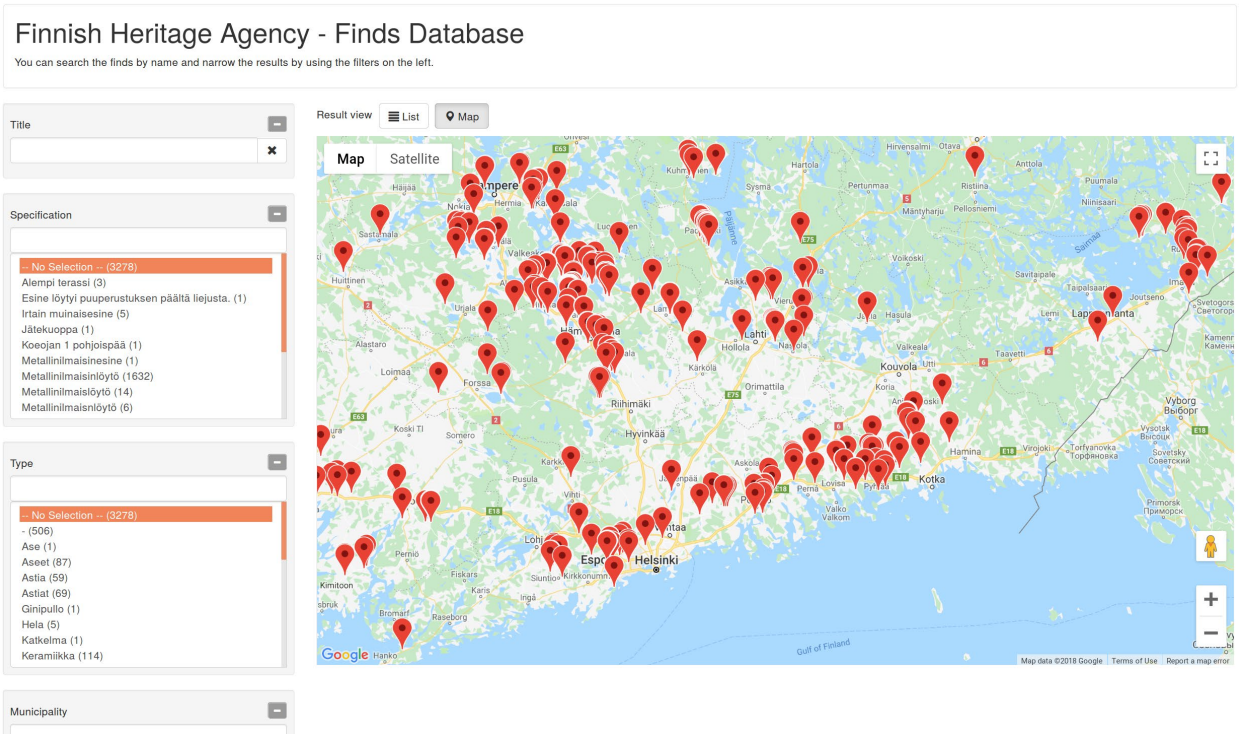

Figure 5. Faceted user interface of Finnish finds database. (use image file: figure_3.png)

Each concept in each facet was given a unique, language independent identifier, i.e. a URI, as is customary in Semantic Web systems. These concepts can be organized into hierarchical domain ontologies using an ontology editor, such as Protege (https://protege.stanford.edu/). The ontologies define the semantics of the concepts in a machine understandable way, can be used for searching and categorising finds in general terms. For example, the material concept Metal has subtypes, such as Bronze, Gold etc. This hierarchy is useful when searching for metal finds of different kinds or when doing data analysis of finds made of different kind of materials.

Our goal in a larger perspective is that this kind of domain ontologies gradually grow to form an ontology infrastructure that can then be shared between different archaeology-related databases in Finland and beyond. By mapping the infrastructure onto international vocabularies, such as British Museum/MDA thesaurus of archaeological object terms, used in the British Museum and PAS (https://finds.org.uk/datalabs/terminology/objects), Geonames (https://www.geonames.org/), Art and Architecture Thesaurus (AAT) and Thesaurus of Geographical Names TGN) of the Getty Research Institute (http://www.getty.edu/research/tools/vocabularies/), semantic interoperability between archaeological databases in different countries can be fostered.

A key goal of using the Linked Data approach is to enrich the data 1) by linking it with additional related data sources and 2) by logical reasoning based of the well-defined semantics of Semantic Web standards (https://www.w3.org/standards/semanticweb/) (Hyvönen, 2012). On top of the enriched linked data, end user interfaces will be built to support information needs of different user groups in Figure 3:

1. metal detectorist for sharing their finds data and for learning from each other and actual finds databases,
2. data curators of the finds database in the Finnish Heritage Agency, and
3. researchers of Digital Humanities, artefact studies, and archaeology analyzing the data from different perspectives.

Separate end-user interfaces for these user groups will be gradually developed in SuALT project in 2017-2021 based on first prototypes, such as those depicted in Figure 4 and 5.

Ethical Considerations

A number of ethical questions are opened up by digital heritage projects such as SuALT, and areas of debate arise in several places. These are to do with, for example, the open philosophy of this kind of data sharing, and whether it is always appropriate to share all details about all archaeological material and artifacts. There are concerns from many about the security of archaeological sites if exact location data is shared online:

> 'Perhaps if someone would find something remarkable, then at least the exact find location should not be open immediately to all users. There is a threat that this would entice criminal behavior.' (Finnish respondent #24, metal detectorist)

> 'Your own finds could e.g. be hidden (in the database) from everybody else except from the authorities. This could hinder vultures from cleaning out the sites before the authorities have had a chance to research the area.' (Finnish respondent #45, metal detectorist)

> 'The sites that haven't been verified by the authorities should not be open for the public, because there is a threat that they become looted otherwise.' (Finnish respondent #61, metal detectorist)

An interesting detail in this questionnaire data is the fact that concerns towards the security of the new archeological sites found through metal detecting is mainly from the metal detecting community and not from archaeologists. Several respondents had a genuine concern that the database would be used as a treasure map for looters, a concern that we need to take seriously within the SuALT project. There is clearly a need to define how and when the exact find locations are openly accessible, and to whom. Should the finds be shown only on a municipality level as in the case of PAN and PAS, or should the data be open to everybody? And when should this data be available - immediately; or only after the site has been fully researched by an archaeologist? Should there be different levels of openness regarding archaeological heritage? And is it truly the case that sharing this data openly will result in increased incidents of looting? Even though the majority of the 161 survey respondents were metal detectorists, the sample of answers above show that the community of hobbyists have true concerns about how heritage sites are treated by others, even by people in their own community.

At present, the information concerning the find spots and archaeological sites are shared in an open access web service of the Finnish Heritage Agency (www.kyppi.fi). The overt data of the Cultural Heritage service window is an essential source for administration, research and for the public to gain shared information about Finnish cultural heritage. For metal detectorists, it also acts as a source to acquire information about the sites and areas where detecting is not permitted in order to remain informed of the restrictions on their otherwise legal hobby. Due to the Antiquities Act of Finland (295/1963: 1 §) it is not allowed to dig or in any other way disturb an ancient monument without authoritative permission (see Maaranen 2016, 274). By exposing the exact find spots in the SuALT database, it is arguable metal detectorists would also be aware of recently discovered sites and restricted areas.

The question of the extent of openness also extends to the users - with finds reporters acting, in a way, as citizen scientists in this project - concerning their own anonymity. Many detectorists have already indicated through a questionnaire survey that we ran in early 2018 that they would want to see users have the right to remain anonymous, with their personal details not available to others viewing the SuALT database. This approach is already used by comparable infrastructures, with both PAS and PAN allowing users to use anonymised usernames. Their information is available to themselves, and also to administrators who can see the details of all users. This anonymization option seems to appeal also to many metal detectorists in Finland, who seem to value their privacy and confidentiality even though most of them wish very much to share their finds data to contribute to the archaeological record. When processing personal data SuALT also, naturally obeys the General Data Protection Regulation (EU 2016/679) of the European Union and the national legislation.

An important question regarding the upcoming database is the questions relating to consent and openness. We also need to discuss copyright issues relating to the object images, taken by the detectorists, which are in the database. For instance, how can these images, taken by finders, be in use as open data for other users, for example, in publications of professional archaeologists?

There are other ethical considerations when it comes to the philosophy of open data. The indigenous Sámi communities in the Nordic nations and Russia have long campaigned for ownership and determination over their own cultural heritage. In Norway, for example, the Sámi Parliament fought for, and gained, control over cultural property considered to be Sámi in origin (Thuen 2004, 88). In Finland, the Finnish Heritage Agency currently makes all ancient monuments within Finnish territory, including those in Sápmi (the traditional homelands of the Sámi people), available online in the open access Ancient Monuments register (www.kyppi.fi). The discussions concerning whether Sámi sites, including sacred seidi sites, should also be included in this way are an ongoing discussion , and one that we continue to monitor in the context of what implications it could have for SuALT and the data that it collects. . In April 2017, The National Museum of Finland concluded a letter of intent to donate an important Sámi collection to the Sámi Museum Siida. The agreement also emphasized continuation of the close co-operation of the two museums to present and document Sámi culture.

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Conclusions and ways forward

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A final challenge for SuALT will be ensuring its sustainability. This is a primary objective of the part of the project led by the Finnish Heritage Agency. Although SuALT is designed to streamline current practices and to utilise Linked Open Data approaches, and in this way will make this part of the Finnish Heritage Agency's work more efficient, it is not without its own resourcing needs. It is likely that the amount of recorded metal detector finds will go up considerably after SuALT is launched, which in turn will increase the need for more resources at the Finnish Heritage Agency.

Because the current funding is for just a finite amount of time, a key challenge in guaranteeing this sustainability will be to make sure that there investments in maintaining and upgrading the software in the future. Like all digital interfaces, it cannot and will not run smoothly if it is just left to its own devices without monitoring and dedicated staff time. Equally, in many ways SuALT is simply 'phase one' of potential future innovations, and as such we may discover yet more questions requiring further research at the end of the project's funding period. Similarly, it is likely that the research infrastructure and database itself will require updates and upgrades, as software and user needs expand and evolve over time.

One key element to ensure the sustainability of SuALT is collaboration of different user-levels, for example, active communication between different users and levels of experience in archaeology. Another element is for SuALT to become completely automated self-recording service to collect metadata that strengthens the use and possibilities of Artifical Intelligence, for example.
At the time of writing this chapter, we are still very much in early development phases of the project. However, we are hopeful that the organizations collaborating on the project, along with the blend of participatory approaches and open data philosophy, will mean that our final product becomes a key staple of the Finnish cultural heritage management scene.

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