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A Citizen Science Approach to Archaeology: Finnish Archaeological Finds Recording Linked Open Database (SuALT)

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Abstract. In this paper, we present an ongoing project called Finnish Archaeological Finds Recording Linked Open Database (Suomen arkeologisten löytöjen linkitetty avoin tietokanta – SuALT), including the reasons why this citizen science project is underway. SuALT will be a digital web service catering for discoveries of archaeological material made by the public; especially, but not exclusively, metal-detectorists. SuALT engages the citizens by providing them access to contextualized data about other related finds by linking data from different data sources in Finland and beyond. SuALT is a collaborative consortium project. The project team members work in three sub-projects, each led by a different organization and thus represents a broad interdisciplinary group, that combines specialisms from archaeology, semantic computing, cultural heritage studies, and archaeological heritage management. Subproject 1, which is based at the Department of Cultures at the University of Helsinki, focuses on user needs research and on the public Cultural Heritage interactions. Subproject 2, based in both Aalto University and in Helsinki Centre for Digital Humanities at the University of Helsinki, is specializing on the technology and implementation of the SuALT prototype. Subproject 3 works with ensuring the sustainability of SuALT at the Finnish Heritage Agency, the organization that will manage the database after the end of this project in 2021.

Keywords: metal-detecting · linked data · citizen science.

1 Introduction

The relationship between metal-detecting and archaeology is an issue that frequently attracts debate, from testimonials of the positive impact of collaborative work (e.g. [3]) through to caution about the potential of metal-detecting to result rather in destroyed archaeological information, and criminal activity (e.g. [12]). The reception of metal-detecting in different countries is affected also by the legal status of the hobby. Because there are different degrees of permission relating to metal-detecting activity, it is possible to carry out the same activity in two different jurisdictions, and to be breaking the law in one while acting perfectly legally in another [25, p. 143].

In countries where metal-detecting is not illegal, sometimes referred to as 'liberal' in this respect, many have sought practical solutions to capture the data that metal-detectorists may be uncovering in their hobby. Deckers et al. have argued that "[T]hose with a liberal approach to metal-detecting might pragmatically argue that the data of finds discovered by metal-detectorists is more important than the source" [7, p. 428]. This wish to record the finds data discovered by metal-detectorists, as well as a philosophy to democratize and decolonize archaeology (e.g. [9]), has led to the development and implementation of several national and regional open databases to which metal-detectorists and others can report their finds. Metal-detecting is legal in Finland, provided certain rules are followed, such as prompt reporting of finds to the authorities and avoidance of legally-protected sites. Despite misgivings by some about the value of researching metal-detected finds (e.g. [18,16]), others have convincingly demonstrated the potential of researching such finds [17,28].

In this paper, we present an ongoing project Finnish Archaeological Finds Recording Linked Open Database (Suomen arkeologisten löytöjen linkitetty avoin tietokanta – SuALT), including the reasons why this citizen science project is underway. SuALT is a digital web service catering for discoveries of archaeological material made by the public; especially, but not exclusively, metal-detectorists. SuALT engages the citizens by providing them access to contextualized data about other related finds by linking data from different data sources in Finland and beyond. SuALT is a collaborative 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 the user needs research and on the public Cultural Heritage interactions, the Semantic Computing Group at Aalto University along with HELDIG – the Helsinki Centre for Digital Humanities, University of Helsinki, specializes on the technology and implementation of the SuALT prototype, and finally the Finnish Heritage Agency for the third component, which is ensuring the sustainability of SuALT. The project's team represents a broad interdisciplinary group, that combines specialisms from archaeology, semantic computing, cultural heritage studies, and archaeological heritage management.

2 Metal-detecting in Finland

The Finnish Heritage Agency (FHA) is responsible for protecting archaeological cultural heritage in Finland, including a liability for collecting archaeological artefacts. In Finland, metal-detecting is allowed without a separate permit in all places, in which law or prohibitions have not forbidden it. Metal-detectorists should ask the landowner for permission to dig on private land.

The Finnish Antiquities Act [2] forbids unauthorized metal-detecting on archaeological sites and the protected areas around them. Once an archaeological feature is discovered, the site is automatically protected and the site must not be disturbed further. The Antiquities Act also obligates the finder of a movable ancient object that does not have a known owner, and that is at least 100 years old, to immediately report and submit the object and associated information to the Finnish Heritage Agency. In some regions, provincial museums or city museums have a collaboration agreement with the FHA. Those museums with professional archaeologist often act also as mediators for reported archaeological artefacts that are handed to them by metal-detectorists and other finders.

In Finland, recreational metal-detecting has grown rapidly in recent years. The number of finds registered to the Archaeological Collections of the Finnish Heritage Agency has increased tenfold compared to the time before metal-detecting became widely popular in Finland. In the middle of the 2010s, the number of finds registered to the FHA Archaeological Collections ranged yearly from 2500 to 3000 objects [20, p. 18],[30, p. 85],[21]. In recent years, the number of reported objects has slightly decreased and at the same time, the amount of assemblages has evidently increased. Improvement indicates that there are continuously more assemblages reported that include only one or just a few finds, which is an important enhancement for metal-detecting in Finland. This is a step towards the right direction to find new sites rather than digging up too many objects. Hopefully this is a direct result of the educational work done by the FHA as well as archaeologists working in museums and in Universities.

3 A Citizen Science Approach

Due to SuALT's goal to encourage metal-detectorists, but also other finders of chance material, to record their discoveries, much of the data handled through the online system will be from outside of formal archaeological excavations. Hence it may shed light on sites and features not usually picked up through 'traditional' fieldwork approaches. By engaging meaningfully with metal-detectorists and other stakeholders, the project hopes to ensure that more finds are reported than at present, including retrospective recording.

The project is unique in responding to the archaeological conditions in Finland, and in providing solutions to its users' needs within the context of Finnish society and cultural heritage legislation. While it focuses primarily on the metal-detecting community, its results and the software tools developed are applicable more generally to other fields of citizen science in cultural heritage, and even

beyond. For example, in many areas of collecting (e.g. coins, stamps, guns, or art), much cultural heritage knowledge as well as collections are accumulated and maintained by skillful amateurs and private collectors. Engagement with SuALT is rewarded by providing the users with a personalized view to the database enriched with data from the national authorities as well as the fellow detectorists for community building. Fostering collaboration, and integrating and linking these resources with those in national memory organizations would be beneficial to all parties involved, and points to future applications of the model developed by SuALT [26].

The benefits of SuALT, aside from the huge potential for regional, national, and transnational research projects and international collaboration, are that it offers long term savings on costs, shares expertise, and provides greater sustainability than was possible before. Internationally, SuALT corresponds with the development of comparable schemes in other European countries and regions (e.g. Portable Antiquities Scheme – PAS, Portable Antiquities Scheme of the Netherlands – PAN, MEDEA in Flanders, Belgium, and Digitale metaldetektorfund in Denmark – DIME). The first of these European voluntary finds databases is the Portable Antiquities Scheme (PAS) operating across England and Wales. PAS has been significant in developing a pragmatic response to metal-detecting. Numerous academic projects (e.g. [5,6]) have demonstrated the research potential of finds data. Furthermore, research emerging from different European countries (e.g. [9,24,8]), including Finland [15,18,30,29], sheds light on the behaviour and motivations of metal-detectorists. This is valuable for understanding these communities ethnographically, but also for identifying the most successful ways in which to collaborate and engage, especially concerning how they contribute to the archaeological record. These European schemes, together with SuALT, all aspire to an ultimate goal of a pan-European research infrastructure, and will work together to a larger international collaborative research grant in the future. A contribution of our work in relation to the other European projects is to employ the Linked Data paradigm, which facilitates better interoperability with related datasets, additional data enrichment based on well-defined semantics and reasoning, and therefore better means for analysing and using the finds data in research and applications. SuALT initiated a questionnaire survey in 2018 to reach out to the public – including mainly metal-detectorists but also archaeologists and other heritage professionals – and hear what they think about the upcoming database. This was an opportunity for respondents to express their preferences and hopes, as well as concerns, about how the new database will function.

The data collection took place in the form of an online questionnaire survey available in Finnish and English, asking a range of multiple choice and open text questions. These questions ranged from expectations and previous experiences of artefact databases, through to motivation and more detailed features and user needs of the future SuALT infrastructure. We also asked about the willingness of respondents to contribute to the future development of the database, for example

by participating in focus groups or user need (UX) interviews, or even testing early versions of SuALT for operability.

The questionnaire surveys gained a total of 178 responses mostly from Finland (160), but also from Europe and the USA. This shows that the SuALT project has already in its early stages gained interest from the public, and we were pleasantly surprised at the response rate [31].

The majority of the answers expressed enthusiasm towards the database. The main motivations mentioned for using SuALT in the future were the sense of responsibility to report finds correctly and legally (73.3%), and the chance to get feedback on finds (72.6%). Approximately 58% of the respondents also wanted to use the database for social interaction online via discussion forums or chats. Over 50% felt that they wanted to 'do the right thing' by reporting their finds to the database [31]. The key elements in mobilizing detectorists seems thus to be the feedback from the professional archaeologists and heritage managers. This has been seen also before in questionnaires (e.g. [23, p. 38–39],[18]) and reflects similar findings also from other countries where there is active engagement between archaeologists and metal-detectorists [32, p. 16,18],[24, p. 61–62], [11].

On the other hand, there were also concerns. 54% of the respondents were worried that sharing their find information in SuALT would make the sites vulnerable to looters. This is a justified concern that could prevent people from using the database. Other obstacles that could hinder the future users of SuALT were a lack of internet access in the field, which is a genuine concern in Lapland (48.4%) and a fear that the recording would be too time-consuming (23.8%). This is a matter we need to take seriously during the development phases of the database in order to avoid such pitfalls. Almost a quarter of all respondents felt that they do not want to share information about their finds publicly (24.6%) [31]. This might relate to the competition amongst metal-detectorists and the fact that detectorists want to keep knowledge of 'their' sites to themselves (e.g. [1, p. 56–59],[19, p. 95]). Naturally this also relates to genuine fears of looting.

In the future we would also like potential 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. We are currently conducting user need research by interviewing future users of the database, 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 project has an active blog[5] and social media presence on Twitter[6] and Facebook[7], 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

[5] https://blogs.helsinki.fi/sualt-project/
[6] https://twitter.com/sualtproject
[7] https://www.facebook.com/SuALTProject/

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. One idea would be to organize public workshops for testing the database early on.

4 The Infrastructure

Publishing the information produced by citizens as open data, in a structured format and using open licenses and standards, facilitates the use of the data in research. Similarly, open data – and open access publishing of scientific results, methods and tools – enables the engagement of citizen scientists in scientific activities [27, p. 483],[22, p. 24]. The recent advancements in web technologies, including the Linked Data paradigm [13,14], have proliferated the initiatives for making cultural heritage data openly available on the web. While archaeologists increasingly use finds information and other data, its full utilization is still limited. Data can be hard to find, and available open data remains fragmented. Although in Finland more and more archaeological archive material is available in digitized form, like excavation reports and find catalogues, the situation is no different in Finland caused by the delays before objects are catalogued and accessible for research due to limited resources. SuALT aims to speed up the process of managing finds data, making it available more quickly for academic researchers and public to use.

Based on the initial feedback from the stakeholder organizations of the SuALT project and the metal-detecting community discussed above, a first draft of the of the workflow in the SuALT system has been designed (Fig. 1). The end user is facilitated with a web interface that helps her in 1) analysing the find, 2) creating the find report with high quality metadata at the find site (via a mobile phone), and 3) later on in managing her personal finds data via a PC with a larger screen. The user can interact with the metal-detecting and expert community through the web interface to get feedback and help the identification of the find. The underlying knowledge base is based on Linked Data and SPARQL endpoint, containing existing finds data from the Finnish Heritage Agency as seed data, and other archaeological information (e.g., museum item collections data). The knowledge base is linked to other European Finds databases, providing users access to contextual information. The Linked Data Finland platform[8] is used for hosting the data as a service.

5 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

[8] `http://ldf.fi`

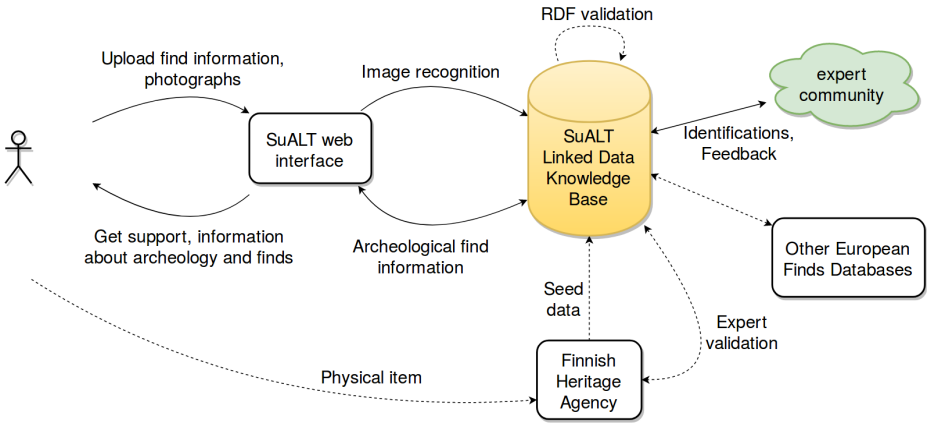

Fig. 1. Workflow in SuALT.

a growing hobby in Finland, and likely represents the majority of avocational hobbyists that are physically engaging with archaeological material. Another important goal is to get 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 [26]. According to our surveys and ongoing user experience research, there is a lot of interest among archaeologists and researchers in this database but also an interest to participate in validating and interpreting finds [31].

The outcome of the SuALT user need research 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 homogeneous group, with many contradictory opinions and values coming to the fore (see e.g. [10] 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. 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 opportunity for 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 they do not record their finds data at all [26].

6 Conclusions and Ways Forward

The process of developing SuALT provides an unprecedented opportunity to research the use of digital platforms to engage the public with archaeological heritage in Finland. As a self-recording scheme, SuALT will in time also demonstrate in what ways the public can engage with the official processes of the Finnish Heritage Agency.

Inspired by successful initiatives such as our 'cousin projects' PAS, PAN, DIME, and MEDEA, the potential for individuals to self-record their finds into the database also echoes the emerging use of crowdsourcing for public archaeology initiatives [4]. Therefore, SuALT offers a significant opportunity to contribute to further understanding of digital cultural heritage and its uses, including its potential role within society.

Because the current funding is for just a finite amount of time, a key challenge in guaranteeing the sustainability will be to make sure that there are 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.

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