

# Project Report

## Towards a Collaborative Strategy for sector information management (TACOS)

### EXECUTIVE SUMMARY

The aim of the TACOS project was to host a one-day seminar to bring together delegates from across the historic environment sector to discuss the integration of effort in the research, organisation, strategic planning, project appraisal and standards development and adoption in the fields of historic environment information capture and recording. The proceedings of the World Café style seminar hosted by the Council for British Archaeology (CBA) held on 14<sup>th</sup> May at the University of York have informed this report and been used as a starting point to further investigate issues that have hindered progress towards a collaborative strategy for information management within the historic environment sector.

To enable a more inclusive event, the York seminar was run in parallel with a ‘virtual’ seminar utilising livestreaming for keynote presentations and real-time online note pads (Etherpads) to record discussions and relay these to remote delegates<sup>1</sup>. The results of discussions between York seminar delegates and comments from virtual seminar participants have been collated to address key themes and look at potential ‘Next Steps’ necessary to progress a collaborative research agenda and strategy for UK historic environment information management.

The research undertaken for this report indicates that more needs to be done to encourage collaborative working as best practice within the sector focussing on the following themes of:

- **Enhancing communications:** encourage partnership working as standard practice, review existing interest groups and networks to identify overlaps, gaps and opportunities for collaboration, better communication and engagement with wider historic environment sector, create opportunities for engagement with partners outside of the sector.
- **Maximising resources:** by linking more datasets to avoid duplication of effort, improving availability and accessibility of information on new and existing projects, encouraging re-use wherever practicable through the a sector-wide commitment to sharing data and more investigation as to how Open Data initiatives and Creative Commons licensing and Open Source technologies might help us achieve this.
- **Innovative funding models:** evaluate the potential to crowdfund historic environment information projects drawing upon feedback from prototypes from the various funding models that exist.

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<sup>1</sup> See the Chartered Institute for Archaeologists Information Management Special Interest Group TACOS webpage <http://www.archaeologists.net/groups/imsig/tacos>

- **Consistent application of existing standards:** promotion and enforcement of existing standards, further investigation of Linked Data to improve sharing of historic environment standardised vocabularies.
- **Improving access to data and information:** better audience research to inform future access strategies, monitoring and evaluating existing information, marketing and promotion of resources in a proactive way, learning from successful projects.
- **Developing skills:** strive for a more structured approach to defining and recording core skills for the sector, using and developing knowledge transfer tools, provide online training support and continuing professional development (CPD) opportunities, encourage collaboration and responsibility across all areas of the sector for maintaining and improving information management skills for professionals, students and 3<sup>rd</sup> sector.
- **Delivering culture change:** through skills training and development that focuses on new approaches and technologies, developing a common language that spans disciplines, more information on Open Source, Open Data and Open Access initiatives to help inform decisions regarding their implementation.

The issues discussed at the TACOS seminars and presented in this report will inform future work to be taken forward by representatives of the Forum on Information Standards in Heritage (FISH), the Historic Environment Information Resources Network (HEIRNET) and various historic environment sector working groups such as the Chartered Institute for Archaeologists Information Management Special Interest Group (IMSIG).

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## INTRODUCTION

Following the event 'New Approaches to Cultural Heritage Online seminar' (NACHOS) held at the British Museum 6 November 2012, English Heritage recognised the need for further collaborative work to promote an integrated approach to historic environment information resources in support of National Heritage Protection Plan (NHPP) objectives. In April 2012, a meeting of the Forum on Information Standards in Heritage (FISH) and the Historic Environment Information Resources Network (HEIRNET) concluded that more effort was needed to actively encourage collaboration between different areas of the historic environment information management sector. It was felt that a more interactive seminar-style event would provide an opportunity for delegates to get to the heart of issues that had previously hindered cross-sector collaboration and start to look at how these might be overcome through a clear strategy encouraging partnership working as standard practice within the historic environment sector. Working in partnership is no longer just a slogan but a necessity, particularly in light of capacity within the historic environment sector.

The TACOS project comprised a one-day interactive seminar resulting in this report to draw together points of discussion, highlighting current issues and potential ways forward. The seminar was opened by Dr Gillian Grayson, Head of Heritage Data Management at English Heritage, who highlighted the value of bringing together colleagues from across the sector to discuss ideas, challenge assumptions and stimulate debate. She felt the key issues that required further discussion were how to: NECESSERILY

- **Avoid duplication of effort by improving efficiency in how we capture and manage historic environment information and data.**
- **Improve communication of existing data solutions for common data issues.**
- **Drive innovation to develop and utilise new tools for accessing and sharing information and data.**
- **Improve inter- and intra- sector connections and encourage development of new partnerships.**
- **Encourage 'blue sky thinking' and think creatively about what we can achieve together.**

Throughout the seminar speakers and delegates reiterated sentiments expressed by Scottish Cabinet Secretary Fiona Hyslop in her opening address for the 2014 IfA conference held in Glasgow,<sup>2</sup> and particularly the successful partnership between different stakeholders that resulted in the **Scottish Strategy for the Historic Environment 'Our Place in Time'**. Delegates were encouraged to make the most of the wealth of knowledge and expertise within the historic environment sector, but also to seek opportunities to develop further collaborative partnerships between our sector and others.

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<sup>2</sup> See <http://www.historic-scotland.gov.uk/ifa-conference-speech> for transcript of the speech.

## AIMS AND OBJECTIVES

The principal aim of the TACOS event was to promote the integration of effort in the research, organisation, strategic planning, project appraisal and standards development and adoption across the sector in the fields of historic environment information capture and recording through:

- 1.) **Review of current trends and future directions** in the use of historic environment information to **promote understanding and management of the historic environment**.
- 2.) **Contribute to the development of a collaborative research agenda and strategy** for UK historic environment information management.
- 3.) **Provide development opportunities** for those seeking to improve their understanding of information systems and associated technologies.

This report summarises discussions that took place at the TACOS seminar in York and the parallel 'virtual seminar' on Wednesday 14 May 2014, as well as subsequent comments received through the event and virtual participant feedback surveys. The aim of this report is to pull together topics of discussion from TACOS to identify real or perceived barriers that currently impede a collaborative approach to information management within the historic environment sector. The final section of the report will make recommendations for further research required to understand issues and any actions that would help to address barriers.

## FORMAT



CBA Publications Officer and former HER Officer Catrina Appleby facilitates round table discussion at the York seminar

## YORK SEMINAR

The TACOS seminar was held on 14 May 2014 at the Ron Cooke Hub on the University of York Heslington East campus, bringing together delegates from across the historic environment information sector to discuss historic environment **Information/Data Use, Information**

**Management Skills Development**, and the use of innovative **New Technologies** to make the most of existing information resources. To facilitate discussions across the breadth of the sector and encourage delegates to contribute as individuals as well as groups, the TACOS event was arranged as a **'World Café'**<sup>3</sup> seminar with interchanging discussion groups comprising delegates from different areas of the sector. The rationale behind utilising this format was to offer networking opportunities between delegates that would not usually work together, providing an opportunity to forge new contacts across different areas of the historic environment sector.

The overarching seminar themes were addressed in three sessions starting with keynote presentations to highlight specific case studies (see Appendix for details) and issues to be investigated further during roundtable discussions. Each discussion session focused on three key questions:

### Session 1: Users & Re-users

- \*What data re-use projects have been fantastic examples of good practice?
- How could lessons from these be applied to other projects?
- What are the main barriers to accessing and re-using data?

### Session 2: Skills Development

- How did you get your information management skills?
- \*Where will the next generation of heritage information managers come from?
- Who should be responsible for developing information management skills within the sector?

### Session 3: Information Systems & Technology

- What are the challenges of implementing the results of research and development work in practice?
- How do we show value in these new technologies to funders and decision makers?
- \*What is your experience of introducing new technologies within your organisation? What worked/did not work?

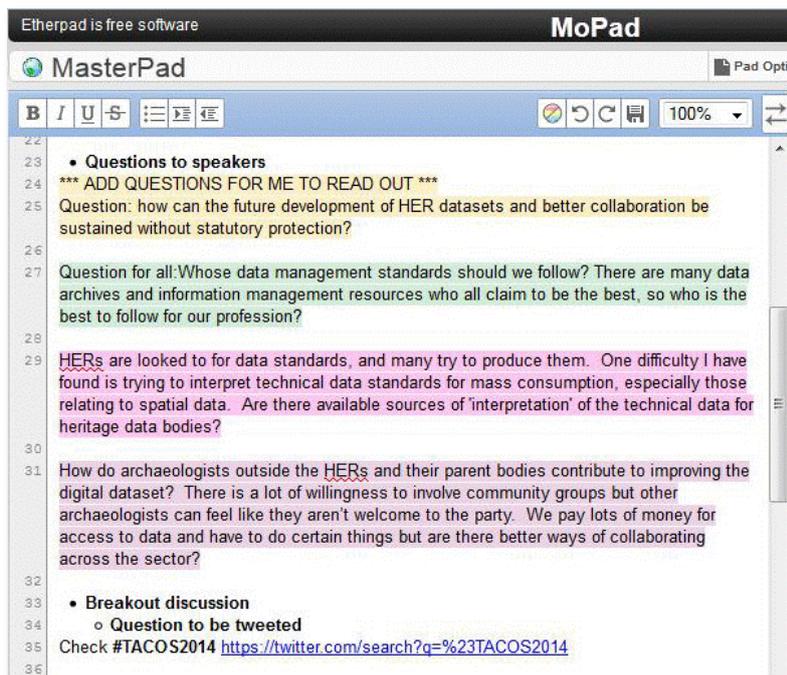
\* Questions put to 'virtual' TACOS participants see below.

## VIRTUAL SEMINAR

To open up seminar discussions to a wider audience, a parallel 'virtual' seminar was held alongside the York seminar to trial new approaches to engaging remote audiences. The opening address, keynotes and closing address were live-streamed and later made available as videos via the IfA IMSIG website. The seminar was supported

<sup>3</sup> <http://www.theworldcafe.com/history.html>





and seminars.

via various social media channels including Twitter<sup>4</sup> and Facebook.

The virtual seminar saw the trial use of **etherpads**<sup>5</sup> to track comments and discussions in real-time, allowing remote delegates to post questions to speakers and York seminar delegates. Although there were some glitches with the platform, mainly compatibility issues with Safari browser,<sup>6</sup> etherpads offer a lot of potential for improving inclusivity and transparency for reporting and participation in historic environment meetings

## DISCUSSION

The following section draws together points of discussion raised during the York TACOS seminar breakout sessions, comments from remote delegates who participated with the 'virtual' Seminar, and also people who subsequently accessed and provided feedback on the TACOS online seminar media (YouTube videos, Twitter feed and Storify). Issues raised are addressed within three overarching themes that emerged from an assessment of current barriers to collaboration within the historic environment information management sector. Questions marked with an asterisk\* were specifically asked of remote delegates via social media and the etherpads.

## USERS AND RE-USERS

The first session of the TACOS seminar focused on how historic environment data is re-used, with three keynote presentations presenting case studies of how and why historic environment information is re-used, what barriers might prevent effective and efficient re-use, and how this might be improved through lessons learned from the outcomes of past projects.

### Breakout discussions focused on three questions:

<sup>4</sup> Tweets using #TACOS2014 were compiled into a Storify by Pat Hadley following the seminar.

<https://storify.com/archaeologyuk/tacos-2014>

<sup>5</sup> <http://en.wikipedia.org/wiki/Etherpad>

<sup>6</sup> Recent attempts to access the TACOS etherpads using an iPhone indicates that the platform is now compatible with Safari browsers.

### Q1. Which data re-use projects have been fantastic examples of good practice?

A number of historic environment and museum sector projects were suggested by York and virtual delegates as useful case studies in the effective re-use of historic environment data, particularly in the lessons learned from early engagement with stakeholders and how to overcome difficulties amalgamating data from different historic environment sources in future projects. Many of the projects suggested are listed in the forthcoming 'Literature Review to Inform Planning' as part of the Heritage Information Access Strategy. For a full list of projects with links to further information see Appendix.

### Q2. How could lessons from these be applied to other projects?

A number of seminar delegates emphasised the need to assess outcomes of re-use projects and to feed back issues to help with the development and improvement of future projects – 'closing the loop'.<sup>7</sup> Many projects do undergo project evaluation in terms of their outcomes and any issues encountered, which is usually a condition of funding from various sources such as the Heritage Lottery Fund. The key to making sure this information feeds back into future projects is to make sure that evaluation is seen as more than the bureaucratic process of 'signing-off' projects, and is seen instead as a key way in which a project can contribute to future knowledge and practice. A comment made in the Information Systems and Technology discussion session also highlighted the importance of feeding back or linking the outputs of synthetic research to historic environment records to enhance existing information resources.

### Q3. What are the main barriers to accessing and re-using data?

Discussions regarding barriers to a more collaborative and cooperative approach to data re-use highlighted the following broad themes:

#### Loss of resources and capacity within the sector

- Fewer opportunities for skills development
- Need to avoid duplication of effort
- Need to involve wider groups within the sector (e.g. commercial and voluntary sector)
  - Volunteers not a 'free' resource – require support and time to be effective
- Triple Helix<sup>8</sup> approach to partnerships between academia, industry and government

#### Economic barriers to data sharing and re-use

- Licensing – caution regarding Open Access, more information on  licensing<sup>9</sup>
- Charging – the need for local authorities to generate income from data

#### Data standards

- Political barriers – structure of organisations, inflexible ICT support contracts
- Technical barriers – different formats

#### Need to improve communication about resources and opportunities

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<sup>7</sup> <http://www.thedailyymba.com/2010/02/27/6-steps-to-closing-the-loop>

<sup>8</sup> [http://triplehelix.stanford.edu/3helix\\_concept](http://triplehelix.stanford.edu/3helix_concept)

<sup>9</sup> Creative Commons – non-profit organisation that enables the sharing and use of creativity and knowledge through free legal tools. <https://creativecommons.org/about>

- How to publicise projects – particularly outputs for data reuse
  - avoid duplication of effort re-recording
- Mutual benefits of collaborative working
- Online resources to engage more people
- Resource discovery

## SKILLS DEVELOPMENT

The provision of skills development within the historic environment sector, for both professionals and the voluntary sector, was a theme that was picked up in the Users/Re-users session and further investigated during this session. The economic downturn has impacted upon the capacity of organisations to deliver staff training and continued professional development opportunities, with further uncertainty caused by the end of a successful run of HLF-funded workplace learning bursaries in partnership with the IfA. The focus in this session was to **identify what are or should be the key skills for the sector and how these might be formally acquired, recorded and recognised to build and maintain capacity** within the historic environment information management sector.

The session started with a quick survey of York seminar delegates in terms of when they graduated, with a small show of hands for graduates before 1994 and even smaller for before 1984. This highlighted a point that **information management is a relatively new skills set** that emerged with the digital revolution and particularly the introduction of the personal computer from 1985 and later the rise of the internet following the launch of popular web browser Netscape in 1994.

### Breakout discussions focused on three questions:

#### Q1. How did you get your information management skills?

Many delegates were self-taught in terms of acquiring skills necessary to manage both paper and digital historic environment information effectively, often through personal interest in the developing ICT sector or through on-the-job training in specific technology. This ad-hoc way in which the historic environment sector's skills base has developed means that there is no clear career path nor CPD plan that specifically addresses person skills gaps and sector skills shortages, which were addressed in the presentation by Kenneth Aitchison (see Appendix). While it was assumed in the past that many 'digital-natives'<sup>10</sup> graduating within the last 10 years would have acquired the necessary ICT skills from everyday use of computers and technology, one delegate emphasised that this was not necessarily recorded in a more formal way. It was also suggested that this everyday working knowledge of specific technologies would not necessarily equip recent graduates with the essential conceptual knowledge of information management.

#### Q2. \*Where will the next generation of heritage information managers come from?

#### Q3. Who should be responsible for developing information management skills within the sector?

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<sup>10</sup> A **digital native** is a person who was born during or after the general introduction of digital technologies and through interacting with digital technology from an early age, has a greater comfort level using it. [http://en.wikipedia.org/wiki/Digital\\_native](http://en.wikipedia.org/wiki/Digital_native)

It was felt by a number of delegates that there was no overall strategy guiding how information management skills training was delivered, and that there was no clear understanding of which areas of the sector should be responsible for ensuring that the next generation of information managers have the necessary technical and conceptual skills, and that existing information managers should be able to access CPD opportunities to cope with and implement emerging technologies. Some delegates felt that universities could do more to support vocational skills development within the sector through undergraduate and graduate training. Many university departments feel that it is not their responsibility to provide vocational training and that graduates should acquire these skills post-education through training provided by employers. However, as highlighted by a seminar delegate, the subject benchmark for university archaeology courses does acknowledge the need for IT skills in courses<sup>11</sup>. It was suggested by a number of delegates that professional placements undertaken during formal education might be the best way of equipping students coming into the sector with the skills necessary to secure employment. This issue was highlighted in Kenneth Aitchison's presentation with the example of the discrepancy between the skills developed through formal education and the skills that are actually required in the workplace for subjects such as archaeology that have traditionally focused on analytical skills development.

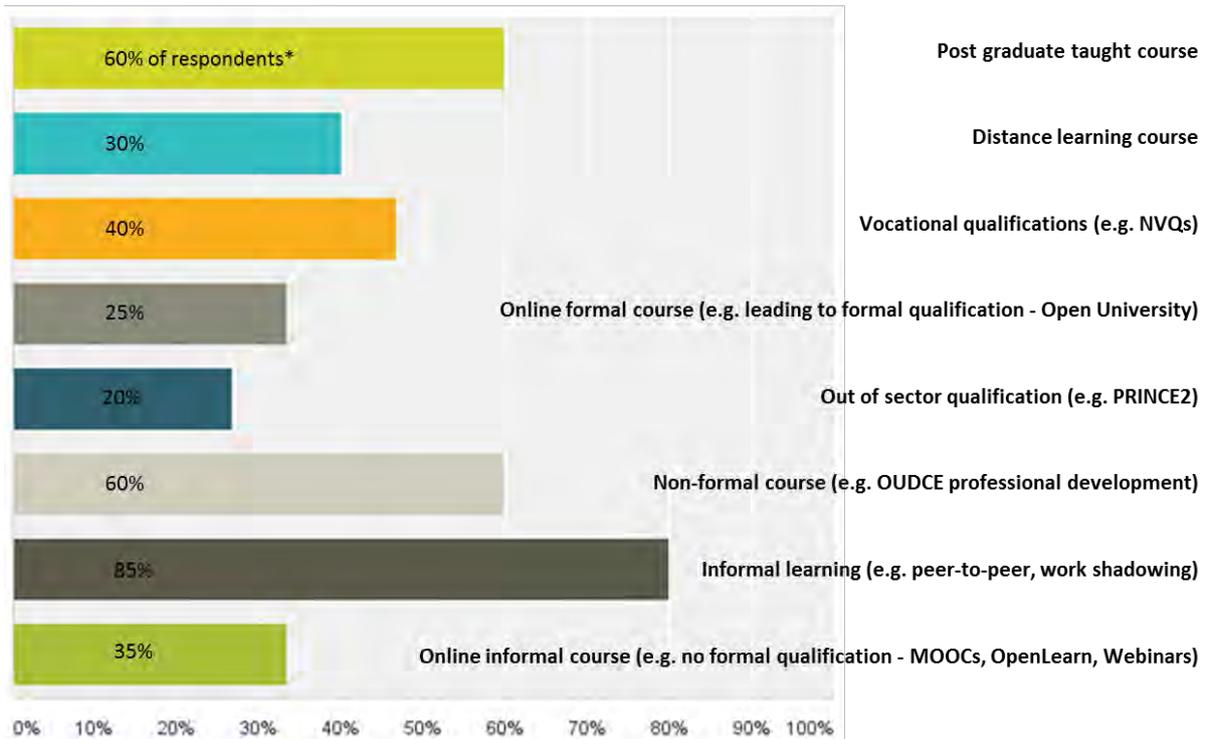
A key concern raised by TACOS discussions and feedback was how to deliver training and skills opportunities that were cost effective, flexible and would meet the specific and changing needs of the historic environment information management sector. Since 2006 many starting professionals have benefitted from the HLF-funded workplace learning bursary scheme with historic environment organisations across the sector hosting placements with a focus on information management (e.g. local authority HERs, commercial units, museums etc). However, this funding stream is coming to an end and there is a need to find alternative ways of supporting vocational training in the future. A poll of approaches to skills development also suggested that informal learning was a desirable mode of learning because it could be tailored to individual needs and was flexible, allowing it to be incorporated around existing commitments.

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<sup>11</sup> <http://www.qaa.ac.uk/Publications/InformationAndGuidance/Pages/Subject-benchmark-statement-Archaeology.aspx>

**Out of the current approaches to skills development within the sector what do you think works?**

*Based on 20 respondents from the Virtual and York Seminar*



The concept of ‘Human Capital’ introduced by Kenneth Aitchison stressed that skills development was an ongoing process with successful information managers continuing to develop and hone their skills set throughout their careers. It was felt that such a process would need cross-sector cooperation and also individuals taking greater personal responsibility for their own skills development by organising work placements with relevant organisations during their studies and ongoing commitment to skills development. Edmund Lee also emphasised in his presentation that information management is not just a technical skill and now forms an essential part of many different disciplines and everyday life due to the sheer volume of data our increasingly digital world generates; information managers needed both technical and communicative skills to be able to digest and make sense of information and to transform it into usable resources. This sentiment was also reiterated by a York seminar delegate who felt that there should be more training on the concepts of information management in addition to training in specific software packages.

## INFORMATION SYSTEMS & TECHNOLOGY

The final session of TACOS discussed the constantly evolving information systems and technology environment, with case studies of how the historic environment sector have embraced new technologies to make the most of existing historic environment data to improve existing user experience and reach out to new audiences.

### Breakout discussions focused on three questions:

## Q1. What are the challenges of implementing the results of research and development work in practice?

Many delegates felt that one of the major challenges when implementing the results of research and development was the difference in how technology developed within an academic environment translates into practical applications within the sector. A number of delegates highlighted the common intermission between academic development and practical uptake of new approaches and technology which was often hindered by issues of resource availability outside of academia, accessibility to information and expertise/guidance on new developments, and also a lack of clear case studies demonstrating practical information management applications pitched at the right level for different audiences and potential user groups. There is also the question of capacity and who should be tasked with the implementation of new technology and whether historic environment information managers have the right technical skillset. This question has at its root the issue of what are the necessary skills for an information manager? Should they be expected to be proficient in technologies or should they have the conceptual knowledge of new technology and systems with access to external expertise to integrate new technologies and approaches into their workflow and schedules?

Various discussions around the conversion of research and development results into practice suggested it was as much about challenging attitudes towards change as getting to grips with new technologies. The fast pace of change within the information technology sector meant that many local authorities were wary of implementing costly 'faddish' technologies that might not have longevity.

## Q2. What is your experience of introducing new technologies within your organisation? \*

Feedback from the TACOS seminar highlighted that one of the major issues affecting the adoption of new technology was the inflexible IT environments of local authorities and national organisations due to the dominance of proprietary software. These software packages not only proved to be costly but limited interoperability of systems and the data held in them with Open Source platforms. In terms of cost benefit and efficiency, many information managers recognised the potential of Open Source software which is cheaper, customisable to individual needs, and adopts new technology faster than proprietary systems. Open Source platforms are often designed to facilitate interoperability unlike commercial systems which are often closed systems, and through crowdsourcing Open Source platforms can have large networks of developers working on issues to fix bugs (e.g. [Drupal](#), Wordpress<sup>12</sup>).

Reasons for using proprietary software	Open Source
It takes away risk and satisfies the need for stability, quality and ongoing reliable software support and development for corporate users.	Crowdsourced development means that this is not always the converse for Open Source alternatives.

<sup>12</sup> There are two versions of Wordpress – Wordpress.com provides a complete website hosting package, Wordpress.org is the Open Source software that can be used to create and host your own website. See <http://en.support.wordpress.com/com-vs-org>

<p>Easy to use interface – as the de facto standard most computer users are familiar with their layout and therefore less time and resources are required for IT training.</p>	<p>If Open Source systems were introduced into the early and higher education curriculum this would be less of an issue. In terms of training it is now acknowledged that learning one system or piece of software is not necessarily helpful and there is a need to move more towards concept-based learning.</p>
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TACOS delegates and feedback comments suggested that many of the barriers to the use of non-proprietary software by information managers were political and seemed unlikely to change without wider support from the sector and clear national policies and standards. This could be set to change with national government assessing how Open Source platforms might be incorporated into their own IT strategy (see below), providing local authorities with an arsenal of central government documents to help build a case for the use of alternative, and often complementary, Open Source systems alongside proprietary platforms.

**“Where appropriate, government will procure Open Source solutions. When used in conjunction with compulsory open standards, open source presents significant opportunities for the design and delivery of interoperable solutions.”** Government IT Strategy 2011<sup>13</sup>

**“Government has a level playing field between proprietary and Open Source software.”** Government Technology Code of Practice<sup>14</sup>

A number of speakers stressed that Open Source is not a miracle solution, and that the platforms and software might be *free* but there could still be implications in terms of resources required for development if existing systems do not meet the needs of our sector. The key to the success of Open Source is crowdsourcing and sharing the load of development across a number of organisations and individuals.

### Q3. How do we show value in these new technologies to funders and decision makers?

It was suggested by a number of discussion groups that to demonstrate the value of new technologies to decision-makers, it was necessary to be able to communicate not only the practical benefits to services but also couch this in the language of ‘efficiency’ and ‘cost benefit’, demonstrating strengths and weaknesses from clear and accessible case studies providing ‘decision-ready information’ so that technologies and approaches could be thoroughly evaluated thus removing some of the risk. It was also recommended that small-scale pilot projects for riskier technological ventures would help to test their feasibility and build a strong business case for new technologies. The session started with presentations from Ceri Binding and Paul Cripps demonstrating the practical applications of semantic and geosemantic technologies to address common data issues encountered by the historic environment sector. The case studies of the **Semantic ENrichment Enabling Sustainability of arCHAEological Links** (SENESCHAL) [Linked Data vocabularies](#) and GeoSemantic Technologies for Archaeological Resources (GSTAR) (see Appendix)

<sup>13</sup> <https://www.gov.uk/service-manual/making-software/open-source.html>

<sup>14</sup> <https://www.gov.uk/service-manual/technology/code-of-practice.html>

clearly demonstrated the benefit of collaborative working between academia and curatorial bodies resulting in a positive and measurable impact, which is a key factor for the major funding bodies.<sup>15</sup>

## NEXT STEPS

It was clear from a number of TACOS discussions and feedback comments that delegates felt that a more strategic direction for the historic environment information management sector was timely. The following section comprises suggested 'Next Steps' to further investigate potential avenues of enquiry highlighted in the report to address some of the issues that currently impede a collaborative strategy to information management across the historic environment sector.

## ENHANCING COMMUNICATIONS

The issue of poor communication within the historic environment information sector was highlighted in both TACOS seminar discussions and feedback comments. Communication was seen as a major barrier to improving cross-sector collaboration in historic environment information management with the need to overcome the perception that the sector is fragmented with different groups operating in isolation. This is clearly not a recent observation and an [HEIRNET](#) user survey undertaken by the ADS and published in 2006 recommended that *"HEIRs<sup>16</sup> will only achieve their full potential with more attention [paid] to communication"* and that *"HEIRs should consider longer term*

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<sup>15</sup> See <http://www.rcuk.ac.uk/ke/impacts/meanbyimpact>

<sup>16</sup> Historic Environment Information Resources

*communications as part of any HEIR development programme*<sup>17</sup>. Edmund Lee reiterated this sentiment by emphasising that information management was about more than just technical skills and that it also relied on the ability to communicate the value of information resources effectively, manage processes and disseminate information based on a sound understanding of user needs to make sure that information was decision-ready<sup>18</sup>.

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## Communicating with users: raising awareness and improving access

Discussions and feedback comments remarked that there was a lack of clear channels for obtaining information, with users either feeling that they didn't know where to go for information or were overwhelmed due to improved online accessibility and overlapping resources. Information portals such as [Heritage Gateway](#), [PastMap](#) and [Archwilio](#) have proved to be useful by providing a single point of access to multiple datasets, which removes some of the issues associated with dispersed datasets, but the discovery and use of these resources still relies on raising awareness to potential user groups. To improve the way we encourage use of historic environment information resources we need to understand the needs and wants of different user groups. Several TACOS presenters and delegates particularly emphasised the need for better audience research to inform actions to address accessibility issues and the implementation of new technology with ongoing evaluation of outcomes to inform future decisions. Marketing and communication skills are not traditionally taught as part of the historic environment subject curriculum and there are few sector-specific training and skills development opportunities in this area for early career professionals or those undertaking CPD.

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## Communication within the sector

There are a number of specialist historic environment information forums and groups (e.g. HEIRNET/FISH, HER Forum, SMR Forum Scotland, IMSIG, ALGAO HER Subject Committee, Antiquist) often with a degree of overlap in membership across the historic environment information sector. *So why is there still a perception (as indicated in TACOS discussions and feedback) that as a sector we are not communicating effectively with each other?* There is also the potential for information managers to be overwhelmed by the sheer volume of information generated by forums and ad-hoc updates through mailing lists and online groups. This, coupled with resource limitations, means that there is less time to spend fully digesting the proceeds of forums, with the cost of travel also potentially prohibiting participation. TACOS feedback suggested that existing forums and facilities for information sharing needed to be improved and that cross-sector information sharing could be facilitated by bringing together forums that would traditionally appeal to different interest groups and areas of the sector. A number of TACOS seminar attendees commented on the low representation of the commercial sector, with 6/45 (13.3%) of the York seminar delegates identifying themselves as commercial and 2/18 (11.1%) of virtual delegates. This is certainly an issue

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<sup>17</sup> <http://www.archaeologyuk.org/heirnet/survey/section12.htm>

<sup>18</sup> "a big part of the value [information managers] provide is in turning the deluge of data into succinct, high-quality, current, on-message information" <https://www.sla.org/wp-content/uploads/2014/03/FT-SLA-Report.pdf>

that needs addressing, and is potentially part of a wider concern regarding the tension between commercial uses of publicly funded (historic environment) datasets.

Positive feedback on the TACOS ‘World Café’ style seminar suggests this format might be a useful way of discussing specific issues in an informal setting with a range of representatives from across the sector. Feedback received on the virtual seminar format suggested that this effort to improve access was welcomed but that more experimentation and research into the pros and cons of using different media was required.

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## Intra-sector communication

Many of the cutting-edge developments in information management and development of new information systems and technology are happening outside of the historic environment sector, with recent intra-sector partnerships demonstrating that historic environment data can be of particular interest to developers. There are also funding incentives encouraging external sectors to engage more with the heritage sector and visa-versa. Digital systems and technology research plays such an important role in the digital humanities<sup>19</sup> that it is no longer limited to EPSRC<sup>20</sup> and ESRC<sup>21</sup> for research funding, with recent examples of cross-sector collaborative projects funded by the AHRC including the [Semantic Technologies for Archaeological Resources](#) (STAR) and [Semantic Technologies Enhancing Links and Linked data for Archaeological Resources](#) (STELLAR) projects. A few historic environment information managers have ventured out into this brave new world of information science and technology and have reaped the benefits that come from these new technology partnerships. For example, Dan Pett’s collaboration with Trace Media who wanted to use the PAS dataset to showcase the potential of their visualisation platform, and the semantic web research of the University of South Wales in collaboration with the Archaeology Data Service and project partners<sup>22</sup>. Both projects are demonstrating the positive and measurable impact that information science research can have on the arts and this notion of ‘impact’ is a major factor for the major funding bodies<sup>23</sup>.

At present technology partnerships involving the historic environment sector are often forged on an ad-hoc basis by those amongst us who are most comfortable with these technologies. But if these sorts of partnerships are to be encouraged across the sector in the future, it will be necessary to improve opportunities for intra-sector communication between historic environment information managers across the sector. Edmund Lee suggested we needed a common language for articulating our sector’s training needs as part of wider learning frameworks, and there is also a need for us to get better at communicating the sectors technological and information management needs to information scientists who are actively researching and developing innovative solutions to common data issues. The Cultural Hub introduced the idea of ‘brokers’ to facilitate the development of partnerships across different sectors and this model could be investigated further to determine if

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<sup>19</sup> [http://en.wikipedia.org/wiki/Digital\\_humanities](http://en.wikipedia.org/wiki/Digital_humanities)

<sup>20</sup> Engineering and Physical Sciences Research Council <http://www.epsrc.ac.uk>

<sup>21</sup> Economic and Social Research Council <http://www.esrc.ac.uk>

<sup>22</sup> Bespoke HER User Group, English Heritage, RCAHMS, RCAHMW and Wessex Archaeology.

<sup>23</sup> See <http://www.rcuk.ac.uk/ke/impacts/meanbyimpact>

this would be a useful facility to provide for historic environment information managers so they can make informed decisions regarding future technology partnerships.

#### **Potential ways forward to improve inter- and intra-sector communication:**

- **Encourage partnership working as standard practice through promotion at information exchange events (such as the TACOS seminar) and through existing groups (e.g. HER Forum, FISH/HEIRNET, ALGAO, Heritage Data, IfA IMSIG)**
- **Review of existing groups and networks to identify overlaps, gaps and opportunities for greater collaboration**
- **Better communication and engagement with the wider historic environment sector to enable the value and benefit of new schemes to be understood and acted upon**
- **Create opportunities for engagement with potential partners outside of the sector**

### **MAXIMISING RESOURCES**

One TACOS delegate remarked that *“austerity might be the driver for change”*. Naturally any discussion of barriers to a collaborative strategy for sector information management will inevitably focus on how such a strategy would be supported across different areas of the sector through resourcing in terms of finances and person time. The recession over the last few years has seen many cuts to the budgets that support historic environment information management at both the local and national government level<sup>24</sup>. As such, there is now much more emphasis on inter- and intra-sector partnerships to share the cost of developing and implementing new systems and technologies as well as greater use of Open Source technologies, with some of the popular platforms highlighted by TACOS seminar speakers, as well as improving accessibility and reuse through Open Data initiatives and Creative Commons licensing. Crowdsourcing and citizen science projects are also providing novel ways of sourcing labour, with crowdfunding models starting to be seen in the sector.

Duplication of effort is considered to be one of the major drains on historic environment information management resources. Seminar presenters suggested various potential ways to improve efficiency in the use of resources including clearer guidelines and standards for data creation, improved channels for communicating, more effective partnership working and greater use of technology. For most historic environment information managers the notion of working in partnership is well entrenched. Victoria Bryant explained that although partnership working was desirable, getting access to the right partners and discovering opportunities for collaboration still requires time, financial resources and access to information to assess the feasibility of partnership projects. The ‘Triple Helix’ concept trialled by the University of Birmingham Cultural Hub brought together academics, public bodies and business to facilitate project initiation by providing a forum to source partners and access new funding streams within and outside the sector. Working in partnership can also help not only to share the financial costs of projects and the person resources required to undertake the work, but also to minimise risk to individual organisations. Some TACOS discussants

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<sup>24</sup> See <http://www.english-heritage.org.uk/professional/protection/national-heritage-protection-plan/activities/2e2>

thought that **collaboration needed to be guided at the strategic level** to encourage inter- and intra-sector partnership working wherever practicable as part of sector best practice.

The recently launched project Micropasts is demonstrating how crowdsourcing might be put to use in the enhancement of historic environment datasets and is starting to collect information that will be vital in assessing the feasibility of partially resourcing historic environment information projects this way. For example, progress reports indicate that there is greater enthusiasm for some tasks than some others; photomasking is by far the most popular being 81% complete after just over three months. It is also important to stress that by increasing the number of data creators in such tasks it can also increase error margins and it will always be necessary for such projects to be closely monitored by an experienced data manager. It is also possible that common data issues could be mitigated through the design of crowdsourcing platforms (e.g. using embedded spell-checkers for common typos, using Linked Data vocabularies etc).

#### **Potential ways forward to maximise use of resources:**

- **Linking more datasets to minimise duplication of effort**
  - **Improving the availability and accessibility of information on new and existing projects**
  - **Encouraging re-use of data wherever practicable through Open Data initiatives and Creative Commons licensing (see below)**
- Making the most of Open Source technologies**

## **INNOVATIVE FUNDING MODELS**

Traditional sources of funding are becoming increasingly limited leading to more competition between different areas of the sector. Not only does this highlight the necessity to work in partnership instead of similar projects competing, it has also encouraged new and innovative approaches to funding and supporting historic environment projects. Over the last five years crowdfunding has been increasingly utilised to raise money for self-contained projects and from 2012 this was applied to archaeology through the ‘social business’<sup>25</sup> DigVentures to crowdfund and crowdsource an archaeological excavation on Flag Fen in Cambridgeshire and again in 2013 for Leiston Abbey, Suffolk. This model seems to work well for excavation-based projects, which are traditionally popular activities, with projects exceeding their original funding goal and participation targets<sup>26</sup>. Building on the recent success of crowdsourcing to enhance historic environment datasets, Micropasts has developed a platform to investigate the potential of crowdfunding for historic environment digital projects that require small amounts of start-up money.

#### **Potential ways forward to make the most of new funding models:**

- **Further information is required to appraise alternative funding models such as crowdfunding and intra-sector public/private partnerships to support projects and facilitate knowledge transfer.**

<sup>25</sup> [http://en.wikipedia.org/wiki/Social\\_business](http://en.wikipedia.org/wiki/Social_business)

<sup>26</sup> <http://www.digventures.com/crowdfunding>

- **Further information on the potential of crowdsourcing to gather and enhance historic environment datasets.**

## CONSISTENT APPLICATION OF EXISTING STANDARDS

The TACOS seminar discussion topics were arranged to avoid explicitly discussing standards in isolation and instead to discuss them in terms of practical applications of existing standards and how these might be better utilised and promoted to historic environment data creators and managers. The TACOS presentation by Ceri Binding (see Appendix) demonstrated the value of online Linked Open Data technologies and how these were improving interoperability through the sharing and aligning of existing standardised terminologies and vocabularies. Peter McKeague urged TACOS delegates to work with existing industry standards but also to seize opportunities to provide feedback on the development of new standards and actively participate in consultation processes to ensure that our sector's needs are accommodated.

### **Potential ways forward to ensure existing standards are utilised consistently:**

- **Better promotion of existing standards tailored to the needs of different data and information producer and user groups**
- **Explore opportunities for greater collaboration on sharing standardised terminology/vocabularies via Linked Data**
- **Promote the potential benefits of applying Linked Data to the wider sector**

## IMPROVING ACCESS TO DATA AND INFORMATION

Seminar discussions and feedback suggested that better audience research as well as monitoring and evaluation of existing information would help to inform future access strategies and enable a more proactive approach to marketing historic environment information resources.

A number of TACOS seminar presentations demonstrated the potential of Open Access historic environment information to encourage greater use and reuse of data. The SHED strategy in Scotland is helping to change attitudes towards open data with the ambition that eventually all Scottish historic environment data will be made available through open licensing to enable and actively encourage reuse of data – even for commercial use. The latter point is still a highly contested area within historic environment data provision with numerous debates on charging and licensing on the HER Forum. The benefits of making data Open Access was demonstrated through Dan Pett's report of increased usage of PAS data since the removal of their commercial clause.

The TACOS seminar facilitated a discussion amongst one group regarding the difference between data that is *freely accessible* and that which is *free to use*. Open Data and licensing is still a major issue for many information managers as their organisations see the information and data they hold as an economic resource and a potential source of revenue. Whilst many TACOS delegates acknowledged that 'data hugging' was a bad thing, there were still reservations regarding the regulation of commercial use of publicly funded datasets. One way that this might be overcome is by using different levels of Creative Commons Licensing (see below) with plenty of examples worldwide

where publicly funded information and data have been made accessible to commercial reuse<sup>27</sup>. As with Open Source platforms these government initiatives have the potential to provide information managers with the information necessary to make a clear business case for Open Data.

### Creative Commons Licenses

<https://creativecommons.org/licenses>



#### Attribution CC BY

Others can distribute, remix, tweak, and build upon your work, even commercially, as long as they credit you for the original creation.



#### Attribution-ShareAlike

Others can distribute, remix, tweak, and build upon your work, even commercially, as long as they credit you for the original creation.



#### Attribution-NonCommercial

Others can remix, tweak, and build upon your work non-commercially, and although their new works must also acknowledge you and be non-commercial, they do not have to license their derivative works on the same terms.



#### Attribution-NonCommercial-NoDerivs

This is the most restrictive of the CC main licenses, only allowing others to download your works and share them with others as long as they credit you, but they can't change them in any way or use them commercially.



#### Attribution-NonCommercial-ShareAlike

Others can remix, tweak, and build upon your work non-commercially, as long as they credit you and license their new creations under the identical terms.

### Potential ways forward to improve data and information access include:

- Carrying out audience research to inform future access strategies
- Monitoring and evaluating existing information
- Marketing and promoting our resources in a proactive way.
- Learning from successful projects (see appendix):
  - To provide clearer guidance for projects on standards and best practice
  - Engage with academic and commercial archaeological sectors.

<sup>27</sup> See [https://wiki.creativecommons.org/Government\\_use\\_of\\_Creative\\_Commons](https://wiki.creativecommons.org/Government_use_of_Creative_Commons)

## DEVELOPING SKILLS

The seminar discussion session and feedback from delegates identified that the majority of historic environment information managers acquired their technical skills on an ad-hoc basis mainly through their own personal interest in the field of ICT. This was highlighted as a potential issue as there was no consensus regarding the skills and knowledge that were essential to the role of an historic environment information manager. It was suggested by a number of discussion groups that it was important to understand better the conceptual skills required to enable information managers to adapt to changing technology with particular focus on analytical skills and epistemology<sup>28</sup> rather than focus training solely on particular software and systems. A number of groups also emphasised that we should not lose sight of the importance of historic environment subject-specific knowledge and skills which are required to check the quality of data and would help inform how best to utilise different datasets.

### Potential ways forward improve skills provision for the sector:

- **A more structured approach to defining and recording core skills necessary for the effective management of historic environment information. Existing models that could be utilised include:**
  - **National Occupational Standards**
  - **CILIP Framework of Professional Development**
- **Using and developing knowledge transfer tools, online training support and CPD opportunities for historic environment information management as well as the historic environment sector in general**
  - **Particularly supporting learning and CPD on the creation, management and use of Open Source, Open Data and enabling Open Access**
- **Encouraging collaboration and responsibility across all areas of the sector for maintaining and improving historic environment information management skills for professionals, students and the 3<sup>rd</sup> sector**

## DELIVERING CULTURE CHANGE

Feedback from the TACOS seminar indicated that a ‘culture of resistance’ was a major barrier to the potential implementation of new approaches and technologies stemming from uncertainty regarding the ever-changing information technology environment and the pace at which digital technologies continue to develop. Many respondents felt that as a sector we are often ‘playing catch-up’ and are left languishing behind due to lack of resources to participate in the initial development of new technologies, struggling to then implement a ‘finished product’ into existing workflows and frameworks. An issue raised by a number of TACOS delegates was that some new historic environment data projects did not adhere to historic environment information sector best practice and existing standards, and whether this could be addressed at the point of application for funding to ensure that datasets generated by new research were accessible and interoperable.

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<sup>28</sup> Theory of Knowledge – nature and scope of knowledge. <http://en.wikipedia.org/wiki/Epistemology>

## Potential ways forward in delivering culture change:

- Skills training and development need to focus on new approaches and technologies
- Developing a common language that spans disciplines
- More information on Open Source, Open Data and Open Access initiatives to enable information managers to make an informed choice and put forward business cases for their use

## END OF PROJECT REVIEW

### What lessons might be applicable to similar projects in the future?

The World Café format worked very well in terms of encouraging dialogue between delegates at the York seminar. Rotation of delegates also meant that discussions remained invigorated with different perspectives coming from delegates representing different areas of the sector. The livestreaming of presentations and use of Etherpads to track discussions in real-time was appreciated by remote delegates, but more experience of using them is required to ensure that these technologies run more smoothly at future events. Etherpads have since been successfully utilised by the CBA to record staff meetings with those unable to attend able to access the live Etherpad or download a transcript at a later date. This technology could be a crucial tool for improving transparency and enabling access to meetings where people are unable to attend in person. Ideally any future 'virtual' events would need not only a virtual coordinator but a team of assistants to ensure that remote delegates were constantly engaged and did not feel detached from the main seminar.

### Recommendations:

The seminar and feedback comments highlighted that communication was a major issue that needed to be overcome before a truly collaborative strategy could be developed for the sector. It was felt that more TACOS-style seminars would be one way of ensuring that different groups within the sector had an opportunity to come together to showcase new approaches and discuss practical implications of utilising technologies as part of their everyday information management tasks. A number of special interest groups and forums already exist<sup>29</sup> and that membership of these bodies needs to be expanded to include those within and outside the sector through active promotion. This

could be started by improving access to information about new and existing projects overseen by different interest groups with a review of existing information management groups to identify overlaps, gaps and opportunities for more partnership working through networking events such as NACHOS<sup>30</sup> and TACOS.

It was clear that many information managers now see the benefit of linking instead of duplicating and ingesting datasets. There are existing protocols for providing machine readable data to web services (see OASIS p. 27-28), but more information needs to be made available to improve understanding as to how these systems work and how information managers can make their own datasets available through them in the future. Consistent use across the sector of existing standards would help to ensure that datasets are interoperable but more needs to be done to actively promote these standards and ensure that data tools are easy to use with adequate support through training opportunities. The importance of assessing project outcomes and analysing feedback was highlighted in all of the TACOS discussion sessions. Feedback is important for understanding the wider picture or information environment. Drawing together the outputs and conclusions from different historic environment sector projects would help to better understand the current 'state of the art' and identify gaps and areas ripe for collaboration in the future.

Dan Pett highlighted new approaches to funding and this is an area that requires more research to evaluate new funding models and particularly crowdsourcing and crowdfunding initiatives (see p. 42). The Triple Helix approach championed by the Cultural Hub at the University of Birmingham, offers much potential for encouraging partnerships not traditionally pursued by the sector. Victoria Bryant highlighted the issue that historic environment information managers are often not privy to opportunities to get involved with these initiatives often 'stumbling upon them' instead of proactively seeking them, which was an intra-sector information access and communication issue. It was made clear by Ed Lee that historic environment information management was more than a set of technical skills but also required conceptual information management skills and knowledge that enabled managers make the most of their resources, identify areas for improvement and initiate beneficial partnerships (see p. 11). The NOS were identified as a potential qualification framework that could be built upon to better define and record core skills for the sector, and it was suggested that a future knowledge skillset should include the emerging fields of Open Source, Open Data and Open Access. A shift in emphasis towards recognising both the hard and soft skills required to be a successful information manager within the historic environment sector would also help to change perceptions and start to deliver culture change.

### **Did the project achieve the stated Aims and Objectives?**

#### **Review current trends and future directions in the development and dissemination of information used to promote understanding and management of the historic environment.**

The TACOS York and virtual seminar provided a broad range of case studies illustrating current trends and future directions for historic environment information management (see Appendix). The presentations formed the foundation of round-table discussions by highlighting key points of discussion that have informed recommendations made in the Next Steps section of this report.

#### **Contribute to the development of a collaborative research agenda and strategy for UK historic environment information management**

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<sup>30</sup> New Approaches to Cultural Heritage Online seminar held at the British Museum 6 November 2012

TACOS discussions highlighted that working in partnership was no longer just a policy buzzword but a necessity. The TACOS presentations and breakout discussions further highlighted the potential benefits of collaboration but also identified some of the issues that would need to be overcome before collaboration becomes the default working arrangement for the sector. The detailed recommendations identify some of the potential ways forward to help progress a collaborative research agenda and how this might feed into the forthcoming English Heritage Information Access Strategy.

**Provide development opportunities for those seeking to improve their understanding of information systems and associated technologies.**

The TACOS seminar provided introductory presentations on a number of new technologies being utilised by historic environment information projects. The purpose of the TACOS seminar presentations and the summaries found in the Appendix of this report was to provide a basic introduction to various technologies and approaches with links to further information for those interested in finding out more.

## APPENDIX

### SESSION 1 – USERS AND RE-USERS: SPEAKERS

The first session looked at historic environment data use and re-use through three case studies introduced by Martin Newman, Datasets Development Manager at English Heritage and member of IMSIG, who started with the concept of the ‘**knowledge pyramid**’ and the how **information managers need to facilitate the flow of information** from creators to users and re-users. He urged delegates not to revisit previous discussions regarding audience segmentation within the heritage sector (see [ESRC report September 2011](#)), but instead to **focus discussions on how information managers might improve the flow of information by better understanding:**

- **Who is using our info and data**
- **Why are they using it?**
- **How are they using it?**
- **What do they need to derive from it?**

## 'BIG DATA': WORKING WITH LARGE AND COMPLEX AGGREGATE DATASETS

The English Landscape and Identities (EngLald) Project  
*Professor Chris Gosden, University of Oxford*

To start the session on users and re-users, [Professor Chris Gosden](#) picked up on a very important question – **what is the distinction between a user and re-user?** To distinguish between the two, users are those who 'consume' our processed or synthesised information (e.g. books, records etc.), whereas a re-user will use original raw data (from one or more sources) and rework this for a purpose other than that originally intended, effectively creating a new information resource.



The EngLald Project sought to utilise digital data from intensive and extensive survey and excavation undertaken as part of the planning process post-[PPG16](#), and particularly the new ways of capturing and analysing archaeological landscape data that emerged with the 'digital revolution' of the last 25 years, to look at what kinds of histories might be written and how the history of the English landscape might be re-written through 'big data'<sup>31</sup> analysis. The EngLald dataset comprises c.800,000 items of data taken from a range of sources: English Heritage's [National Mapping Programme](#) (NMP) and [National Record of the Historic Environment](#) (NRHE), the [Archaeological Investigations Project](#) (AIP), local [Historic Environment Records](#) (HERs), planning application 'grey literature'<sup>32</sup>, the [Portable Antiquities Scheme](#) (PAS) and other artefact databases including the [Celtic Coin Index](#) and the Fitzwilliam Museum's [Corpus of Early Medieval Coin Finds](#). When trying to collate data the project highlighted ongoing issues regarding a lack of HER provision for some counties and districts<sup>33</sup>. For example, 77 out of the 84 HERs in the UK were able to provide data with the remaining seven having no dedicated HER officer to fulfil the data request.

Chris talked about fragmentation of historic environment data due to the different aims and imperatives, funding models and opportunities for different areas of the sector (e.g. curatorial, commercial, academic, the public), and noted that there was overlap between datasets but that no one data source proved to be comprehensive. However, he ended the presentation with an optimism that this could be overcome by utilising the increasingly digital world and the opportunities that come with this to create an 'intellectual commons'<sup>34</sup>, a set of common resources that we can all combine around. He hoped that the outcome of projects such as EngLald would be a 'series of conversations' around data which would cross intra- and inter-sector boundaries to help us identify a commonality



Tweet from the CBA Community Archaeology  
Training Coordinator

<sup>31</sup> Datasets too large and complex to manipulate or interrogate with standard methods or tools.

[http://en.wikipedia.org/wiki/Big\\_data](http://en.wikipedia.org/wiki/Big_data)

<sup>32</sup> Unpublished reports

<sup>33</sup> See the 6<sup>th</sup> Report on Local Authority Staff Resources (July 2014).

<http://www.english-heritage.org.uk/publications/sixth-report-la-staff-resources>

<sup>34</sup> The idea that certain (information) resources should not be restricted in use and subject to private ownership but accessible to all. See <http://en.wikipedia.org/wiki/Commons> and [http://en.wikipedia.org/wiki/Public\\_domain](http://en.wikipedia.org/wiki/Public_domain)

between creators, users and re-users to build the social relationships necessary for successful partnerships.

## TOMORROW'S STANDARDS TOGETHER

Kirsty Lingstadt and Peter McKeague

*Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS)*

Presenter Kirsty Lingstadt introduced [‘Scotland’s Historic Environment Data Strategy’](#) (SHED) which is a sector-wide initiative to improve access to information about Scotland’s historic environment published in April 2014. She also highlighted the collaborative approach that ‘team Scotland’ were taking as outlined in [‘Our Place in Time - the Historic Environment Strategy for Scotland’](#) which is the



first of its kind in terms of a collaboratively developed higher level framework to align and prioritise sector activity towards a common goal through all areas of the sector working together. The Strategy sets out a 10-year vision for Scotland’s historic environment allowing adequate time deliver its aims. Kirsty also talked about ‘mainstreaming’ of the historic environment in Scotland through effective intra-sector collaboration to ensure it was at the heart of cultural, social, environmental and economic

policy within the Scottish government.

**In terms of delivery, the strategy will seek to:**

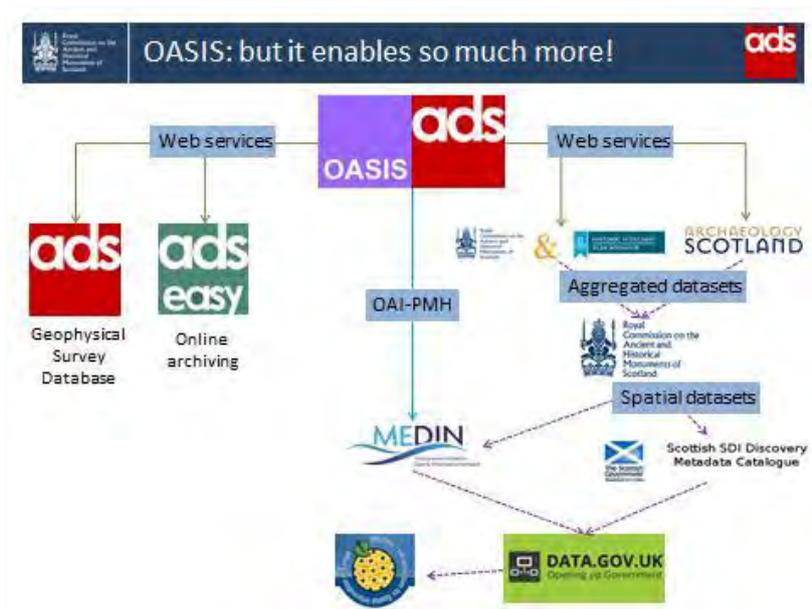
- Improve existing datasets and accessibility to them
- Improve content – to increase usage
- Develop standards to ensure consistency
- Improve efficiency in data creation and management
- Reduction in duplication – with some duplication to link datasets



The Scottish historic environment strategy also seeks to link historic environment datasets with those from Museums and Archives around the common theme of ‘place’, which has started conversations regarding the use of spatial data to draw diverse datasets together and make them accessible through portals such as [Pastmap](#) which brings a number of historic environment datasets together through a mixture of static and live data services<sup>35</sup>.



Peter McKeague then took over to talk about successful partnerships fostered through the use of the [OASIS](#) system to manage and control the flow of information on fieldwork undertaken as part of the planning process from producers to users and re-users. Peter emphasised the importance of standards to achieve interoperability and suggested that the historic environment sector should work more closely with existing and forthcoming industry standards (e.g. [INSPIRE](#) for spatial data), and seize opportunities to play an active role in their formation and think about how we want to deliver our information instead of trying to force our data it into existing frameworks that might not be fit for our sector’s purposes. For example, the consultation for INSPIRE is open until 2020 to ensure that cultural heritage features prominently within the new standard.



<sup>35</sup> Data is made available to customers via the internet. [http://en.wikipedia.org/wiki/Data\\_as\\_a\\_service](http://en.wikipedia.org/wiki/Data_as_a_service)

1919 - 1953



Peter talked about innovative projects to harness the enthusiasm of the voluntary sector to enhance existing datasets with examples including ‘[Scotland’s Rural Past](#)’ and using crowdsourcing to enhance the Canmore dataset by allowing users to upload comments and images via [MyCanmore](#). The partnership between the RCAHMS, the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) and English Heritage to deliver the ‘[Britain from Above](#)’ project that encourages members of the public to identify and provide information about old aerial images of Britain was also highlighted.



Scotland's Rural Past

Peter reported that the [Scottish, English Heritage and RCAHMW historic environment vocabularies](#) achieved the exemplary 5\* level of openness as described in the [Open Data Charter](#) that sets out five strategic principles:

- **Open data by default**
- **Quality and quantity**
- **Usable by all**
- **Releasing data for improved governance**
- **Releasing data for innovation**

He acknowledged that there was still work to do to bring all Scottish historic environment data in line with these standards by making sure information is:

- **Published and reusable**
- **Machine readable to facilitate linking and sharing of data**
- **Made available through open licensing to enable reuse – even commercial use**
- **Discoverable, usable and understandable**

Despite an exponential increase in the availability of data in structured and unstructured formats and the rise of intellectual commons (see p. 26) and Open Access initiatives for publicly funded data, there are still issues with data being kept in ‘silos’<sup>36</sup> and persistent excuses for ‘Data Hugging’<sup>37</sup>.



Excuses for ‘Data Hugging’	Counter argument
The data is <i>wrong</i> – users will tell us it is wrong!	Citizen Science <sup>38</sup> and crowdsourcing <sup>39</sup> will help refine our data.
People will misunderstand (or misuse) our data.	Historic environment data is difficult but it is our responsibility to publish usable data and inform people about

<sup>36</sup> Applications that do not interact with other applications or information systems <http://www.pcmag.com/encyclopedia/term/57871/siloed-application>

<sup>37</sup> A tendency to guard data because of economic concerns or fears of misinterpretation.

<sup>38</sup> The collection and analysis of data by members of the general public, typically as part of a collaborative project with professionals <http://www.oxforddictionaries.com/definition/english/citizen-science>

<sup>39</sup> Obtain information or input into a particular task or project by enlisting the services of a number of people typically via the Internet. <http://www.oxforddictionaries.com/definition/english/crowdsource>

	its use and limitations.
You are giving away an economic resource for free.	Research is built upon data (often gathered at public expense). Access to data helps inform research and challenge conclusions.
Cost of making data available.	The purpose of collecting and curating historic environment data is to make it available and encourage its use/reuse by the sector and members of the public.

A discussion was started on the HER Forum by Martin Newman in 2008 regarding national journal coverage by HERs and whether these were routinely checked and considered a priority. Numerous responses to this post emphasised that HERs did not have the resources to undertake this work and this was often not a good return on effort in terms of enhancing the HER. Peter suggested that this issue could be

overcome by using Linked Data and web services to enhance HERs and national datasets<sup>40</sup> with existing bibliographic data held in the [British and Irish Archaeological Bibliography](#) (biab) avoiding duplication of effort within the sector.

## LINKING DATASETS WITH ARCHIVES

**Victoria Bryant**

*Archive & Archaeology Service Manager, Worcestershire County Council*



Victoria Bryant presented her personal experience of linking archaeological datasets to archives as part of the Worcestershire Archives and Archaeological Service that operates out of The Hive, which is Europe’s first joint university and public library that also houses the Worcestershire County Council’s customer services. The building has received a lot of media attention with its striking gold façade which has in turn enhanced the profile of services operating out of the building, offering new opportunities but also presenting issues.

**“It was the best of times, it was the worst of times”<sup>41</sup>**

<sup>40</sup> [Heritage Gateway](#) for England, [Historic Wales](#) and [Canmore](#) for Scotland

<sup>41</sup> Charles Dickens, 1859 *A Tale of Two Cities*

Victoria highlighted the conflict between opportunity and capacity. Although having a new facility raised their service's profile and presented more opportunities for external funding partners (now accounting for over 50% of the service's operating budget), the lack of core funding meant that there was limited capacity to initiate projects. As such, the most successful collaborative projects tended to be small scale, ad-hoc and practical with a clear end-product demonstrating value added for the resources used.

**University of Birmingham Cultural Learning Hub**

*Funded by the European Regional Development Fund*

**Partners:** Birmingham City Council, Birmingham Museums and Art Gallery, Ironbridge Gorge Museums Trust, the Worcester HIVE and Arts Council

- More than 40 small-medium enterprises in ICT and culture
- **'Triple helix' concept** – bringing together academics, collections and business for their mutual benefit
- **Act as brokers** – bringing together potential partners
- **Easy to start small scale projects**
  - E.g. Touch history multi-touch table showcasing resources at The Hive



The vision for integrating the archives and archaeology datasets focused on the common goal of using different, but often complementary, evidence to tell a story with the learning and outreach aspects of archaeology and archives being fully integrated. However, there were issues because of the cultural differences between the archaeology and archives services in how and why information is collected, what it is used for and how it is disseminated. For example, archives are viewed and used as an end product: there is no interpretation offered and they are simply presented as they are. Conversely, archaeological data is collected specifically to be interpreted, with interpretation also occurring at different stages within the archaeological process and lifespan of an archive.

Victoria again emphasised the importance of linking to external datasets, for example, archive content was 'sign-posted' from the HER, and also the enhancement of common resources for use in different formats (e.g. tithe maps – physical copy held in archives scanned to provide digital geo-referenced resource for use by the HER).

**Victoria concluded by stressing that when working in partnership we need:**

- **Good partners – with a strong overall vision, avoid those who are risk averse**
- **An eye for opportunity**
- **Impact proportional to time and effort put in, small is good!**
- **Flexibility – to ensure that we keep up with the ever-changing information and technology environment**

**And finally, it is all about people – mutual respect and shared agendas.**

## LIST OF PROJECTS RE-USING HISTORIC ENVIRONMENT DATA

[An Atlas of Hillforts in Britain and Ireland](#) - Project to collect, collate and present data on hillforts across the UK and Ireland providing, for the first time, an integrated resource to serve research into this important monument type.

[ArchSearch](#) - powerful search tool for the ADS digital collections.

Historic Wales - map enabled portal for historic environment information in Wales.

[ARCHWILIO](#) – Portal to access records on archaeological sites in Wales from the four Welsh Archaeological Trusts.

[Bristol Know Your Place](#) – Online portal to access historic maps, images and linked information on the historic environment of Bristol.

[British and Irish Archaeological Bibliography](#) (biab) – abstracting and indexing service covering all aspects and periods of archaeology and the historic environment with a geographical focus on Britain and Ireland.

[CANMORE](#) - brings together the results of the survey and collections material into one place and combines location information, site details and images on more than 300,000 archaeological, architectural, maritime and industrial sites throughout Scotland.

[England's Rock Art](#) - database to help record and conserve rock art.

[English Landscapes and Identities from 1500 BC to AD 1086](#) (also see Professor Chris Gosden's presentation above)

[Grey Literature Library](#) – Online resource making unpublished fieldwork reports available in an easily retrievable fashion as part of the OASIS Project (see below).

[Heritage Gateway](#) – Portal allowing cross-searching of over 60 resources, offering local and national information relating to England's heritage.

[History Pin](#) – is a searchable interactive map that allows users to 'pin' images to share information and memories.

[Hoarding in the Iron Age and Roman Britain](#) – Project that seeks to understand why so many hoards were buried in Britain during the Iron Age and Roman periods.

[LEAP Project](#) – linking electronic archives and publications.

[Norfolk Heritage Explorer](#) – Online portal to access the Norfolk Historic Environment Record database.

[NOMISMA](#) - collaborative project to provide stable digital representations of numismatic concepts according to the principles of Linked Open Data.

[North Sea Palaeolandscapes Project](#) – using existing 3D seismic data to generate information on the Mesolithic Landscape of the North Sea.

[OASIS](#) - online index to archaeological grey literature with full-text reports available via the [ADS Grey Literature Library](#)

[Open Context](#) – reviews, edits, and publishes archaeological research data and archives data with university-backed repositories.

[PELAGIOS](#) - Enable Linked Ancient Geodata in Open Systems – aiming to use Linked Open Data with online resources that refer to places in the historic past.

[Portable Antiquities Scheme](#) ( see Dan Pett's presentation below)

[Roman Grey Literature Project](#) – an assessment of the research potential of grey literature in the study of Roman period in England.

**The Mesolithic and the Planning Process in England** - Doctoral research undertaken by [Ed Blinkhorn](#) (University of York) exploring aspects of methodology, communication and material remains recovered in developer-led investigations.

[Selected Heritage Inventory for Natural England](#) (SHINE) - is a single, nationally consistent dataset of undesignated historic environment features from across England that could benefit from management within Natural England's Environmental Stewardship scheme.

[Semantic ENrichment Enabling Sustainability of arCHAEological Links](#) (SENESCHAL)

## SESSION 2 – SKILLS DEVELOPMENT

### SKILLS ISSUES IN INFORMATION MANAGEMENT AND THE USE OF TECHNOLOGY

Kenneth Aitchison  
*Landward Research*



Kenneth started by distinguishing between ‘Skills Gaps’ and ‘Skills Shortages’ which are often treated as one and the same but are different problems that require different solutions.

<p><b>Skills gap</b></p> <ul style="list-style-type: none"> <li>• Something that an organisation doesn't have but needs</li> <li>• Addressed by training existing people</li> </ul>	<p><b>Skills shortage</b></p> <ul style="list-style-type: none"> <li>• Something an organisation cannot get</li> <li>• Addressed by bringing in new people with these skills</li> </ul>
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To understand these skills issues we need to measure capacity:

- This is not just about head counts, but what people can do.
- It is about what sectors and organisations have and also what they might need
  - Measuring capacity is a process - identify what you have > design a plan to improve it > deliver > re-measure to establish new baseline

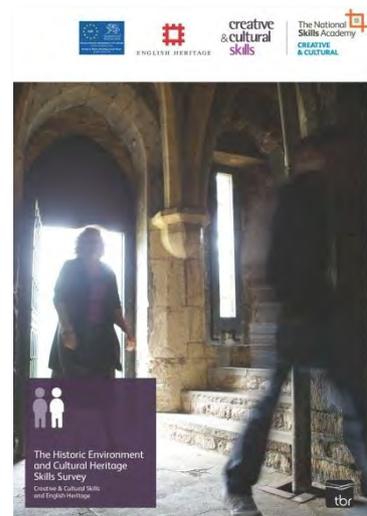
Table 1- Profiling the Profession ICT skills over time

ICT	2002/3	2007/8	2012/13
Skills Gap	74%	68%	35%
Skills Shortage	67%	53%	25%

The ongoing ‘Profiling Profession’ project provides a snapshot of the state of the archaeological profession at 5-year intervals with reports covering 1998, 2002/3, 2007/8 and 2012/13. In terms of Information and Communication Technology (ICT) the change over time shows that there are still significant skills gaps and shortages but that these have improved over the last 10 years.

Data Management	2012/13
Skills Gap	22%
Skills Shortage	9%

The figures for skills gaps and shortages in data management were lower, although it is possible that this is due to different interpretations of what data management is (see below). In 2013 a study of skills issues within the historic environment and cultural heritage sectors, drawn from



a survey of over 1000 employers, was published. This report was written for a specific audience and therefore the general perception was that IT and digital issues mainly related to outward public-facing services such as social media, websites (design etc) rather than data management. The report also found that IT and digital skills were lacking in new entrants with 13% reported for cultural heritage and 10% for archaeology. Kenneth finished by highlighting what has been an ongoing issue for disciplines such as archaeology that require vocational skills as well as academic and transferable skills. The sector often requires a higher education qualification, but higher education institutions do not see it as their responsibility to provide vocational training and instead focus on providing students with training in analytical methods to understand past human activity and generic transferable skills. This means some graduates are leaving higher education without essential vocational skills, and that employers in the future might not necessarily be able to solve skills shortage in some areas by bringing in new people as many of the next generation might not necessarily possess these skills. He concluded that in the future concepts of skills issues should not just focus on training but 'human capital'<sup>42</sup> by building capacity starting with what people are able to do instead of the traditional focus on the training people have already done. In addition, he also emphasised that it is the responsibility of individuals to build their own personal capital and skills so they have the necessary skills to get the jobs they want.

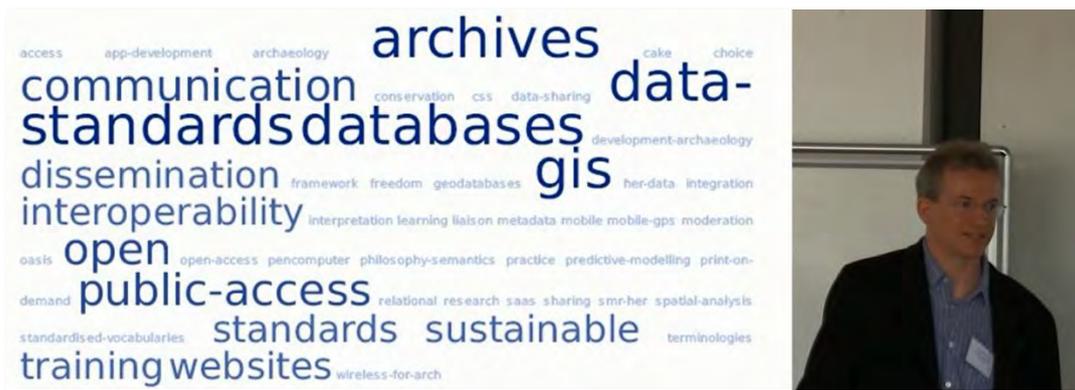
## INFORMATION MANAGEMENT PROFESSIONAL SKILLS TRAINING

Edmund Lee

*Knowledge Transfer Manager, English Heritage*

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<sup>42</sup> The skills, knowledge, and experience possessed by an individual or population, viewed in terms of their value or cost to an organisation. <http://www.oxforddictionaries.com/definition/english/human-capital>



**Table 2 – Word cloud from the first meeting of the IfA Information Management Special Interest Group (IMSIG) - what makes an information manager for the historic environment sector?**

Edmund reminded us that information management is a relatively new skills set that emerged with the digital revolution and particularly the introduction of the personal computer from 1985 and later the rise of the internet following the launch of popular web browser Netscape in 1994. He then pointed out that some of the skills gaps highlighted by ‘Profiling the Profession’ were not just from the new generation coming into the profession but also the existing workforce depending on when they acquired their digital and information management skills and knowledge. To illustrate the ad-hoc way that expertise within the historic environment information management sector developed, he tracked his own skills set as a pre-personal computer graduate (c.1985) and found that some skills were acquired through training but that many were from pursuing a personal interest in the developing field of information technology.

**CILIP key knowledge and skills:**

- **Organising knowledge and information.**
- **Knowledge and information management.**
- **Using and exploiting knowledge and information.**
- **Research skills.**
- **Information governance and compliance.**
- **Records management and archiving.**
- **Collection management and development.**
- **Literacies and learning.**
- **Leadership and advocacy.**
- **Strategy, planning and management.**
- **Customer focus, service design and marketing.**
- **IT and communication.**

He suggested that in the face of increasing skills gaps and shortages within ICT and information management the sector needed to have a more structured approach to skills training and development and more granularity to understand what the skills requirements should be for the sector, drawing inspiration from how related sectors have approached skills mapping. For example, the Chartered Institute of Library and Information Professionals (CILIP) have compiled a list of key knowledge and skills required for library and information professionals<sup>43</sup>, which and can

be used as a self-assessment tool for continuing professional development (CPD), training plans, and to build a portfolio as part of CILIP’s Framework of Professional Registration. In addition, he mentioned that central government has also been considering how it can [develop the digital capabilities of civil servants](#) which were identified as a high priority in the [Civil Service Capabilities Plan](#) published in April 2013.



*“National Occupational Standards (NOS) are statements of the standards of performance individuals must achieve when carrying*

<sup>43</sup> [http://www.cilip.org.uk/sites/default/files/documents/Your\\_PKSB\\_WEB.pdf](http://www.cilip.org.uk/sites/default/files/documents/Your_PKSB_WEB.pdf)

out functions in the workplace, together with specifications of the underpinning knowledge and understanding.”

Edmund suggested that the NOS could be used to provide the infrastructure that would underpin the way the historic environment sector deals with information management skills. Although they are not qualifications, they can be used to build qualifications such as NVQs by pulling together units demonstrating different competencies within areas of a discipline. They are not only useful for individuals wanting to build their personal capacity and record their skills against nationally recognised standards, but can be used by organisations in the creation of accurate job descriptions and person specifications to aid with recruitment as well as tracking performance and structuring continued professional development (CPD).

**Existing NOS units covering information management within archaeology:**

- **Develop procedures for the use of archaeological information systems.**
- **Develop information systems to meet user needs.**
- **Classify, compile and maintain data on the material remains and intangible heritage of past communities.**
- **Provide information on the material remains and intangible heritage of past communities to others.**
- **Disseminate, deposit and archive data on the material remains and intangible heritage of past communities.**

Source <http://www.isgap.org.uk/nos>

Edmund suggested that the NOS could provide the granularity that was lacking in the way skills gaps and shortages are currently reported within historic environment information management and IT. He also highlighted how the NOS infrastructure could improve how our sector collaborates with other sectors by providing a structure and terminology that would enable information exchange and share best practice through a common language for information management professionals. However, before we can use NOS to structure our approach to skills development we need to make sure that they suitably reflect the core skills that are necessary to be an effective historic environment information manager. He concluded that once we have established these building blocks we can use them to construct qualifications or embed activities such as the TACOS seminar into routine work and knowledge transfer finished with the statement **‘Information and knowledge becomes real when it leads onto action’**.

**Information management is more than a technical skill - it is also about:**

- **Communicating your value**
- **Understanding the drivers**
- **Managing processes**
- **Keeping technical skills up-to-date**
- **Providing decision-ready information**

*See Financial Times/SLA. 2013. [‘The evolving value of information management’](#).*

## SESSION 3 - INFORMATION SYSTEMS & TECHNOLOGY

## LINKED DATA & HERITAGE VOCABULARIES

Ceri Binding

*Hypermedia Research Unit, University of South Wales*



Ceri introduced the SENESCHAL<sup>44</sup> project which was an AHRC-funded collaborative project between the University of South Wales [Hypermedia Research Unit](#), the [Archaeology Data Service](#) and project partners: the Bespoke HER User Group, [English Heritage](#), [RCAHMS](#), [RCAHMW](#) and Wessex Archaeology to create enhanced vocabulary services by making historic environment vocabularies available as Linked Data so that users could index their own datasets with uniquely identified (machine readable) controlled vocabularies.

A common issue that prevents greater interoperability amongst historic environment datasets is incompatible terminology that hinders cross-searching between resources. This problem is rooted in the way text is used to convey meaning. Words are ambiguous and using them in metadata indexing causes inherent ambiguity in search results. In the table to the right the underlying concepts represented by words are the same but the inconsistent indexing of these terms means that to retrieve all possible variations in a search, the data would need to be cleansed or a complicated query constructed to account for all the possibilities.

Feature	Period
Post-hole	IRON AGE
Posthole	ron age
POST HOLE	Iron age?
POSTHOLE	EARLY IRON AGE
POST HOLE (POSSIBLE)	250 BC
POSTHOLES	C 500-200 B.C.

**We cannot automatically disambiguate indexing terms from different datasets, for example:**

**TENEMENT in the RCAHMS Monument Type Thesaurus**

*Concept "A large building containing a number of rooms or flats, access to which is usually gained via a common stairway"*

**TENEMENT in the English Heritage Monument Types Thesaurus**

*Concept "A parcel of land"*

To improve the communication of what we actually mean and express search criteria more accurately, the project set out to investigate how to:

- **Indicate what we mean in both indexing and searching without using words**
- **Reference something that unambiguously represents what we mean**
- **Devise globally unique identifiers for things we want to reference**

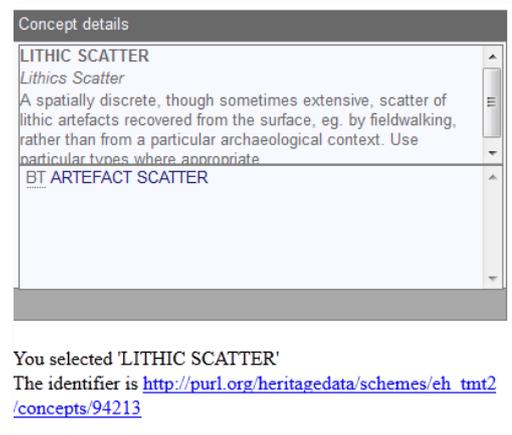
The aim of the SENESHAL Project was to improve interoperability between datasets by putting existing controlled vocabularies, terminology and identifiers online in a consistent, standardised,

<sup>44</sup> Semantic ENrichment Enabling Sustainability of arCHAEological Links  
<http://www.heritagedata.org/blog/about-heritage-data/seneschal>

machine-readable format to differentiate unambiguously between similar indexing terms by supplementing them with concept identifiers describing the data to make it explicit what is meant by terms. The concept-based approach can also be used to accommodate colloquial terms and facilitate multilingual searching by attaching terms into an existing concept structure.

The [heritage vocabularies](#) were made available in machine-readable format(s) through Open Licensing to encourage their incorporation into other applications as:

- **Linked Data** - data made available using existing architecture of the web expressed in RDF<sup>45</sup> using HTTP<sup>46</sup> URIs<sup>47</sup> as identifiers for 'things'.
- **Web services** - a method of communication that allows two software systems to exchange data over the internet.
- **Widgets - Data entry and lookup tools** using web services that can be incorporated into web applications to prevent reoccurring vocabulary problems by providing validation at the point of data entry (e.g. dropdown list of controlled vocabulary concepts when indexing a record).



The vocabularies data were converted to SKOS<sup>48</sup> format which provides a standard way to represent knowledge organisation systems (KOS) encoding different things and their relationships to form a hierarchical structure to construct thesauri and classification schemes within the framework of the Semantic Web<sup>49</sup>. So far the vocabularies and widgets have been adopted by the Portable Antiquities Scheme (PAS) which have incorporated them into finds records, the Archaeology Data Service (ADS) for [use in their content management system](#) and Clwyd-Powys Archaeological Trust (CPAT) in a mobile application to create a monument type dropdown menu.

#### Next steps for SENESCHAL:

- **Identify potential uses across cultural heritage disciplines**
- **Incorporate other vocabularies – and linking vocabularies Creating links to other Linked Open Data (LOD) resources**
- **More predefined user interface widgets for use in with different Apps and webpages**

## GEOSEMANTIC TECHNOLOGIES

Paul Cripps

<sup>45</sup> **RDF** – Resource description framework – a standard model that uses text to encode a knowledge structure and express a chain of relationships comprising statements (or triples) e.g. <subject><predicate><object>.

<sup>46</sup> **HTTP** – Hypertext Transfer Protocol, foundation of data communication for the World Wide Web.

<sup>47</sup> **URI** – Uniform resource identifier, a string of characters used to identify the name of a resource.

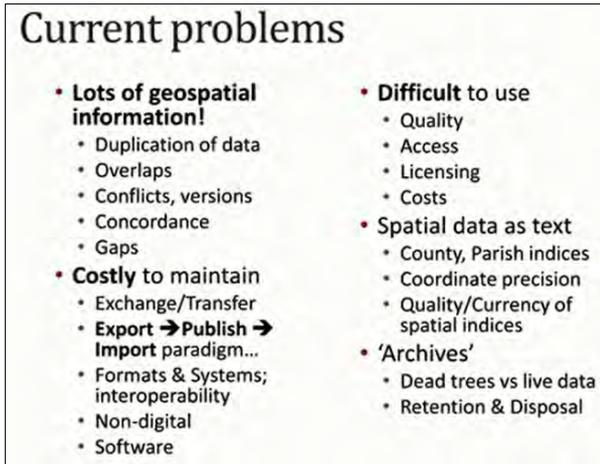
<sup>48</sup> See <http://www.w3.org/2004/02/skos>

<sup>49</sup> [http://en.wikipedia.org/wiki/Semantic\\_Web](http://en.wikipedia.org/wiki/Semantic_Web)

Paul started by introducing his doctoral research on GeoSematic Technologies for Archaeological Resources (GSTAR) which seeks to incorporate complex geospatial information into ontological<sup>50</sup> models of heritage data. GeoSemantic Technologies are an extension of semantic web Linked Data into the geospatial arena to include geometries, places etc. using standards such as GeoSPARQL<sup>51</sup>.

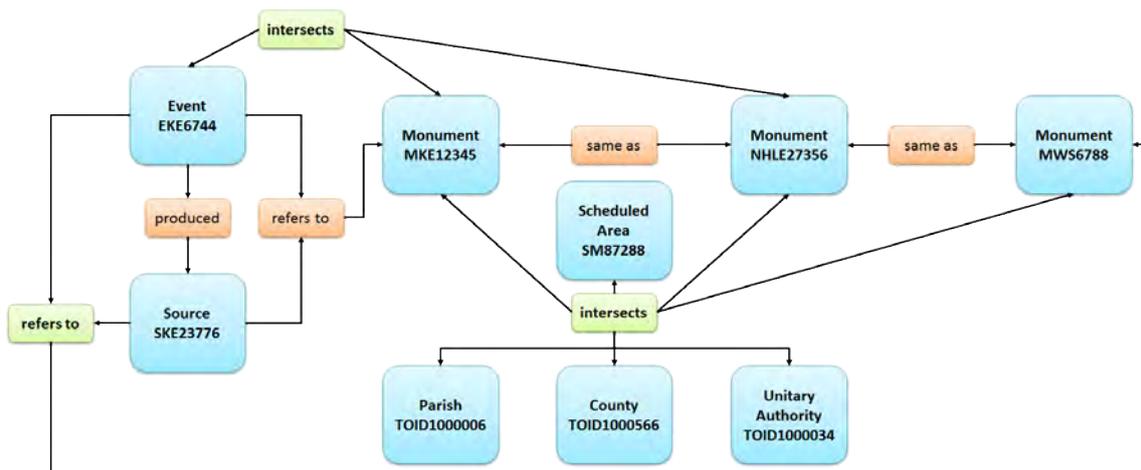


Paul Cripps presents his GSTAR research © Martin Newman



He highlighted some of the problems the historic environment information sector faces due to the ad-hoc way our sector's digital resources were created for different drivers, constraints and stakeholders, and the disparate way in which these resources are currently managed. He also

emphasised that in the current economic climate this situation is likely to get worse. Paul demonstrated how spatial inference and indexing could enhance and link geospatial datasets. In the example presented below, three monuments from different datasets are shown to be the same through the use of spatial operators (common functions found in GIS software) such as intersection and links to additional information describing their spatial relationships.



Paul also gave the example of the [Colonisation of Britain project](#) that used Open Refine<sup>52</sup> and the Ordnance Survey reconciliation API<sup>53</sup> to turn spatial data held as potentially ambiguous text strings

<sup>50</sup> Structural framework for organising information used as a form of knowledge representation.

<sup>51</sup> A Geographic Query Language for RDF Data – a standard to support representation and querying of geospatial data on the Semantic Web. <http://www.opengeospatial.org/standards/geosparql>



into concepts with persistent URIs in a similar way to the Linked Data for the controlled vocabularies. This data can then be used with existing information systems to enhance and enrich them by providing standardised pre-defined spatial information such as current administrative boundaries or even historical boundaries such as Parishes, which can form the basis of queries to extract subsets of data for use with web services.

**What we need is joined up working, collaboration if you will, whereby teams take ownership of groups of records and maintain them, sharing them with other teams.<sup>54</sup>**

## Potential

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>▪ <b>Aligned resources</b> <ul style="list-style-type: none"> <li>▪ Requirement: <b>Persistent Identifiers</b></li> <li>▪ Linked Data not data exchange/copying</li> </ul> </li> <li>▪ <b>Aggregation not duplication</b> <ul style="list-style-type: none"> <li>▪ Focus resources</li> <li>▪ Share efforts</li> <li>▪ Share data</li> <li>▪ Shared infrastructure</li> </ul> </li> <li>▪ <b>Better resource discovery, access and retrieval</b> <ul style="list-style-type: none"> <li>▪ Improved search; mediation</li> <li>▪ <i>This</i> search boundary</li> <li>▪ <i>My</i> search boundary</li> <li>▪ HTML, KML, (geo)JSON, WKT, etc</li> </ul> </li> <li>▪ <b>True spatial indices</b> <ul style="list-style-type: none"> <li>▪ Inferencing</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>▪ <b>Leverage standards for interoperability:</b> <ul style="list-style-type: none"> <li>▪ World Wide Web Consortium (W3C)</li> <li>▪ Open Geospatial Consortium (OGC)</li> <li>▪ MIDAS, CIDOC, Spectrum, etc</li> <li>▪ Inspire</li> </ul> </li> <li>▪ <b>Build on good bits of existing infrastructure</b> <ul style="list-style-type: none"> <li>▪ ADS archives</li> <li>▪ Heritage Gateway</li> <li>▪ Oasis (principals...)</li> <li>▪ NHLE</li> <li>▪ HBSMR</li> </ul> </li> <li>▪ <b>Local maintenance</b> <ul style="list-style-type: none"> <li>▪ Expertise</li> <li>▪ HERs as spine</li> </ul> </li> </ul> |
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He suggested that to create unified resources local should be at the core with local knowledge and expertise captured by HERs feeding into a national aggregate dataset by linking and layering different datasets rather than duplicating them.

**Record once, use many times.**

Paul gave the example of how SHED was changing the way Scotland is managing and sharing their historic environment data (see above) and concluded by emphasising the importance of collaborative, as well as workable and usable standards within the information and heritage sectors to make better use of digital spatial resources through:

- **Efficiency - using technological solutions to redirect (both financial and 'human capital'<sup>55</sup>) towards content creation and enhancement**
- **Linking, sharing and collaborating instead of duplicating**
- **Improving our shared skills-base**

<sup>52</sup> A powerful tool for working with 'messy' data: cleaning it; transforming it from one format into another; extending it with web services; and linking it to databases. <http://openrefine.org>

<sup>53</sup> <http://data.ordnancesurvey.co.uk/docs/reconciliation>

<sup>54</sup> <https://storify.com/pauljripps/tacos-2014>

<sup>55</sup> Or human resources - individuals who make up the workforce of an organization, business sector, or economy.

- Focusing on understanding and addressing user needs

## THE PORTABLE ANTIQUITIES SCHEME

Dan Pett

*Portable Antiquities ICT Advisor, The British Museum*

Dan started with a brief history of the Portable Antiquities Scheme (PAS) system from the first online database in 2001 through the implementation of a new system created by Oxford Arch Digital in 2003 and how he continued to develop the system in-house post 2007 utilising Open Source software solutions (see examples below). He drew attention to the ICT risk of having one person solely responsible for implementing technology and that the PAS ICT team increased its capacity by recruiting a temporary post to assist Dan with ICT developments.



The 3 pillars of PAS data sharing are:



Although the PAS reported an increase of users by removing their commercial clause, for many other organisations there are still [political] issues and mindsets to overcome for this to become standard, especially when many organisations are actively encouraged to make revenue from their data. There are now 415 research projects that utilise PAS data which can be provided in a range of formats (e.g. XML, JSON RDF, CSV) to suit different user needs. For example, QR codes<sup>56</sup> have been used to link

<sup>56</sup> [http://en.wikipedia.org/wiki/QR\\_code](http://en.wikipedia.org/wiki/QR_code)

PAS records with the physical objects they represent enabling finders to easily access information about their finds.



Dan talked about building mobile optimised websites using tools such as Bootstrap<sup>57</sup> as an alternative to the recent trend to put historic environment data into Apps, which he felt are ‘digital silos’<sup>58</sup> that are expensive to develop and maintain with little return on investment. He referenced research undertaken by Lorna Richardson to determine the appetite for such

Apps from community groups, with preliminary findings suggesting that this was surprisingly low, which re-emphasises the importance of understanding target audience and user needs before commissioning digital projects.

The PAS also recycles and links to external data sources using URIs (see above), which has the benefit of enriching PAS records as well as contributing to an aggregate dataset. For example, Ordnance Survey Open Data<sup>59</sup> is used to enhance records with spatial concepts rather than text, the SENESCHAL Linked Data provides standardised indexing via widgets embedded in the online recording form, Pelagios<sup>60</sup> adds place identifiers with numismatic concepts provided by Nomisma<sup>61</sup>. The PAS data is captured in real-time with record being instantly available to the public and Dan raised the question of whether this way of capturing and publishing data would be appropriate for HERs.

Dan talked about various technology partnerships and knowledge transfer projects that are using, enhancing and disseminating PAS data in new ways and linking this up with related datasets. For example, a joint knowledge transfer project undertaken in collaboration with the Pitt Rivers Museum at Oxford



**Screenshot from the Lost Change Project**

University is trialling the ingestion of museum collection data into the PAS which can be downloaded by HERs to enhance their records and link back to the physical artefacts. The success of this project could see this expanded to include other museum collections. In addition, a Leverhulme Trust funded project ‘[Lost Change](#)’ uses visualisation technology to display relationships between coins found in England and Wales and their issuing mints across a range of periods. Dan talked about some

<sup>57</sup> Open Source front-end HTML, CSS and JavaScript framework for developing ‘mobile first’ projects on the web. <http://getbootstrap.com>

<sup>58</sup> Or an information silo - an insular management system incapable of reciprocal operation with other, related information systems. [http://en.wikipedia.org/wiki/Information\\_silo](http://en.wikipedia.org/wiki/Information_silo)

<sup>59</sup> <http://www.ordnancesurvey.co.uk/business-and-government/products/opendata-products.html>

<sup>60</sup> <http://pelagios-project.blogspot.co.uk/2012/10/the-portable-antiquities-scheme-joins.html>

<sup>61</sup> a collaborative project to provide stable digital representations of numismatic concepts according to the principles of Linked Open Data.

of the digital projects he is supporting through the provision of server space for projects such as [Day of Archaeology](#), The Palestine Exploration Fund and the World Numismatics Society.



He introduced the project [Micropasts](#) which is testing the market for crowdsourced historic environment data enhancement projects through simple web-based applications. The two pilot projects are harnessing crowdsourcing to transcribe information held on BM index cards and photo mask objects ready for conversion into 3D images. The potential for Crowdfunding has been investigated by [DigVentures](#) for funding excavation projects and the Micropasts site will also be used to bring together groups of

academics, organised volunteer societies and other interested individuals to advertise new research projects that they wish to conduct in collaboration that require small to medium amounts of start-up money.

Finally Dan talked about how the British Museum is using digital technology to reach wider audiences with video-conferencing to schools and various social media channels with a record ¼ million views of Staffordshire Hoard Flickr on the day the news broke. He did however conclude with a reservation as to whether social media was the 'silver bullet' we hoped it would be to reach wider audiences, especially with the small followings that are usual for archaeology when compared with those of celebrities<sup>62</sup>.

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<sup>62</sup> For more information on the use of Digital media for engagement see Bonacchi, C. (Ed). 2012. Archaeologists and the Digital: Towards Strategies of Engagement. London: Archetype.