Evaluating the Impact on Research Practice of the Development of Digital Repositories within the Humanities: an Assessment of Quantifiable Methods of Impact Assessment

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I certify that this dissertation which I now submit for examination for the award of MSc in Computing (Information and Knowledge Management), is entirely my own work and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the test of my work.

This dissertation was prepared according to the regulations for postgraduate study of the Dublin Institute of Technology and has not been submitted in whole or part for an award in any other Institute or University.

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ABSTRACT

The proliferation of digital repositories is an important manifestation of data sharing and knowledge sharing in humanities disciplines. These repositories encompass both digitised and 'born' digital datasets. Previous studies have focused greatly on the practical and technological aspects of these projects, but there has been increasing recognition of the importance of understanding the actual impact of the availability of these resources on research and research practice.

In a competitive funding environment, previous assumptions of 'if you build it they will come' are no longer sufficient. Impact assessment methodologies offer a means of demonstrating performance and utility. Tools and techniques to evaluate the impact of digital resources are emerging from nascent scholarship in this area.

In order to explore methods for impact assessment, this study has assessed the impact of a defined set of digital resources relating to Irish archaeology in the context of a specific 'community of practice' (professional archaeologists). The study has taken a multi-strand approach using three techniques that form part of the *Toolkit for the Impact of Digitised Scholarly Resources* (TIDSR) developed on behalf of JISC in the UK. The techniques employed were bibliometic analysis, webometric analysis and a survey of practitioners. Seven existing digital resources relevant to Irish archaeology were successfully targeted for evaluation using these techniques.

The techniques used for this study were largely effective, though with certain defined limitations, largely consistent with those encountered in previous studies using these methods. The most significant challenge for impact assessment studies identified was the impact of poor citation practices on measurability. The results obtained have identified significant factors that can influence the impact of a digital resource, positively or negatively.

Keywords: Digital Humanities; Archaeology; Digital Repositories; Impact Assessment; Bibliometrics; Webometrics

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1. INTRODUCTION

1.1 BACKGROUND

The digitisation of datasets and the creation and expansion of digital repositories of varying scale are a significant feature of knowledge sharing within humanities disciplines. The proliferation of digitised datasets and digital repositories is an important aspect of Digital Humanities practice (e.g. Deegan & Tanner 2004; Palmer 2004; DARIAH 2009, 7–10; ARIADNE 2014b, 7). Significant resources and funding have been (and continue to be) expended on the digitisation of a wide variety of material such as archival documents and manuscripts, photographs, maps and printed matter (books and journals). Further, where research funding will result in the creation of 'born' digital datasets, such as databases or geo-survey datasets, it is usually expected that those 'born' digital datasets will be made available (in a web-accessible format) for further or future research (e.g. ARIADNE 2014b, 19–20).

Digital repositories make these digitised and 'born' digital datasets readily available to researchers, but a question that remains is what is their actual impact on research and research practice in the humanities and can this impact be meaningfully quantified. To date, there has been a greater academic focus on the technology underpinning the delivery of digital repositories and digitisation projects, with only limited focus on the evaluation of their impact. This has been changing in recent years and the importance of understanding the impact of these initiatives on research and scholarship has been recognised. Tools and techniques to evaluate this impact are emerging from this nascent scholarship (e.g. Oxford Internet Institute 2008–13).

Archaeologists have been identified as early adopters of ICT technology within the humanities (Eiteljorg 2004, 21). Current practice is increasingly gravitating from analogue to 'born' digital methods of data collection and capture. Digital photography has largely replaced print negative and slide photography. Spatial data is captured using GPS-enabled total stations and laser scanners and exported to 2-D and 3-D software tools for processing. This can be seen internationally in projects such as *3-D Icons* (2012) and nationally in projects such as *Ogham 3D* (see Chapter 4.3.6).

1.2 DESCRIPTION

This project takes a multi-strand approach, utilising a number of different techniques to attempt to quantify or measure the impact of certain identified digital resources relating or relevant to Irish archaeology. Three different techniques have been used to attempt to quantify and assess the impact of specific datasets relevant to Irish archaeology:

- Bibliometrics (or Citation Analysis)—a well-established quantifiable technique that is used, amongst other things, to rate the relative importance of academic and peer-review journals and to measure the output and 'reach' of the work of individual academics within traditional print media.
- Webometrics—a newer quantifiable technique that develops statistics and metrics based on the propagation of hyperlinks between websites. Arguably, it can be used in a similar manner to bibliometrics to measure and quantify scholarly impact within the digital sphere.
- Survey of Practitioners—a broad purpose method of knowledge elicitation; the survey for this study will be targeted at a specific community of practice (Irish archaeologists).

All three techniques form part of the *Toolkit for the Impact of Digitised Scholarly Resources* (TIDSR) (Oxford Internet Institute 2008–13) and have been used in previous studies utilising the full 'toolkit' to evaluate impact (e.g. Meyer *et al.* 2009). Each technique has also been used in isolation in published studies assessing impact (e.g. Eccles *et al.* 2012; Sinn 2012; Chassanoff 2013).

Digitised material and digital resources have an increasingly important role in the dissemination of knowledge and information. There is a growing realisation that the assumption that 'if you build it they will come' needs supporting validation. There is a recognition of the need to understand how these resources are actually used and to quantify their impact and benefit (Warwick *et al.* 2008, 85; Meyer 2011, 1)

A number of selection criteria were developed to decide on appropriate examples of web-accessible resources to target for assessment. These criteria included the type of dataset delivered by the resource, the geographic spread of the dataset and the temporal spread of the dataset. It was also decided to include examples of both research-funded and commercially funded resources.

The intention of the application of these criteria was to arrive at a reasonably diverse range of examples. This resulted in the selection of seven resources for evaluation: Excavations Bulletin Database; Archaeological Survey of Ireland (ASI) Database and Webviewer; Logainm – Placenames Database; Mapping Death; Eachtra Journal; Ogham 3D; Irish Inscribed Stones Project.

1.3 Aims & Objectives

The aim of this project was to examine methods to assess and quantify the impact of the availability of digitised datasets and digital repositories on research practice in the humanities. This has been accomplished by focusing on a particular humanities discipline (archaeology), a particular community of practice (Irish archaeologists) and a designated series of digital or digitised datasets, available online, that are relevant to that discipline and likely to be utilised by practitioners. It utilised a multi-strand approach combining objective datasets (bibliometrics; webometrics) with a subjective dataset (survey of practitioners). The project has explored the efficacy of these approaches to quantifying impact both in isolation and in combination and compared the outcomes with similar recent international studies.

The objectives of the project were to:

- Review existing published research into the impact of digitised datasets and digital repositories on research and research practice in Humanities Disciplines, with particular regard to any studies specific to the field of archaeology or closely related fields, such as history.
- Identify approaches to impact assessment used in previous studies and perceived efficacy of these, as well as any particular limitations.
- Design and execute a multi-strand approach to evaluating the impact of available digitised datasets within Irish archaeology that combined objective datasets (bibliometrics and webometrics) with a subjective dataset (survey of professional archaeologists).
- Analyse, compare and contrast the results of the different research strands
- Assess the efficacy of the methodologies utilised for assessing research impact, both in isolation and in combination.
- Identify significant factors that can affect the impact of resource, whether positively or negatively
- Make recommendations for future research in this area.

1.4 Scope of Study

The scope of this study has been limited to:

- a specific discipline (archaeology)
- a specific community of practice (Irish archaeologists)
- a specified group of seven number web-accessible resources or repositories
- the use of three quantifiable techniques of evaluation

1.5 Structure of Dissertation

This dissertation comprises the following chapters:

- *Chapter 2*

  This chapter provides an introduction to computing in the Humanities or 'Digital Humanities'. It provides an overview of the computing practices in certain humanities disciplines and also current practice within Ireland. Finally, this chapter provides an overview of previous work evaluating the impact of digital resources within the humanities.

- *Chapter 3*

  This chapter provides an overview of knowledge management, knowledge sharing and data sharing. It considers the role of digital repositories to facilitate knowledge sharing. It also provides an overview of these practices within the discipline of archaeology.

- *Chapter 4*

  This chapter describes the digital resources that have been targeted for assessment as part of this study. It sets out the selection criteria used, the background to each resource and individual rationales for their selection.

- *Chapter 5*

  This chapter presents the bibliometric analysis undertaken for this study. It describes the methodology used and outlines the results obtained and key findings.

- *Chapter 6*

  This chapter presents the webometric analysis undertaken for this study. It describes the methodology used and outlines the results obtained and key findings.

- *Chapter 7*

  This chapter presents the survey of practitioners undertaken for this study. It describes the design of the questionnaire, the target audience, as well as the distribution and collection methods used. It then outlines the results obtained and key findings.

- *Chapter 8*

  This chapter presents a combined evaluation and discussion of the results of the three techniques used. The results from each of the techniques are discussed separately and in combination and compared to other relevant studies. An over-arching impact assessment of each of the target resources is presented and discussed.

- *Chapter 9*

  This chapter presents the final conclusions that have emerged from this study and provides recommendations for further works that would be potentially interesting or informative.

2. COMPUTING IN THE HUMANITIES—DIGITAL HUMANITIES

2.1 INTRODUCTION

The humanities comprise a broad and diverse range of fields and disciplines including history, archaeology, art history, music and language studies (both ancient and modern). The development of computing technology in the 20th century led to the development of the sub-discipline of 'Humanities Computing' latterly referred to as 'Digital Humanities' (Svensson 2009).

This chapter provides a definition for digital humanities and gives a brief overview of the development of ICT practices in humanities disciplines. It outlines the development of digital repositories, including current practice in Ireland. It concludes with an overview of previous studies on the impact of digital repositories.

2.2 DEFINING DIGITAL HUMANITIES

Though digital humanities could perhaps be broadly described as the application of digital technologies and ICT-based or derived methodologies within humanities disciplines, this is still quite generalised. How digital humanities can be precisely defined remains a matter of some debate within the digital humanities community (Svensson 2010, §19–29) and varied and personal definitions are commonly offered (TAPoR 2011).

The pioneering use of computers as an analytical or academic tool within humanities disciplines is commonly dated to the late 1940s (Hockey 2004, 4; Svensson 2009, §17) and journals devoted to the discipline were developed from the late 1960s onwards (Hockey 2004, 7; Svensson 2009, §19). Hockey (2004) presents a chronological overview beginning with this pioneering work and outlining the key developments over the intervening period. An important conclusion of this overview is the significance of the Internet, and the world-wide web, to current practice, as a means of both facilitating access to digital or digitally created artefacts and, also, of broadening the audience for such material (Hockey 2004, 17).

Svensson (2009; 2010; 2011; 2012) has explored the origin, evolution and current academic landscape of digital humanities in a series of four linked papers. This sequence of papers provides a useful broad introduction to the discipline as a whole, though it is necessary to look elsewhere for very specific information on regional practice and the adoption and utilisation of digital humanities practices within specific humanities disciplines. Svensson's aim throughout is to '*outline and critically discuss how the humanities interrelates with information technology in multiple ways, to understand the historical, conceptual, and disciplinary aspects of this*

interrelation, and to present an expansive model for the digital humanities' (2009, §6). A central idea, that recurs throughout, is the idea of digital humanities as an evolving discipline in a state of flux (Svensson 2009, §61; 2010, §22; 2012, §1).

2.3 Digital Humanities in Practice

Practice within digital humanities can vary greatly depending on the 'core' humanities discipline and the aims and objectives of the individual researcher or research project. It is possible, however, to identify common threads within the use digital technologies within individual disciplines.

2.3.1 Computing in Archaeology

Archaeologists were relatively early adopters of computer technology, though its initial use within the profession was not widespread due to cost and the technological challenges of its utility before the development of affordable personal computers in the 1970s (Eiteljorg 2004, 21). Initially, computerised solutions were primarily used for record-keeping and for statistical analysis. The ability of computerised database systems to integrate and manage large and complex datasets was of particular utility and, arguably, this has had a consequential impact on the level of detail and complexity of recording undertaken by archaeologists in the field (Eiteljorg 2004, 21-3).

Early computing technology often required archaeologists to develop their own software, though now their needs can largely be met through the use of generic commercial software increasing the potential for cooperation and data-sharing (Eiteljorg 2004, 26).

Archaeological data is also, usually, spatial data, so that Geographic Information Systems (GIS) and Computer Aided Design (CAD) are part of the bedrock of the archaeologist's digital toolkit (Eiteljorg 2004, 23–6). These tools facilitate the storage, presentation and analysis of both 2-D and 3-D datasets.

The switch to digital photography from film-based photography has also been an important innovation for archaeologists. Developing from this, the integration of digital photography with 3-D modelling tools is increasingly facilitating the creation of 3-D representations of sites and artefacts (Eiteljorg 2004, 27). This is well-exemplified by the EU-funded 3-D Icons project that is currently creating 3-D, web-accessible reconstructions of significant archaeological sites across Europe (3-D Icons 2012).

In contrast to other humanities disciplines, use of digital tools and techniques is not primarily a modern facet of academic practice, but is more broadly engaged with by practitioners working in commercial practice, public sector and museum sector (ARIADNE 2014b, 35). Digitisation projects and digital datasets in other humanities disciplines are more frequently transformative, involving the conversion of existing analogue cultural material (texts, images etc.) to a digital format and the scholarly engagement with these digitised resources. Archaeologists are creators of 'new' digital data (ARIADNE 2014b, 36).

2.3.2 Computing in the field of History

By contrast the adoption of computerised tools and methodologies by historians has, at times, been much more controversial. Thomas (2004, 56–61) notes that this adoption by American historians largely coincided with a broader shift in methodologies and approaches exacerbating the emergence of highly divergent views as to the appropriateness and value of computing technology within the discipline. This schismatic tendency was not as pronounced in other countries, however, Thomas (2004, 61) still notes the existence of more widely located schools of thought that view the use of computerised tools and methodologies as potentially detrimental to the discipline.

As with archaeologists, historians also commonly take advantage of generic commercial software, in particular database software. However, inconsistencies between the design of such software—often aimed primarily at business users—and the needs of historians have been noted (Thomas 2004, 60). Commercial database software, for example, is often unable to support 'historic' dates (i.e. pre-1900) within the standard date format and may not be flexible enough to accommodate the 'fuzziness' of historical datasets (Thomas 2004, 60).

Another significant trend is the digitisation of historical source material—texts, images and recordings. The use of the Text Encoding Initiative (TEI) language (TEI 2007) is central to the digitisation of text-based records. Its use is by no means limited to historians; the importance and centrality of text is common strand within digital humanities practice generally (Svensson 2009, §50). Thomas (2004, 65) argues that this change to the use of digital or digitised source material is also changing the dialogue between historian and archival source and the nature of the scholarship that emerges from this (Thomas 2004, 65–6).

2.4 Development of Digital Repositories

This increasing expansion in the creation of digital artefacts within humanities disciplines leads, naturally, to the requirements for storage, access and dissemination of this material. Eiteljorg (2004, 22–3) notes the increasing development of web-accessible repositories that 'publish' or disseminate specific archaeological datasets. The lack of common data structures and ontologies that would allow for the aggregation and recombination of such published datasets remains an issue (Eiteljorg 2004, 22). Chan (2004) describes the emerging trend of university-based repositories to capture and disseminate the research output of individual institutions, which include humanities scholarship. These institutional repositories have the potential to impact both on access to scholarship and on broadening the impact of research (Chan 2004, 295).

As well as being a creation of scholastic research endeavours, digital repositories can be the focus of scholarship and research as a digital artefact in their own right. Digital repositories, even where they take advantage of established data standards and available software—whether open-source or proprietary—such as SQL-based databases, still commonly involve a degree of customised design or development either in data-handling or in the approach to the user interface. Srinivasan *et al.* (2009), for example, have studied user interaction with an experimental museum catalogue user-interface. This research highlighted the disconnect between the Web 2.0 aspects of the interface (such as the inclusion of 'tagging') and the specialised or technical language that continued to be used within the catalogue content in promoting or enhancing user engagement. Patuelli (2011) examined the development of a domain-specific ontology to facilitate access to a particular digital primary source collection. This research both developed a user-based approach to ontology design and demonstrated its efficacy and appropriateness in specific scenarios. Similar technological or usability focused research is common in the literature (Sinn 2012, 1521).

2.4.1 Current Practice within Ireland

Within Ireland, the Digital Humanities Observatory (DHO) was established under the auspices of the Royal Irish Academy to assist researchers working within the discipline and help co-ordinate resources. It plays an important advisory and liaison role, recommending national standards to ensure interoperability and cross-compatibility of the digital resources that are created and facilitating co-operation between researchers, bodies and organisations working in the field (DHO 2008–2011). The, DARIAH report on digital humanities practice within Ireland identified a number of on-going challenges for current practice including (2009, 12):

- Lack of a cohesive national strategy for digitisation of material
- Sustained and sustainable funding for projects
- Lack of capacity within the sector

However, it also pointed out a number of important opportunities for digital humanities in Ireland (DARIAH 2009, 12):

- Presence of major companies such as Google, Intel and Microsoft offers potential for leveraging industry partnerships of future projects
- There good awareness and high interest in digitisation projects
- A substantial body of digitised work has been created in recent years and this is expected to increase exponentially over time, so there is a potential of Ireland to take a lead in developing policy in this area.

An important trend within digital humanities practice in Ireland has been the creation of accessible digital repositories containing either digitised or 'born' digital data. Examples include:

- **CELT**: Corpus of Electronic Texts (CELT 1997–2012)
- **ISOS**: Irish Script on Screen (Dublin Institute for Advanced Studies n.d.)
- **1641 Depositions** (Trinity College Library Dublin 2009–2010)
- **Circle**: Irish Chancery Letters (Circle 2012)

Some of the earliest or longest established examples are relatively simple—effectively the digital reprinting of out-of-print or out-of-copyright scholarly editions or translations of primary source material (e.g. CELT 1997–2012). More recently developed repositories, however, often incorporate more sophisticated or complex elements and can support user-feedback or user-generated additions or emendations (e.g. Trinity College Library Dublin 2009–2010; Circle 2012).

Digital repositories are also, commonly, a secondary outcome of funded research projects. Many projects publish databases of their collected datasets, either in full or in abbreviated formats, as part of their formal dissemination of results (e.g. Mapping Death n.d.).

These projects to date have, largely, been undertaken on a standalone-basis and rely for their long-term viability or curation on the host institutions that undertook (or are still undertaking) the research projects, which underpin them or form the basis for their creation. Recognising this deficit, the *Digital Repository of Ireland* (DRI) has been established to become a national trusted digital repository for contemporary and historical, social and cultural data held by Irish institutions (DRI 2013). This institution is still in the requirements gathering stage (O'Carroll & Webb 2012), but in the long term it will become the central hub and repository for the digital and digitised datasets that have been and continue to be developed within humanities disciplines in Ireland.

Unfortunately the DRI will not be accepting Irish archaeological datasets. In 2008 the SHARE-IT project undertook a framework study to develop a data management strategy for Irish archaeology. This study undertook the first explicit study of digital practices in Irish archaeology and developed recommendations for the development of better methods of data and knowledge sharing (SHARE-IT 2008). In particular, it advocated for the development and funding of an open-access national archaeological portal or archive for archaeological datasets.

2.4.2 Evaluating the impact on research

As noted above, there has been a strong emphasis in published research in exploring the technology and technical challenges in creating digitised datasets and digital repositories (Sinn 2012, 1521). Research devoted to the assessment of the actual impact and scholarly reach of these initiatives has been more limited and is, in general, a very recent development (e.g. Meyer *et al.* 2009; Eccles *et al.* 2012; Sinn 2012; Chassanoff 2013). However, the importance of evaluating the impact of these digital projects has increasingly been recognised, particularly in the context of the competition for research funding (Tanner 2012). In general, such projects rely on research funding from public agencies at national and international level or from philanthropic organisations. The funding process is usually a competitive one, so the ability to accurately assess the impact (both actual and potential) has implications for project design and the success of funding bids.

One of the earliest impact studies was the LARIAH project (Warwick *et al.* 2009) which used quantitative Deep Log Analysis and qualitative user workshops to evaluate a series of digital resources for the humanities. The study argued for the importance of aligning resources with the needs of the prospective user community, developing user-friendly interfaces and ensuring demonstrable resource quality as factors affecting the impact and use of digital resources.

In the UK, JISC has played a pioneering role in funding and commissioning research on this area. The organisation had funded significant digitisation projects such as '19th century British Library Newspapers' and 'British Library Archival Sound Recordings' during the period 2004–7 and commissioned Oxford Internet Institute to assess the impact and usage of these repositories—*Usage and Impact Study of JISC-funded Phase 1 Digitisation Project* (Meyer *et al.* 2009). This study used a variety of empirical and non-empirical methodologies and, most usefully, has resulted in the online publication of a 'toolkit' for impact assessment—*Toolkit for the Impact of Digitised Scholarly Resources* (TIDSR) (Oxford Internet Institute 2008–13). This 'toolkit' describes a variety of different techniques—both quantitative and qualitative—and how they can be applied to measure impact. It has subsequently been utilised for a series of impact studies—

primarily of other JISC-funded resources (e.g. Hughes *et al.* 2011; Meyer 2011; Eccles *et al.* 2012)

A number of recent studies have utilised single tools or techniques to evaluate impact. Sinn (2012) used bibliometrics or citation analysis to examine the citation of digital archival and web-accessible materials in a single peer-review journal. Eccles *et al.* (2012), recognising that scholarly discourse is now much more diverse than just traditional publication, undertook a webometric study of a series of British digital repositories of historical datasets. This study looked at the frequency, proliferation and patterning of links to these sites with the aim of assessing the viability of this technique for quantifying the impact of these sites (at least in part).

Most recently, Chassanoff (2013) undertook a survey-based study of American historians to evaluate how they access and use primary source material in the context of the increasing availability of digitised versions of archival documentation. Though not specifically framed as an impact assessment, this study nevertheless addressed this issue indirectly in examining how historians do (or do not) use digitised datasets, the reasons underpinning this and the degree to which the ready availability of digital datasets has affected or altered their research practices. To date no published example of an impact assessment of an Irish humanities dataset or repository has been identified.

2.5 Conclusions

This chapter has presented a definition for digital humanities and provided an overview of the development of ICT practices in humanities disciplines, notably history and archaeology. It has described the development of digital repositories, including current practice in Ireland. Finally it has summarised previous studies on the impact of digital repositories.

3. KNOWLEDGE MANAGEMENT, KNOWLEDGE SHARING AND DIGITAL REPOSITORIES

3.1 INTRODUCTION

This chapter briefly outlines the relationship between knowledge sharing, communities of practice and knowledge management. It describes knowledge sharing within archaeological practice and its relationship to the development of digital repositories.

3.2 KNOWLEDGE MANAGEMENT AND KNOWLEDGE SHARING

Knowledge Management is a wide ranging discipline involving people, processes and technology (Awad & Ghaziri 2004, 2). Exact definitions of knowledge management and the interactions of these three factors, though sharing many common elements, can be quite varied (e.g. Awad & Ghaziri 2004, 2–3; Hislop 2009, 52), reflecting the perspectives of individual commentators, technical approaches, particular disciplines or business areas. Though ICT is not essential to the practice of Knowledge Management, it is commonly used to support Knowledge Management strategies within organisations and the development of software tools to assist and support knowledge sharing, for example, is not unprecedented (Hislop 2009, 202–20).

Knowledge sharing is an important and, arguably, central part of Knowledge Management practice (Hislop 2009, 53–69). Promoting and incentivising the free exchange of knowledge is an important part of any Knowledge Management strategy (Hislop 2009, 138–40). Knowledge can be shared and transferred in a variety of ways—working together, learning by doing, embedded procedures or face-to-face discussions (Awad & Ghaziri 2004, 273). It does not necessarily require complex ICT systems or technological support.

3.3 COMMUNITIES OF PRACTICE

Communities of Practice are a feature of formal Knowledge Management practice and have been described as ‘a group of people who have an activity in common and as a consequence have some common knowledge, a sense of community identity and some element of overlapping values’ (Hislop 2009, 157). Communities of practice are considered to facilitate and promote knowledge sharing and exchange. Practitioners in humanities professions tend to form communities of practice, these can vary from very formal professional associations to more loosely affiliated groups. A practitioner may belong to multiple over-lapping communities depending on their discipline, specialism and research interests. Examples of these, to which Irish archaeologists might belong, include:

- **European Association of Archaeologists** (http://www.e-a-a.org/): an association of professional archaeologists, mainly from Europe, but with a membership extending across 60 countries.
- **Institute of Archaeologists of Ireland** (http://www.iai.ie/): the representative organisation for all archaeologists throughout the island of Ireland.
- **Group for the Study of Irish Historic Settlement** (http://irishsettlement.ie/): brings together archaeologists, historians, archaeologists and historic geographers who are interested in the development of the Irish settlement landscape.
- **Aerial Archaeology Research Group** (http://www.univie.ac.at/aarg/): provides an international forum for exchanging ideas and information about aerial photography and other forms of remote reconnaissance for archaeological purposes.
- **Friends of Medieval Dublin** (http://friendsofmedievaldublin.wordpress.com/): a group aiming to increase knowledge about and promote public interest in all aspects of medieval Dublin.
- **Irish Society for Post-Medieval Archaeology** (http://ipmag.ie/): seeks to promote amongst academics and the general public a greater understanding of Ireland's post-1550AD archaeology, history and material culture.

3.4 Knowledge Sharing in Archaeological Practice

Knowledge Management has not yet made significant inroads into professional archaeological practice. It has not, as yet, been possible to identify an archaeological company or organisation, within Ireland, that practices knowledge management in a formal or overt sense.

Where Knowledge Management has made some inroads into archaeological practice, it has heavily focused on ICT approaches rather than the broader range of knowledge management tools and techniques. Approaches to date have been quite varied and diverse, focused on particular data sets or knowledge areas rather than on company or organisation structures (in contrast to more conventional knowledge management practice).

Cowrie *et al.* (2009) describe the on-going development of a wiki-based system to provide archaeologists working in the field with supporting information on soil geology and geo-morphology. It is a tool which aims to share information on soils across a wide spectrum of the archaeological community, ensuring that this information can be accessed at point of need and supports the work of the field archaeologist. This is not a system aimed at a particular organisation but at the broad spectrum of the profession.

Karmacharya *et al.* (2008; 2009) describe the integration of knowledge management tools and techniques to more conventional archaeological methods of recording archaeological excavation, along with the development if an ICT system for recording and managing archaeological data from excavations (in keeping with the broad principles of Knowledge Management).

Bracini & Federici (2010) focus on the development of an ICT system to support the management and dissemination of information about archaeological objects or artefacts at all stages of their treatment from excavation, through conservation and cleaning, to identification, analysis and study.

Watrall (2011) describes an ICT system to not only collect, archive, and analyse excavation and artefact data, but to access and visualize that data remotely from anywhere in the world. It is designed to facilitate the interoperability of data, allowing archaeologists to readily share, disseminate and recombine data and information in order to pursue synthetic research objectives.

The common thread in all of these approaches is the focus on specific kinds of archaeological datasets and knowledge areas, to create tools that facilitate the management and sharing of data cross-sectorally, within professional practice, or interdisciplinary (with researchers and colleagues working in complementary or related fields).

What these approaches demonstrate is that the creation of digital repositories for archaeological information can be construed as 'Knowledge Management'. Thus, even where organisations, individuals or groups of researchers are creating such a digital resource, without explicit or stated Knowledge Management objectives, they can still be described as Knowledge Management activities.

A good example of this is the WODAN project, which developed an online database for archaeological wood and charcoal datasets. The aim of the project was not simply to create a repository for wood and charcoal datasets, but to promote data and knowledge sharing between wood anatomists, to promote the adoption of common standards within professional practice and to facilitate and inspire future scientific research (Stuijts 2008; 2009; Stuijts *et al.* 2010). Knowledge Management is not mentioned anywhere in the project documentation, nor are there any indications that the project participants had any familiarity with formal Knowledge Management practices. However, its aims clearly characterise it as a 'knowledge sharing initiative'.

Data sharing and knowledge sharing are also at the heart of a number of on-going EU initiatives focused on or incorporating archaeological datasets and material:

- **3D Icons** (http://3dicons-project.eu/): brings together partners from across Europe with the relevant expertise to digitise in 3D architectural and archaeological monuments and buildings.
- **LoCloud** (http://www.locloud.eu/): is exploring the potential of cloud computing technologies to enhance Europeana, the on-line portal providing access to millions of digitised materials from European museums, libraries, archives and multimedia collections.
- **ARIADNE** (http://www.ariadne-infrastructure.eu/): is bringing together and integrating existing archaeological research data infrastructures, so that researchers can use the various distributed datasets and new and powerful technologies as an integral component of the archaeological research methodology.
- **ArchaeoLandscapes Europe** (http://www.archaeolandscapes.eu/): is focusing on aerial survey and 'remote sensing' methodologies to promote understanding, conservation and public enjoyment of the shared landscape and archaeological heritage.

The most important of these is the ARIADNE project, which commenced in 2013 and is funded through to 2017. This project is focusing on the e-infrastructure for archaeological research. It is aiming to increase integration and inter-operability of existing archaeological resources across the EU. Initial outcomes of the project include recommendations for data sharing policies (ARIADNE 2014a) and a comprehensive study of user requirements with regard to archaeological research data and the infrastructure and services being developed (ARIADNE 2014b).

3.5 Conclusions

This chapter has presented a brief summary of the relationship of knowledge sharing and communities of practice to formal Knowledge Management practice. It has also provided an overview of knowledge sharing in archaeological practice, identifying projects that have explicitly aligned themselves with formal Knowledge Management practice, as well as knowledge sharing initiatives that embrace the spirit of Knowledge Management, albeit without explicitly referencing it.

4. DIGITAL REPOSITORY SELECTION

4.1 INTRODUCTION

The first step in undertaking an impact assessment of web accessible digital resources is the selection of suitable targets for study. This chapter describes the selection criteria used to identify suitable web-accessible resources relevant to Irish archaeology. It then goes on to describe each of these resources, providing both a general background introduction to each resource and the dataset(s) it contains and an individual rationale for its inclusion within this study.

4.2 SELECTION CRITERIA

The selection of the web resources for evaluation within this study was based on the following criteria:

- Selected web resources should deliver an archaeological dataset or a dataset of relevance to archaeological research but deriving from a cognate discipline (e.g. history, linguistics, folklore).
- Selected web resources should include one or more examples of national or island-wide datasets (i.e. datasets that cover the whole island of Ireland, so are not of limited geographic relevance to research).
- Selected web resources should include one or more examples of multi-period datasets (i.e. datasets not limited to a particular time period such as the Neolithic or Bronze Age), as well as one or more examples of period-specific datasets.
- Selected web resources should include one or more examples of datasets produced as a by-product of funded research, as well as one or more examples of datasets produced through commercial activity.

4.3 WEB RESOURCES

4.3.1 Excavations Bulletin Database

URL: http://excavations.ie/Pages/HomePage.php

This database contains summary accounts of all the excavations carried out in Ireland—North and South—from 1970 to 2010. Hard copy publication of an annual Excavations Bulletin (containing summary accounts of archaeological excavations undertaken in Ireland) began in the 1970s and continued, somewhat sporadically in the 1980s. Since the 1990s, all archaeologists who undertake an archaeological excavation on the island of Ireland are required to submit a summary account of that excavation for publication in the Excavations Bulletin for that year. Since 1986 it has been compiled by Isabel Bennett and published by Wordwell Ltd, with support from the National

Monuments Service, the Department of Arts Heritage and the Gaeltacht. In 2001, a digital copy of the Excavations Bulletin was made available online. This online edition included all previously published summaries up to the (then) current printed volume. The database is updated annually in tandem with the publication of the hard copy Bulletin.

Rationale for selection: This is one of the longest established web resources for Irish archaeology. The resource covers the entire island of Ireland and is not restricted to any time period.

4.3.2 Archaeological Survey of Ireland (ASI) Database and Webviewer

URL: http://webgis.archaeology.ie/NationalMonuments/FlexViewer/

The Archaeological Survey of Ireland (ASI) is a unit of the National Monuments Service established to compile an inventory of the known archaeological monuments in the State. The ASI Sites and Monuments Record (SMR) contains details of all monuments and places (sites) where it is believed that there is a monument, known to the ASI, pre-dating AD 1700 and also includes a selection of monuments from the post-AD 1700 period. In addition to paper files, the ASI also maintains a GIS compatible database. There are in excess of 150,800 records in the database and over 138,800 of these relate to archaeological monuments. The records are subject to revision and the data is updated regularly. The web viewer does not give full access to the *ASI Database*, the locations of all sites are shown but not all detailed site descriptions have been released.

Rationale for selection: This is an important resource used by all archaeologists practicing in Ireland. The resource covers the entire island of Ireland and is not restricted to any time period. There is a partial print analogue in the published county inventory or survey volumes (though the print volumes do not cover all counties and the web site provides updated information on discoveries post-dating the publication of the various volumes). Though site descriptions are not available in all cases, the majority published online are the same as those published in the inventory and survey volumes.

4.3.3 Logainm – Placenames Database

URL: http://logainm.ie/

FIONTAR created the Placenames Database of Ireland in collaboration with The Placenames Branch (Department of Arts, Heritage and the Gaeltacht). This is a comprehensive management system for data, archival records and placenames research conducted by the State. The database provides the official Irish and English placenames, as well as access to scanned archival files from

the Placename Commission. This is a general purpose resource, but potentially useful to archaeologists, as placenames can provided important evidence for past human activity and can highlight locations of archaeological potential.

Rationale for selection: This is an example of a dataset of relevance to archaeological research but deriving from a cognate discipline. The resource covers the whole of the Republic of Ireland.

4.3.4 Mapping Death

URL: http://www.mappingdeathdb.ie/

The *Mapping Death* project was an interdisciplinary study of burial practices in Ireland from the late Iron Age to the early medieval period. It was funded by Heritage Council through the INSTAR programme. One of the outcomes of this project was a database of all excavated burials relating to the period from the first to eighth centuries AD. This database has been published online and made publicly accessible.

Rationale for selection: This is an example of a resource created to service a specific research project, which has subsequently been 'published' online and is now generally accessible and searchable. The resource covers the entire island of Ireland, but is specific to a delimited time period (first to eighth centuries AD).

4.3.5 Eachtra Journal

URL: http://eachtra.ie/index.php/journal/

This is an online web-based journal developed by Eachtra Archaeological Projects—a private consultancy. The e-journal is used by Eachtra as a mechanism to disseminate the results of archaeological work that they undertake and to make project reports (so-called 'grey' literature) publicly available.

Rationale for selection: This is an example of a relatively small-scale initiative driven by a private company to make its work publicly accessible and to meet the ethical or moral requirement to disseminate the results of archaeological work. Similar type initiatives can be seen elsewhere, notably Oxford Archaeology, one of the largest companies in the UK which maintains an online 'library' of all of its project reports (https://library.thehumanjourney.net/).

4.3.6 Ogham 3D

URL: http://ogham.celt.dias.ie/menu.php?lang=en&menuitem=00

This is an on-going multi-disciplinary research project that aims to complete laser scans of all known surviving ogham stones and to make these scans and resultant digital models freely available.

Rationale for Selection: This is an example of an on-going research project that is producing a digital dataset. The dataset is period specific but covers the entire island of Ireland.

4.3.7 Irish Inscribed Stones Project

URL: http://www.nuigalway.ie/irish-inscribed-stones-project/

The Irish Inscribed Stones Project is based at NUI Galway and has undertaken digital laser scans of early medieval stone work that includes inscriptions. The resulting scans and models have been made available for download from the project archive. The purpose of the project is to 'preserve' the inscriptions. As most of these 'inscribed' stones are in situ on archaeological sites at various locations around the country they are subject to decay and weathering as they are exposed to the elements.

Rationale for Selection: This is an example of a digital dataset produced as a result of a funded research project. The dataset is period specific but covers the entire island of Ireland.

4.4 KEY FEATURES

The relationship of the resources selected with respect to the selection criteria is summarised in Table 4.1 below.

Resource	Main Discipline	Geographic coverage	Period	Funding Source
Excavations Bulletin Database	Archaeology	All Island	All periods	Public
Archaeological Survey of Ireland (ASI)	Archaeology	26 Counties	All periods	Public

Resource	Main Discipline	Geographic coverage	Period	Funding Source
Logainm	Onomnastics (Placename Studies)	26 Counties	All periods	Public
Mapping Death	Archaeology	All island	Late Iron Age and Early Medieval	Research
Eachtra Journal	Archaeology	All island	All periods	Commercial
Ogham 3D	Archaeology	All island	Early Medieval	Research
Irish Inscribed Stones Project	Archaeology	All island	Early Medieval	Research

Table 4.1—Summary of relationship between resources and selection criteria

4.5 CONCLUSIONS

This chapter has described in detail the criteria used to select web-accessible digital resources, relevant to Irish archaeology, for inclusion in this study. A total of seven resources were selected. An introductory background for each resource has been outlined that describes the nature of the dataset(s) that each contains. In addition, a specific rationale for inclusion has been provided for each resource to demonstrate how it satisfies the selection criteria for inclusion within the study.

5. BIBLIOMETRIC ANALYSIS

5.1 INTRODUCTION

Bibliometrics or citation analysis looks at the frequency with which a particular published paper or overall work of a particular academic author is cited or referenced in publications. It can also identify research 'networks' evident in the cross-citation of academic output. Bibliometric techniques have been used in a number of studies assessing the impact of digital resources both in isolation (e.g. Sinn 2012) and in combination with other techniques (e.g. Meyer *et al.* 2009).

This chapter describes the methodology used to undertake a bibliometric analysis in relation to the seven target web resources and describes the results obtained. It describes the software tool used and the types of metrics that can be calculated. It also outlines the general limitations and caveats that attach to most bibliometric studies, as well as the specific challenges encountered during this specific application of the methodology.

5.2 METHODOLOGY

Bibliometrics a well-established quantifiable technique used to evaluate the scholarly impact of specific research papers or broader bodies of work. It is, by no means, a perfect method and has limitations (see below), but should provide an indication of the academic impact footprint of the target web resources.

This project used *Publish or Perish* 4.6.4 (Harzing 2007) a software tool to extract citation data from *Google Scholar*. Though Google Scholar may not have the perceived authority of some of the longer established citation indices (such as *ISI/Web of Knowledge* or *Scopus*) it has been identified as, potentially, a better index for humanities disciplines due to its greater range and diversity of source material (e.g. Kousha *et al.* 2011). *Publish or Perish* has been used for bibliometric analysis in other studies evaluating the impact of digital resources in the humanities (e.g. Meyer *et al.* 2009).

5.2.1 Limitations of Methodology

The limitations and caveats that apply to traditional bibliometric studies, such as journal impact studies, also apply here. Analysis of citations relies on the reliability and coverage of the citation database or index used. Indices such as *ISI/Web of Knowledge* or *Scopus* are effectively curated, journals are 'selected' for inclusion (Bar-Ilan 2008, 256). On the one hand selection implies quality, the citation listed are 'good' citations, but selection also means 'exclusion'. If certain materials are selected for inclusion then, by definition, other (potentially relevant) material is

excluded. This exclusion of material is a significant factor in why these longer established citation indices can provide poor coverage for humanities disciplines. The *Google Scholar* database combines a curated approach with adventitious inclusions (Bar-Ilan 2008, 256). On the one hand, this leads to a more diverse dataset (Kousha *et al.* 2011), but it can also result in false positives and other detritus (Harzing 2008; 2013; Vaughan & Shaw 2008). Nonetheless, bibliometrics is well-established as a method of identifying the impact and 'reach' of individual scholars and of scholarly research.

5.2.2 Publish or Perish Queries

Publish or Perish has been primarily designed as a tool for academics to track and monitor the impact of their own research output, evaluate the impact of the research output of others and to evaluate the impact and reach of journals (Harzing 2013). It supports three main search types:

- **Author Query**—to analyse the impact of the a specific individual
- **Journal Query**—to analyse the impact of a specific journal
- **General Query**—supports searches (and analysis of results) using any or all of the fields supported by the *Google Scholar* Advanced Search.

Using 'The Phrase' field in the General Query option—which returns all publications containing or citing the searched for phrase—it is possible to search for specific URLs (such as 'mappingdeathdb.ie') and extract a list of publications containing these text strings from the *Google Scholar* Index. These results can then be checked for relevance (to confirm that the documents are definitely citing the digital resource). *Publish or Perish* supports the export of search results in .csv format, this allows both for easy archiving of search results and for search results to be imported into a spreadsheet programme (such as MS Excel) for further classification and analysis. In addition, it is possible to import previously saved search results or suitably formatted bibliographic datasets in .csv format to take advantage of the statistical analyses supported by the software.

The raw results of a search can be edited within the software to either exclude invalid responses or combine duplicated responses (where the same paper has been returned twice by the search algorithm). Where more sophisticated editing or data-checking is required, results can be exported, and edited using other software tools and then re-imported as outlined above.

5.2.3 Publish or Perish Metrics

Publish or Perish automatically calculates the following statistics and metrics (and updates them 'on the fly' as any edits are made):

- Total number of papers and total number of citations
- Average citations per paper, citations per author, papers per author, and citations per year
- Hirsch's h-index 'defined as the number of papers with citation number higher or equal to *h*' (2005, 1). This statistic takes account of both the number of papers and the number of citations of those papers. An academic with a h-index of 10 has produced at least 10 papers each of which have been cited at least 10 times.
- Egghe's g-index (2006)—a complement to the h-index designed to give more weight to highly cited papers in measuring academic impact (Harzing 2013)
- The contemporary h-index (Sidiropoulos *et al.* 2006)—a refinement of the h-index statistic that factors in the age of each paper (more recent papers are given a greater weighting than older ones).
- Three variations of individual h-indices—the Individual h-index (Batista *et al.* 2006), the Normalised h-index (Harzing 2007) and the Multi-author h-index (Schreiber 2008)—which are variations on the original h-index to account for the co-authorship. Harzing (2013) notes that scholars working in certain disciplines, such as the Natural Sciences, tend to produce larger numbers of papers (but a greater proportion co-authored), whereas in other disciplines, such as humanities, the publication rate may be lower, but with a greater proportion of single-author papers.
- The average annual increase in the individual h-index
- The age-weighted citation rate
- An analysis of the number of authors per paper

These statistics and metrics can be exported in a variety of formats such as .xlsx or .csv for further comparison and analysis.

5.2.4 Web Resources Targeted

Searches were conducted using the General Query function with the following parameters entered into the 'The Phrase' field:

- excavations.ie
- www.excavations.ie
- webgis.archaeology.ie
- logainm.ie
- mappingdeathdb.ie
- eachtra.ie/index.php/journal

- ogham.celt.dias.ie
- nuigalway.ie/irish-inscribed-stones-project
- Irish Inscribed Stones Project

The URL strings for each search were kept as short as possible, to ensure that all references to the web resource would be captured, while still being sufficiently specific to exclude irrelevant results (such as different resources or web pages in a shared domain).

After the initial results were compiled, an additional search was run for 'archaeology.ie/ArchaeologicalSurveyofIreland/', as it was pointed out by an expert in this field that many archaeologists using the *ASI Database* cite the Archaeological Survey information page rather than the resource (Dr Rob Sands, pers. comm.). The results of this search were integrated with those for the resource URL and this integrated result is presented below.

In addition, the Journal Query option was used to obtain metrics and statistics for the Journal of Irish Archaeology (JIA). These would provide a benchmark against which to evaluate the metrics obtained for the target websites. JIA is the journal of the Institute of Archaeologists of Ireland. It is a peer-review journal and is considered to be of National (NAT) significance by the European Reference Index for the Humanities (ERIH). JIA was established in the 1970s, so the search query was limited to the period 2001–2014. The longest established of the target web resources—the *Excavations Bulletin Database*—was established in 2001.

5.3 Results of Bibliometric Analysis

This section presents the results of the bibliometric analysis performed. The full dataset produced for each bibliometric search, along with the metrics and statistics produced by *Publish or Perish*, are appended on CD (Appendix E).

5.3.1 Overview

Valid citation sources for six of the seven target web resources were identified. No citation sources were found for *Inscribed Stones*. A search for the full project title '*Irish Inscribed Stones Project*' was undertaken when the initial URL search failed. This did not return any citation sources either, therefore we can conclude that it is unlikely that this resource has been cited in any scholarly publications.

Four of the resources—*Eachtra Journal*, *ASI Database*, *Mapping Death* and *Ogham 3D*—had very low levels of citation (Table 5.1). However, both the *Excavations Bulletin Database* and

Logainm had much more robust levels of citation; these resources were cited by 79 and 31 publications respectively (Table 5.1).

	Excavations Bulletin Database	**ASI Database**	**Logainm**	**Mapping Death**	**Eachtra Journal**	**Ogham 3D**	**Inscribed Stones**	**JIA 2001-14**
Total number of papers	79	7	31	2	8	2	0	60
Total number of citations	118	0	18	1	5	0	0	170
Years	14	7	6	2	5	2	0	14
Average number of citations per year	8.43	0	3	0.5	1	0	0	12.14
Average number of citations per paper	1.49	0	0.58	0.5	0.63	0	0	2.83
Average number of citations per author	89.7	0	14	1	1.25	0	0	131.9
Average number of papers per author	61.11	3.59	26.5	1.5	6	1.5	0	49.07
Average number of authors per paper	1.8	2.86	1.42	1.5	1.88	1.5	0	1.63
h-index	6	0	2	1	1	0	0	7
g-index	9	0	3	1	2	0	0	10
Contemporary h-index	5	0	4	1	1	0	0	3
Individual h-index	3.6	0	1	1	0.25	0	0	3.77
Normalised h-index	5	0	2	1	1	0	0	6
Age-weighted citation rate	19.75	0	8.87	0.5	2.5	0	0	15.3
Age-weighted index	4.44	0	2.98	0.71	1.58	0	0	3.91
Age-weighted citation rate per author	14.85	0	5.53	0.5	0.63	0	0	11.91
e-index	6.93	0	2.45	0	2	0	0	6.08
hm_index	4.67	0	1.33	1	0.25	0	0	5.67
Average number of citations per author per year	6.4	0	2.33	0.5	0.25	0	0	9.42
Average annual increase in individual h-index	0.36	0	0.33	0.5	0.2	0	0	0.43

Table 5.1—Metrics and statistics for each target web resource (after cleaning of datasets)

Though citation sources were identified for six of the target resources, the datasets were only sufficient for *Publish or Perish* to calculate detailed metrics and statistics for four of the target resources—the *Excavations Bulletin Database*, *Logainm*, *Mapping Death* and the *Eachtra Journal* (Table 5.1).

The metrics calculated by *Publish or Perish* reflect different statistical methodologies for quantifying the significance and academic 'reach' of an author or publication. The h-index (Hirsch 2005) is the key metric. It has become a widely adopted metric for evaluating the work individual scholars, as well as a suggested alternative to the Journal Impact Factor (JIF) (Bar-Ilan 2008; Vanclay 2008; Harzing & van der Wal 2009; García-Pérez 2010). Most of the other metrics are derivatives or variations based on the original h-index (see Section 5.2.3 above). All metrics conform to a standard 'bigger is better' paradigm i.e. metrics of higher numeric value indicate greater relative impact.

The relative ranking of the target web resources is consistent (Table 5.1). The *Excavations Bulletin Database* has the strongest impact footprint, based on metrics, followed by *Logainm* with *Eachtra Journal* and *Mapping Death* at a fairly similar level, but lower again.

The Journal of Irish Archaeology (JIA) provides an example of a conventional academic publication of national significance within the field of Irish archaeology. In general, all of the metrics for the target web resources are lower (in most cases significantly lower) than those returned for JIA (Table 5.1). Of the four resources for which metrics could be calculated, only the *Excavations Bulletin Database* has results that are anyway close to the measures for JIA.

5.3.2 Difficulties encountered

As stated above, two separate searches had to be run for the *ASI Database* and the results combined to account for the fact that users might cite either of two different URLs. The results of each search were separately exported to Excel and combined into a single worksheet, then reimported into *Publish or Perish* from a .csv file.

The results returned for the searches of the URLs for *Logainm*, the *ASI Database* and the *Excavations Bulletin Database* returned some invalid citations. However, this was not the case for the searches run for *Eachtra Journal*, *Mapping Death* and *Ogham 3D* ,which did not contain any invalid citations.

The inclusion of non-scholarly material within the *Google Scholar* database has been noted (Harzing 2008; 2013; Vaughan & Shaw 2008), but not perceived as problematic or sufficiently

prevalent to distort bibliometric datasets or the metrics derived from them. Some of the invalid citations that were found during this study derived from a site known as *Pilgrimage in Medieval Ireland* (http://pilgrimagemedievalireland.com/), which is a heritage-related website and blog. The *Google Scholar* database includes all of the individual blog posts and webpages from this site as individual publications. In the case of *Logainm* 12 of the 45 citation sources returned were pages or entries from *Pilgrimage in Medieval Ireland* and in that of the *ASI Database* it was seven out of the ten. These datasets were cleaned directly within *Publish or Perish* by unchecking the listing for each invalid citation in the Results Panel within the main interface. The invalid citation still form part of the (saved) raw dataset for the search, but are excluded from the calculation of metrics and statistics.

	Logainm		**ASI Database**	
	Raw	**Cleaned**	**Raw**	**Cleaned**
Total number of papers	45	32	10	3
Total number of citations	18	18	0	0
Years	6	6	2	2
Average number of citations per year	3	3	0	0
Average number of citations per paper	0.4	0.56	0	0
Average number of citations per author	14	14	0	0
Average number of papers per author	39.5	27.5	8.83	1.83
Average number of authors per paper	1.33	1.41	1.3	2
h-index	2	2	0	0
g-index	3	3	0	0
Contemporary h-index	4	4	0	0
Individual h-index	1	1	0	0
Normalised h-index	2	2	0	0
Age-weighted citation rate	8.87	8.87	0	0
Age-weighted index	2.98	2.98	0	0
Age-weighted citation rate per author	5.53	5.53	0	0
e-index	2.45	2.45	0	0
hm_index	1.33	1.33	0	0
Average number of citations per author per year	2.33	2.33	0	0
Average annual increase in individual h-index	0.33	0.33	0	0

Table 5.2—Comparison metrics from raw and cleaned datasets for *Logainm* and *ASI Database*

Comparing the metrics from the raw and cleaned datasets for each of these target resources (Table 5.2) does not suggest that there was a significant distortion. The h-index for *Logainm* is unchanged as are its associated variants—g-index, contemporary h-index, individual h-index and normalised h-index. However, only limited metrics could be calculated for the *ASI Database*; a similar proportion of 'bad' citations in a larger dataset might have the potential to be distorting.

This issue was also noted in the *Excavations Bulletin Database* search results, but was a relatively minor and easily identified as an issue by comparison with the other difficulties encountered compiling this dataset.

The initial search using the parameter 'excavations.ie' returned 313 citation sources, however, as checking of these commenced it became rapidly apparent that the majority were invalid. Searching directly in *Google Scholar* using the same parameter quickly highlighted the cause (Figure 5.1). Despite entering the search term in 'The Phrase' field (and even with the addition of quotations) the search algorithm was not limiting its returns to the exact text string 'excavations.ie' but was returning grammatical variations (e.g. 'excavations, ie' or 'excavations (ie'). Checks of the search parameters used for the other target web resources indicated that this problem was limited to 'excavations.ie'.

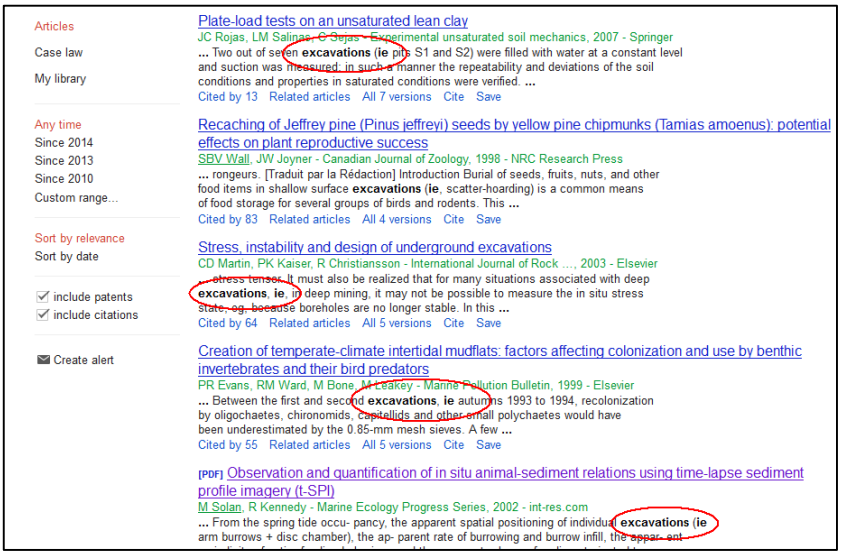

Figure 5.1—Screengrab of search results from Google Scholar

The most obvious solution was to emend the search parameter to 'www.excavations.ie', but this would exclude instances where 'www' had been dropped from the citation (e.g. Becker *et al.* 2008). A multi-stage solution was adopted. Two searches were run in *Publish or Perish*, the first—using the parameter 'www.excavation.ie'—produced 66 citation sources. The second search used the original parameter 'excavations.ie' but limited citation sources returned to the period 2001–2014 (the web resource was originally made available in 2001, so references prior to that year must be invalid as it did not exist). Both sets of results were exported to excel for comparison. All duplicated results (i.e. those present in both datasets) were presumed valid and the remaining unique results were checked for validity. This resulted in 79 'valid' citation sources.

This dataset was saved to .csv and imported back into *Publish or Perish*, which then calculated the metrics and statistics for the *Excavations Bulletin Database* presented above.

5.4 Key Findings of Bibliometric Analysis

The analysis undertaken as part of this study does indicate that six of the seven target web resources have a definite (if in some instances small) scholarly footprint. The resource most heavily cited is the *Excavations Bulletin Database* (79 citation sources) while those at the lower end of the scale were *Mapping Death* and *Ogham 3D*, each with two citation sources.

It was also possible to calculate metrics for four of the resources. The key metric is the h-index (Hirsch 2005) and most of the other metrics calculated are derivatives and variations based on Hirsch's original (Batista *et al.* 2006; Egghe 2006; Sidiropoulos *et al.* 2006; Harzing 2007; Schreiber 2008; Harzing 2013). The h-indices returned for the individual resources show the same pattern as the citation count. Comparison with the metrics for the *Journal of Irish Archaeology* (JIA) suggests that the *Excavations Bulletin Database* has a similar or just slightly lower level of scholarly impact.

Three significant challenges had to be addressed and resolved in order to successfully undertake the analysis. Two of these—the return of invalid citations and the failure to parse the 'excavations.ie' search correctly—resulted from the choice of citation database—*Google Scholar*—and reflected the limitations of that particular data source for bibliometrics generally. The third challenge—tracking two separate URLs for the *ASI Database*—was a difficulty that has been encountered in other impact assessment studies and is discussed in more detail in Chapter 8.

5.5 Conclusions

Bibliometric analysis is the first analytical technique that has been used in this study. This chapter describes the methodology adopted for this study and the results obtained.

The results have been presented empirically and will be discussed in detail and compared to the results of the other two analytical techniques, as well as the results of other impact assessment studies in Chapter 8.

6. WEBOMETRIC ANALYSIS

6.1 INTRODUCTION

Webometrics has been described as '*a set of quantitative techniques for tracking and evaluating the impact of web sites and online ideas*' (Thelwall 2008–13). It looks at the propagation of hyperlinks between websites. Links to a website or web resource can, potentially, shed light on factors such as its popularity, who is using it and where those users are located (Thelwall 2008–13). Webometric techniques aim to analyse link data so that these trends can be identified and explored. Similarly to Bibliometrics, it can be used to assess the online impact of scholarship and scholarly research, since a large proportion of academic dialogue now takes place online and outside of the more traditional publication fora (Eccles *et al.* 2012). A variety of different techniques can be used (Thelwall 2008-13; 2013) including:

- Web impact assessment (examining 'mentions' on websites)
- Link impact assessment (examining citations of a web URL or hyperlinks to a web URL)
- Link relationship mapping (mapping the connections between web URLs)
- Network analysis (both of individuals participating in social networks and networks of social websites)

This chapter describes the webometric analysis technique used as part of this study and outlines the results of that analysis.

6.2 METHODOLOGY

The particular methodology selected for this study was a *Link Impact Assessment* using URL citations. It is a methodology that has been used in previous studies evaluating the impact of digitised, web-accessible resources (e.g. Meyer *et al.* 2009; Meyer 2011; Eccles *et al.* 2012).

6.2.1 Link Impact Assessments

Link Impact Assessments presume that the count of hyperlinks to, or citations of, a URL can be used to determine the web impact of the resource cited or linked to (Thelwall 2013, 27–28), analogous to the way that citation of a publication is considered indicative of its perceived usefulness or value. A URL citation is the 'mention' of a URL on another web page (often referred to as a *site inlink*), within the text of that page; these citations may also be formatted as hyperlinks or not and are considered an appropriate substitute where actual hyperlinks cannot be tracked or counted (Thelwall 2013, 106). Many commercial search engines—notably Bing—no longer provide information about hyperlinks, but URL citation data can be extracted from them for analysis (Thelwall 2013, 27).

Link Impact Assessments can be used to evaluate the following (Thelwall 2013, 28–9):

- The relative performance or impact of a group of web sites; the counts of *site inlinks* can be compared to identify strong or weak performers
- The types or categories of site linking to a target can be identified and evaluated for patterns or contrasts
- The locations or host countries of *site inlinks* can be identified from Top Level Domains and geographic trends identified where present

6.2.2 Caveats and Limitations

Link Impact Assessments do have certain limitations (Eccles *et al.* 2012, 516–8). *Site inlinks* can be created for a variety of different reasons (Thelwall 2003), most notably automated links created for site navigation. That website *A* publishes a link to website *B* is not necessarily an endorsement (Eccles *et al.* 2012, 513; Thelwall 2013, 26). Impact studies using this type of data in aggregate, however, do demonstrate that analysis of it can shed light on the impact of a resource, even if it is not definitive (Meyer *et al.* 2009, 56; Eccles *et al.* 2012).

As with bibliometric analysis, it relies on the actual citation of the URL for a given web resource and, also, that this URL is stable/unchanging. Where the URL for a resource has changed it can complicate the analysis, as it is necessary to collate and combine datasets for the old and new URLs in order to be able to undertake an accurate evaluation (Meyer 2011, 20; Eccles *et al.* 2012, 516–8). A related complication is where URL redirection is used; some sites may link to the original page and some to the redirected page (Meyer 2011, 20).

The main practical limitation, however, is that most search engines will only return a maximum of 1,000 results. This means that where webometrics returns a *site inlink* count greater than 900 for a target URL there must be additional results that are known to the search engine but are not being returned due to the cap on results (Eccles *et al.* 2012, 518).

6.2.3 Webometric Analyst

This impact assessment was undertaken using *Webometric Analyst* 2.0 (Statistical Cybernetics Research Group 2013) which uses the Bing Search API to compile and analyse link data. This particular software has been used for previous impact assessment studies (e.g. Eccles *et al.*, 2012) and has been recommended within the *TISDR 'toolkit'* (Oxford Internet Institute 2008–13).

Webometric Analyst has built in 'wizards' pre-configured to deliver a number of different types of webometric analyses (Thelwall 2013, 102–110). The built-in 'wizard' to produce a Link Impact

Report (LIRe) was used on its default settings. URL citations are used to generate the Link Impact Report as Bing no longer supports searches for hyperlinks (Thelwall, 2013, 106). There are three stages to the operation of the software (Thelwall, 2013, 102; 106–7):

1 *Input*: List of URLs saved as a text file and loaded into Webometric Analyst when prompted. Webometric Analyst automatically converts this list to a set of web searches, including the addition of the appropriate search parameters to eliminate *site self-links* (links to a web-page or URL from within the same web site or domain).

2 *Search*: Searches are submitted to the Bing search engine using its API and the results saved as text files.

3 *Reporting*: The URL dataset in the text files is analysed and formatted into a standardised reporting template (output as interlinked html files). Automatic analysis includes listing of all URLs returned for each search target, identification of source sites and domains and tabulation of this data.

6.2.4 Web Resources Targeted

The following list of search parameters was saved as a plain text file and loaded into *Webometric Analyst* to commence the assessment:

- excavations.ie
- webgis.archaeology.ie
- logainm.ie
- mappingdeathdb.ie
- http://eachtra.ie/index.php/journal/
- ogham.celt.dias.ie
- http://www.nuigalway.ie/irish-inscribed-stones-project

There was one entry for each of the target resources. Where a target resource is available on a dedicated domain or sub-domain the search parameter can be limited to that domain (e.g. *Excavations Bulletin Database* or *Mapping Death* database). A full URL was required for web resources on a shared domain (e.g. *Eachtra Journal* or *Inscribed Stones*).

After the initial results were compiled, an additional search was run for 'archaeology.ie/ArchaeologicalSurveyofIreland/', as it was pointed out by an expert in the field that many archaeologists using the *ASI Database* cite the Archaeological Survey information page rather than the resource (Dr Rob Sands, pers. comm.). The results of both searches were imported into Excel and combined. This integrated result is presented below.

As noted above, the built-in 'wizard' automatically configures the search and adds the parameter to exclude *site self-links* (e.g. '-site:excavation.ie' to the 'excavations.ie' search). This is an important feature as *site self-links*—links to a URL from within the same domain or sub-domain—are primarily an artefact of a web site's structure (for navigation) and not an indication of the 'value' of the URL linked to (Thelwall 2013, 26). Inclusion of these within the analysis could distort the results, particularly for target resources returning low numbers of URLs (and thus, potentially with a low impact footprint).

6.3 Results of Webometric Analysis

This section presents the results of the webometric analysis performed. The full dataset produced by *Webometrics Analyst* 2.0 is appended on CD (Appendix F).

6.3.1 Link Impact Report

The full Link Impact Report produced by *Webometrics Analyst* 2.0 is appended on CD (Appendix F). The raw search data is presented as a series of text files:

- //Appendix_F_Webometrics/TargetSites URLciteSch. bing long results.txt
- //Appendix_F_Webometrics/TargetSites URLciteSch. bing long results_raw.txt
- //Appendix_F_Webometrics/TargetSites URLciteSch. bing long results_spam.txt
- //Appendix_F_Webometrics/TargetSites URLciteSch. bing short results.txt
- //Appendix_F_Webometrics/ASI_SplashSearch URLciteSch. bing long results.txt
- //Appendix_F_Webometrics/ASI_SplashSearch URLciteSch. bing long results_raw.txt
- //Appendix_F_Webometrics/ASI_SplashSearch URLciteSch. bing long results_spam.txt
- //Appendix_F_Webometrics/ASI_SplashSearch URLciteSch. bing short results.txt

The report presenting and collating this data is presented as a series of interlinked html files; the main navigation page (//Appendix_F_Webometrics/Link_Impact_Report/index.html & //Appendix_F_Webometrics/Link_Impact_Report_Supplemental/index.html) provides a summary of the results which link to detailed tables. This report includes:

- numbered lists of all URLs which cite each of the target web resources
- tables listing the Domains, Sites, Second Level Domains (STLDs) and Top Level Domains (TLDs) from which the URLs returned for each of the target sites derive and frequency of citation from each Domain, Site, STLD and TLD
- summary counts of each of these tabular lists

Selected tables from this report to which additional contextual information has been added (see below) are also reproduced in Appendix A.

6.3.2 Overall comparison

The Link Impact Report provides an overall summary count of the number of unique URLs that contain a citation for each of the target web resources (Table 6.1) alongside counts of the:

- **Domains**—domain names of the URLs returned for each target site
- **Sites**—the distinguishing end of the domain names of the URLs returned for each target site; always the STLD plus one section to the left
- **Second Level Domains (STLDs)**—the second level domain (where that applies e.g. .co.uk) of the URLs returned for each target site, for URLs with no STLD element, the TLD is used
- **Top Level Domains (TLDs)**—the top level domain of the URLs returned for each target site

Two of the target web resources—the *Excavations Bulletin Database* and *Logainm*—emerge with relatively high counts of URLs, Domains and Sites. Both are cited on well over 100 different URLs; the *ASI Database* lags just behind them with a total of 109 URLs (66 citing the resource URL and 43 the information URL). The remaining target resources have markedly lower citation levels (Table 6.1), with *Inscribed Stones*, in particular, barely reaching double-digits in the count of URLs. There is much less marked variation in the counts of STLDs and TLDs in all instances.

Target Resource	Base query	URLs	Domains	Sites	STLDs	TLDs
Excavations Bulletin Database	"excavations.ie" -site:excavations.ie	460	368	240	22	19
Archaeological Survey of Ireland (ASI) Database and Webviewer	"webgis.archaeology.ie" -site:archaeology.ie; "archaeology.ie/ArchaeologicalSurveyofIreland" -site:archaeology.ie	109	78	60	14	13
Logainm – Placenames Database	"logainm.ie" -site:logainm.ie	157	117	103	11	11
Mapping Death	"mappingdeathdb.ie" -site:mappingdeathdb.ie	21	14	10	4	4
Eachtra Journal	"eachtra.ie/index.php/journal" -site:eachtra.ie	36	23	17	8	8
Ogham 3D	"ogham.celt.dias.ie" -site:dias.ie	40	29	25	8	7
Irish Inscribed Stones Project	"www.nuigalway.ie/irish-inscribed-stones-project" -site:nuigalway.ie	11	8	4	3	3

Table 6.1—Overall summary of link impact assessment

6.3.3 Top level domains (TLDs)

In some instances the TLDs and STLDs can indicate the 'type' or 'classification' of URL that is citing the web resource. For example, the .edu TLD is reserved for use by American third level institutions, while the .ac.uk STLD serves a similar function for UK-based institutions. Any URL from these domains can be presumed to be 'academic' in character.

Unfortunately most of the TLDs returned for the seven web resources evaluated tended to reflect country of origin (see Table 6.2) rather than 'type' of web site. Similarly very few 'diagnostic' STLDs were returned (see Appendix F).

Most URLs for each of the target sites come from the .com, .net and .ie domains, none of which support STLD designations (Table 6.2). A .ie domain name can only be obtained by individuals or organisations with an address within the island of Ireland (including Northern Ireland) or who can prove a substantive connection to Ireland (IEDR 2014). Though the .com domain was originally intended for use by businesses, it is widely used by a variety of different types of user, so a .com website cannot be assumed to be a business website and .net is similarly widely used.

Country/ Region	**Domain**	**Excavations Database**	**ASI Database**	**Logainm**	**Mapping Death**	**Eachtra Journal**	**Ogham 3D**	**Inscribed Stones**
Transnational	com	121	39	50	4	8	14	2
Transnational	net	110	9	9	5	7	4	5
Ireland	ie	70	14	36	4	2	6	0
Transnational	org	22	2	10	0	0	0	0
United Kingdom	uk	16	6	0	1	1	2	0
Russia	ru	6	1	2	0	0	0	0
USA	edu	4	1	1	0	1	0	1
Germany	de	4	0	1	0	2	0	0
Transnational	info	2	1	4	0	0	0	0
Europe	eu	2	1	1	0	0	0	0
Australia	au	3	0	0	0	0	0	0
Columbia	co	1	0	0	0	0	1	0
Italy	it	1	0	0	0	0	1	0
Canada	ca	0	0	2	0	0	0	0
Japan	jp	1	0	0	0	0	1	0
Spain	es	1	0	1	0	0	0	0
Tokelau	tk	0	1	0	0	0	0	0
Latvia	lv	0	1	0	0	0	0	0
Netherlands	nl	0	0	0	0	1	0	0

Country/ Region	Domain	Excavations Database	ASI Database	Logainm	Mapping Death	Eachtra Journal	Ogham 3D	Inscribed Stones
Switzerland	ch	0	0	0	0	1	0	0
Sweden	se	0	1	0	0	0	0	0
Greece	gr	0	1	0	0	0	0	0
Denmark	dk	1	0	0	0	0	0	0
Lithuania	lt	1	0	0	0	0	0	0
Niue/ Internationalised	nu	1	0	0	0	0	0	0
Transnational	today	1	0	0	0	0	0	0
Totals		**368**	**78**	**117**	**14**	**23**	**29**	**8**

Table 6.2—Country or Region of origin based on Top Level Domains (TLDs) with count of unique domains from each

Taken as a whole, 26 different TLDs are the source of citation to the target web resources. Of these 26, five TLDs are transnational, one is specific to Ireland, 12 (excluding .ie) are European and four relate to other English-speaking countries (note, .uk has been counted as both European and English-speaking). The remaining five relate to various non-English speaking, non-European countries.

Despite this diversity, the majority of URLs in all examples derive from transnational TLDs (mainly .com and .net). Other than the Irish .ie TLD, citations from country-specific TLDs tend to number between one and four (commonly with only a single example). All of the target web resources, with the exception of *Inscribed Stones* are cited by Irish websites, though only in the cases of the *Excavations Bulletin Database*, *ASI Database* and *Logainm* are the total citations greater than 10.

The Excavation Bulletin Database has citations from 19 different TLDs and, in addition to the predominant .ie, .com and .net TLDs includes seven examples from Europe and three from other English-speaking countries. *Logainm* and the *ASI Database* show a similar level of TLD diversity with 13 and 10 distinct TLDs respectively. The *ASI Database* is cited from five European TLDs and two other English-speaking country TLDs, while *Logainm* has citations from three European TLDS and two other English-speaking country TLDs. The *Eachtra Journal* has citations from eight distinct URLs, however four of these are from Europe and two from other English-speaking countries. *Mapping Death* and *Inscribed Stones* show the least diversity with only four and three unique URLs respectively.

6.3.4 Sites

The Link Impact Report provides a table of unique site names derived from the URLs returned for each of the target websites (Appendix A). This list of sites lends itself to classification. Many are readily identifiable (e.g. facebook.com) and for other less well known sites

The following eighteen classifications were applied to the list of individual sites returned for each target site (see Appendix A for detailed tables):

- **Academic**—sites deriving from 3rd level institutions and research projects
- **Archaeology Information**—sites providing information about archaeology solely or primarily
- **Blog**—blogs and personal websites
- **Business – Archaeology**—sites deriving from businesses who deliver archaeological services
- **Business – Other**—sites deriving from all other business organisations
- **Education**—primary and post-primary schools or sites providing resources for same
- **Heritage Information**—sites providing information about heritage broadly, including disciplines such as history, genealogy or folklore
- **Language/Linguistics**—sites providing information and resources relating to language skills and linguistics
- **Local Heritage**—sites providing information about heritage in a local area or region only (often community based or supported)
- **News/Media**—news and media websites
- **Public Sector**—sites deriving from government bodies, state agencies, local authorities, etc.
- **Search Engine**—search engine sites
- **Social Media**—social media sites and message boards/discussion boards
- **Tourism**—sites providing tourist information or promotion
- **Web Archive**—sites that automatically archive other websites
- **Web Stats/Information**—sites that provide statistical information about other websites
- **Wiki/Encyclopedia**—online encyclopedia websites and wikis
- **Other**—sites not readily classified or not falling into any of the defined categories

Note this classification is wholly thematic, for example the Heritage Information and Archaeology Information categories includes web sites produced by professional bodies and specialist organisations, as well as sites with less intellectual 'authority'.

Site Classification	**Inscribe Stones**	**Mapping Death**	**Eachtra Journal**	**Ogham 3D**	**ASI Database**	**Logainm**	**Excavations Database**
Academic	1	4	5	1	4	6	31
Archaeology Information	0	1	1	2	3	0	17
Blog	1	1	2	3	12	10	14
Business - Archaeology	0	0	0	0	1	0	9
Business - Other	0	0	0	2	0	1	18
Education	0	0	0	0	0	5	4
Heritage Information	0	0	0	2	6	9	18
Language/Linguistics	0	0	0	0	0	14	0
Local Heritage	0	0	0	1	6	7	20
News/Media	0	0	0	2	3	4	4
Other	0	1	4	2	2	12	31
Public Sector	0	1	0	1	6	7	22
Search Engine	1	0	0	0	1	1	5
Social Media	0	0	2	5	9	8	20
Tourism	0	0	0	0	0	3	2
Web Archive	0	1	0	0	2	0	3
Web Stats/Information	0	0	1	2	2	11	13
Wiki/Encyclopedia	1	1	2	2	3	5	9
Total	**4**	**10**	**17**	**25**	**60**	**103**	**240**

Table 6.3—Summary classification of sites citing the target web resources

Four of the web resources evaluated—*Excavations Bulletin Database*, *Logainm*, *ASI Database* and *Ogham 3D*—are cited by a wide array of website types (Table 6.3). The Excavations Bulletin is cited by 17 different types of website, *Logainm* by 15 different types, while the *ASI Database* and *Ogham 3D* are both cited by 14 and 12 different types of website respectively.

There is a strong contrast with the *Eachtra Journal*, *Mapping Death* and *Inscribed Stones* web resources which are cited by a narrow range of site types; the first two are cited by seven different types of web site, while *Inscribed Stones* is only cited by four different types.

All of the target web resources are cited by academic sites as well as blog and wiki/encyclopedia sites (Table 6.3; Figure 6.1). *Mapping Death* and the *Eachtra Journal* show a significantly higher level of citation from academic sites than might be expected. The number of sites which cite these two resources is similar to that which cite *Logainm*, despite the fact that a much larger pool of sites cite the latter.

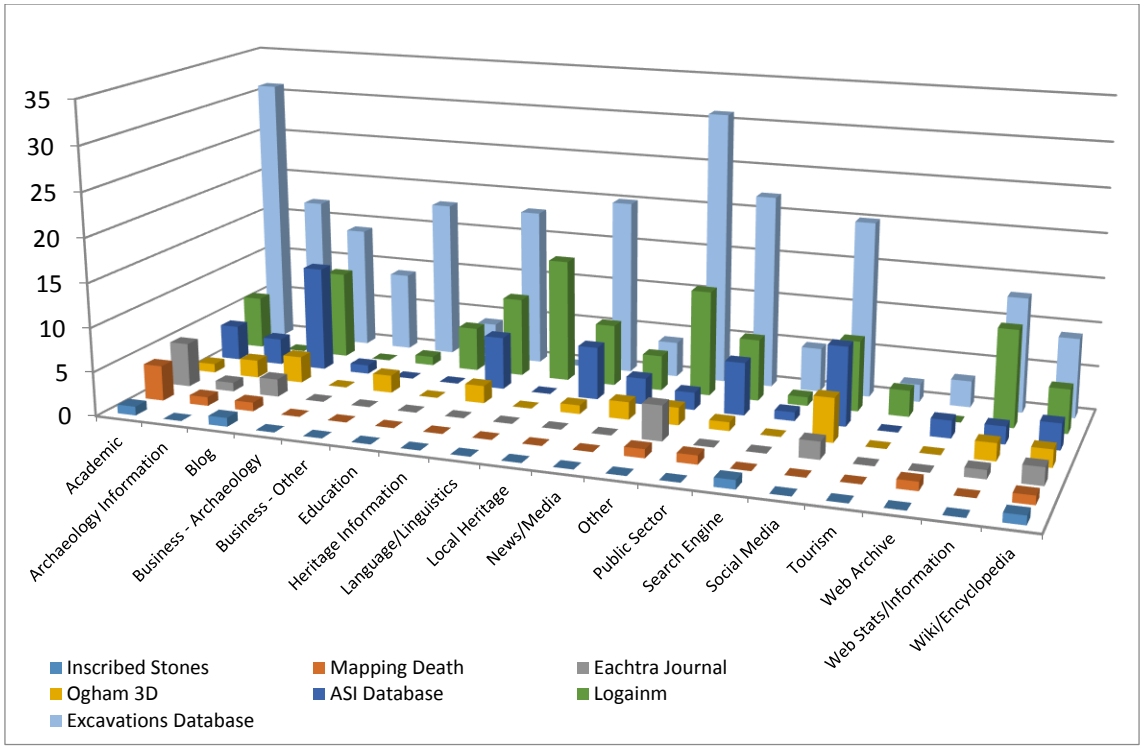

Figure 6.1—Graph comparing the classification of sites citing the target web resources

Though many of the target web resources are cited by the same types of website, comparison of the results relating to the target web resources indicates that there is considerable variation in the number or proportion of citations across the categories (Figure 6.2).

Looking at the *Excavations Bulletin Database*, though citations derive from 17 categories of site, Academic, Public Sector, Archaeology Information, Heritage Information, Business and Social Media type sites are the more common sources. *Logainm* has citations deriving from a similar number of site types (15 categories in total), however the dominant categories of sites are Language/Linguistics. The *ASI Database* has citations from 14 different categories of site, but only two—Blogs and Social Media—are dominant.

Except for *Inscribed Stones*, the results from the remaining target resources indicate the prevalence of a single category only within the result set for each resource. In the case of *Ogham 3D*, citations are most likely to derive from Social Media sites, whereas for *Eachtra Journal* and *Mapping Death* Academic sites are the most common site type. The dataset from *Inscribed Stones* (four sites in total) is too small for meaningful analysis.

Note, as 'Other' is a catch-all category it has been excluded from mention here, even where a significant proportion of citations derive from websites within this category.

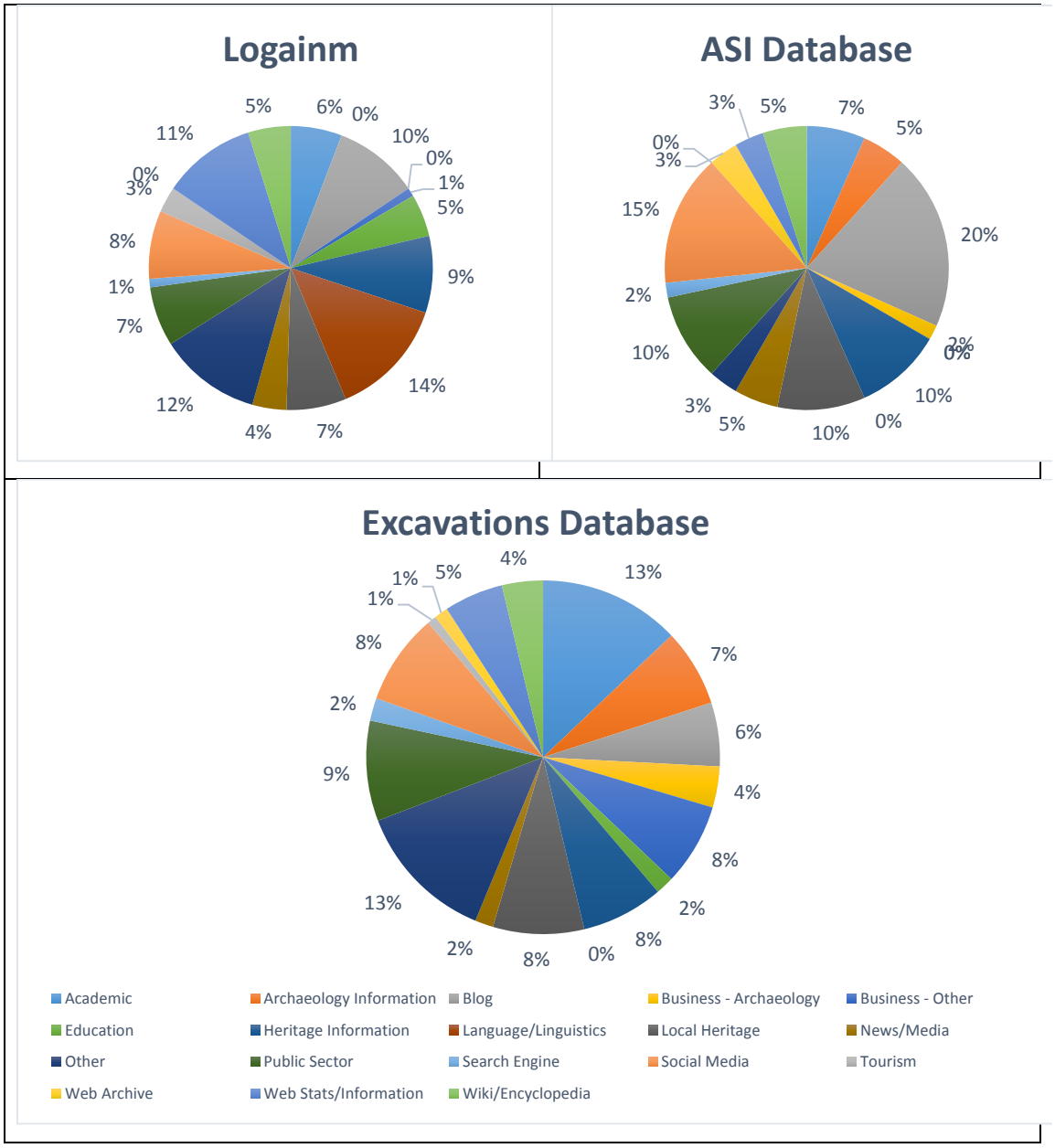

Figure 6.2—Proportion of citations from different site categories for *Logainm*, *ASI Database* and *Excavations Bulletin Database*

6.4 Key Findings of Webometric Analysis

The Link Impact Assessment conducted, produced meaningful data in relation to all seven of the target resources. Analysis of the regional spread of the Top Level Domains (TLDs) suggests, that most interest in these sites, other than from Ireland, comes from other English-speaking countries and from other European countries.

Categorising the sites that linked to each of the resources by type demonstrates that, despite the any commonalities in the subject matters of each resource, different resources are more popular with different types of sites.

Webometrics is not without its limitations (see Section 6.2.2 above), but, for the most part, these were not a particular issue during this study. The URLs for the web resources are stable, so change was not a factor that needed to be accounted for. None of the targeted web resources produced *site inlink* counts greater than 900, so search engine limitations did not affect the results.

The only significant challenge was the need to combine the results from two URL searches for the *ASI Database*. This is a difficulty that has been encountered in other impact assessment studies and is discussed in more detail in Chapter 8.

6.5 Conclusions

Webometric analysis is the second analytical technique that has been used in this study. This chapter describes the methodology adopted for this study— *Link Impact Assessment*—and the results of the Link Impact Report produced by *Webometrics Analyst* 2.0.

The empirical results have been presented thematically and will be discussed in detail and compared to the results of the other two analytical techniques, as well as the results of other impact assessment studies, in a subsequent chapter—Chapter 8.

7. SURVEY OF PRACTITIONERS

7.1 INTRODUCTION

Surveys (or questionnaires) are another method of gathering data about the utilisation of, and attitudes towards, available digitised resources. This approach has been used in other impact assessment studies both in isolation (Chassanoff 2013) and in combination with other techniques (e.g. Meyer *et al.* 2009; Hughes *et al.* 2011). Surveys can be broad-based and opportunistic (e.g. Hughes *et al.* 2011), seeking to elicit responses from wide-ranging and varied users or they can be targeted at specific user-groups or communities (e.g. Chassanoff 2013).

The survey undertaken as part of this study was targeted at a specific user-group or community of practice—Irish archaeologists. This chapter describes the methodology used and results obtained from that survey. The survey questionnaire was designed in an iterative process with reference to relevant questionnaires used in previous studies (Meyer *et al.* 2009; Chassanoff 2013). The results of the survey provide contextual information about attitudes to knowledge sharing, data sharing and the use of digital resources (generally) as well as specific feedback about their awareness and usage of the target web resources.

7.2 TARGET AUDIENCE

The survey was targeted primarily at members of the Institute of Archaeologists of Ireland (IAI). The IAI (http://www.iai.ie/) is the primary professional body for practicing archaeologists in Ireland. A survey of its members should be broadly representative of professional archaeologists practicing in Ireland.

The aim of IAI is to advance and strengthen the profession of archaeology in Ireland. It provides guidance on professional practice, promotes professional development (CPD) and advocates for the profession at national and international level. As such, its members share common values and professional standards. Its membership crosses all sectors of the profession—public, private and academic—and spans both jurisdictions (current membership figure stands just under 300). These shared values and an association based on shared knowledge and expertise, arguably, makes its members an effective 'community of practice'.

Professional archaeologists are a key demographic within the audience for the target web resources. As well as providing feedback on the impact of these resources within a specific community of practice, the survey responses are intended to provide a context for the interpretation and evaluation of the results of bibliometric and webometric analysis.

7.3 Design of Questionnaire

Questionnaires are a natural method of knowledge elicitation and useful for gathering structured information from large numbers of individuals. The aim of this questionnaire was to elicit information from the respondents about their attitudes to knowledge sharing, data sharing and the use of digital resources (generally), as well as obtaining specific feedback about their awareness and usage of the target web resources. Surveys have been conducted as part of previous impact studies (e.g. Meyer *et al.* 2009; Hughes *et al.* 2011).

Survey questionnaires used in two previous similar studies (Meyer *et al.* 2009; Chassanoff 2013) were reviewed. Some of the questions used in these surveys were directly replicated with slight revisions (see below). One of the main revisions undertaken was the replacement of binary or multi-choice selection check-boxes with Likert scales. This was intended to produce more nuanced results, particularly in multi-choice selections (i.e. 'select all that apply' questions), allowing respondents to weight their selections. The survey design was an iterative process and a number of draft versions were produced and reviewed prior to finalising the question order and wording.

The survey questionnaire was divided into three sections, targeting three main thematic areas. Section A questions were intended to query search behaviour (how respondents go about finding digitised information or resources online) and general approaches and attitudes to the utilisation of digital or online resources. Section B focused on questions in relation to the use of the specific online resources that are the target of this impact assessment study, along with the citation practices of the respondents in relation to digital or online resources. Section C questions were designed to solicit general background data from the respondents, including level of competence in using computers and personal research or data-sharing habits.

The finalised survey questionnaire (as presented to respondents) is reproduced in Appendix C.

7.3.1 Section A

This section presented five questions to the respondents:

1. *Which of the following techniques or methods do you use when searching for archaeological information as part of your work or research?*
2. *When you use the following type of sources or resources in your work or research, how do you access them?*
3. *How important are the following factors to you when deciding to utilise an online or digitized resource in your work or research?*

4. *How do you prefer to access the following types of sources or resources?*
5. *Is there anything in particular that would keep you from using an online or digitised resource in your work or research?*

Question 1 was intended to collect information about search behaviour—how the respondents find information, data and digital resources online. The question mirrors Question 13 of Chassanoff's survey of American historians (2013, 475), though the options presented were changed to be more relevant to Irish archaeologists and a Likert scale was added to distinguish between search behaviours that were more commonly used and those infrequently used. Question 2 focused on how respondents typically accessed very broad types of academic resources and was identical to Question 1 of the *TIDSR Survey on the Use of Digitised Resources* (Meyer *et al.* 2009, 1–2). Question 3 examined the factors that influenced whether or not a respondent would make use of a digital resource and was based on Question 19 of Chassanoff's survey (2013, 477). Changes were made to the options presented to make them more relevant to the focus of this study and again a Likert scale was introduced so that the positive responses could be weighted to reflect their relative level of influence. Question 4 was unique to this survey, though deliberately echoing Question 2. It aimed to elicit the respondents' preferred method of accessing very broad types of academic resources (complimenting the elicitation of actual methods of access captured in the previous question). The final question in this section—Question 5—aimed to identify any particular barrier or obstacle that would mitigate against the use of an online or digital resource. It was based on Question 21 of the Chassanoff survey (2013, 477) and retained the open-ended response type of that survey.

7.3.2 Section B

This section also presented five questions to the respondents:

1. *How familiar are you with each of the following resources?*
2. *How do you cite the materials from these resources? Do you cite the electronic version of the resource, or the print/hard copy (where this is an option)?*
3. *Do you use any other electronic resources in your work that you think are particularly good or useful?*
4. *Would you mind telling us what they are and why you like them?*
5. *Is there a particular source or resource not currently available online that you would want digitised?*

Question 6 sought to ascertain familiarity with each of the specific digital resources that have been targeted for bibliometric and webometric assessments as part of this study (see Chapter 4). Question 7 focused on citation practices in relation to each of these resources. Both questions

replicate Questions 7 and 16 of the *TIDSR Survey* (Meyer *et al.* 2009, 7; 16), albeit with the web resources altered to meet the purposes of this research project. Questions 8 and 9 were closely linked and sought to identify if there were other significant digital resources typically used by the respondents and what these resources might be. Again, these directly replicated questions included in the *TIDSR Survey*—Questions 21 and 22 (Meyer *et al.* 2009, 18). Question 10, the last question in this section, sought to identify if there was a particular resource not currently digitised or available online that the respondent thought should be made available in this way. It directly replicated Question 23 of the *TIDSR Survey* (Meyer *et al.* 2009, 19).

7.3.3 Section C

Again, this section of the questionnaire presented the respondents with five questions:

1. *Please choose the title that best describes your activities as an archaeologist:*
2. *How would you rate your expertise with technologies like the Internet and e-mail?*
3. *Do you use a website/blog to share information about your research (either in general or specific projects)?*
4. *When you have completed a new paper, report or other research output, are you likely to make it available on:*
5. *Can you think of any particular obstacle that prevents you from making the results of your research available online or in digital format?*

Question 11 asked the respondents to classify themselves as archaeologists. Its aim was to record what cross-section of the profession had participated in the survey and to facilitate (where appropriate) the categorisation of responses and the identification of sectoral trends in the data. Question 12 directly replicated Question 2 of the *TIDSR Survey* (Meyer *et al.* 2009, 2) with the aim of ascertaining how comfortable the respondents were in using computers. The final three questions in the survey—Questions 13–15—were closely related. The purpose of these questions was to identify if the respondents promoted or disseminated their research activities using blogs or websites, how freely they disseminated papers, reports and other research output and what obstacles they identified that limited them in engaging in these types of activities. Question 13 combined Questions 44 and 45 of the *TIDSR Survey* (Meyer *et al.* 2009, 38–9), while Question 14 replicated Question 46 (Meyer *et al.* 2009, 39). Question 15 was unique to this survey.

7.4 Distribution and Collection

The survey was delivered using the *QuestionPro* online survey platform (QuestionPro 2014). The *QuestionPro* platform supports the delivery of the survey questionnaire, collection and collation of survey results and online analysis and reporting tools. The raw survey data can be exported for archiving or further analysis in a variety of formats including excel files (.xlsx) and comma separated values (.csv).

QuestionPro supports the creation of customised URLs to facilitate survey distribution and this feature was used to create a unique URL for the survey:
http://digitalimpact2014.questionpro.com

An invitation to participate in the survey was circulated to all members of IAI. This invitation explained the purpose and background to the survey and included the URL to access the survey questionnaire. In addition, a short notice about the survey (including the URL) was included in the weekly update bulletin, which is circulated to all IAI members. A reminder notice was circulated in subsequent weekly bulletins. The invitation and notices are reproduced in Appendix B.

The data collection period was one month. The survey was opened and the initial invitation circulated on 14 May 2014. The survey was closed on 15 June 2014.

7.5 Results of the Survey

A graphical report outlining the full results of the survey is contained within Appendix D. The complete survey dataset is appended on CD (Appendix G).

7.5.1 Response rate

As previously noted, the survey was circulated to all current members of IAI—just under 300 individuals. *QuestionPro* recorded that 79 individuals accessed or viewed the survey, 61 individuals commenced the survey and 43 of those individuals completed the survey (Appendix D), this represents a response rate of 14.3%. The 2008 survey of *Digital Practices in Irish Archaeology* had a 9% response rate (SHARE-IT 2008, 4), suggesting that the response rate for this study is within realistic expectations. Many of the surveys undertaken as part of other impact assessment studies were opportunistic (e.g. Meyer *et al.* 2009; Hughes *et al.* 2011), with the surveys circulated broadly using bulletin boards, discussion mailing lists and social networking tools amongst other methods. Meaningful response rates for these surveys cannot be established.

7.5.2 Section A

A total of 46 of the respondents provided a response to Question 1, which was designed to inquire about information seeking behaviours. The results indicated (Figure 7.1; Appendix D) that all of the options presented have been used by the respondents to some degree. However, the weighting scores indicate that a standard web search was the most likely method to be used when seeking out information during research. Based on the results, the information seeking approaches presented in the questionnaire can be rated from most commonly or widely used to least as follows:

1. Use standard web search (e.g. Google, Yahoo)
2. Follow leads (footnotes, bibliographies, textual references found in books/articles)
3. Use JSTOR Ireland
4. Ask colleagues/other archaeologists
5. Use online library catalogues
6. Use Google Books
7. Use Google Scholar
8. Consult Archaeological Data Service (ADS) online archives and databases
9. Consult specialist online database sites (e.g. Web of Knowledge, Nielsen Bookdata Online or Proquest Dissertation and Theses)

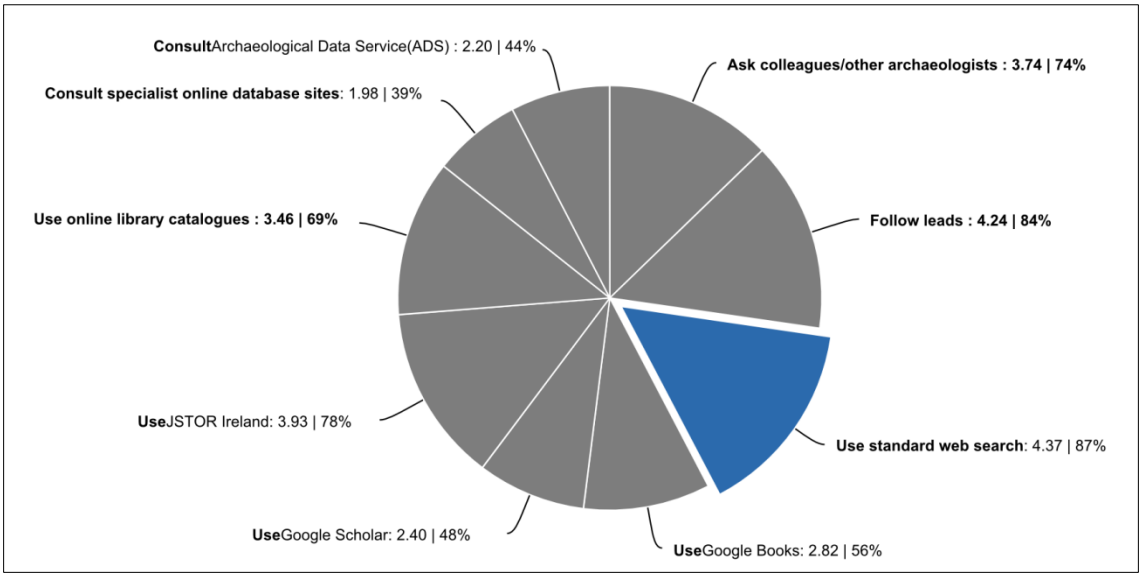

Figure 7.1—Weighted preferences for information-seeking

Question 2 elicited information about how respondents access different types of resource. In the case of all four resource types—Popular media, Reference works, Secondary scholarly sources and Primary sources—the dominant response was that resources were accessed in both digital and hard copy (Figure 7.2).

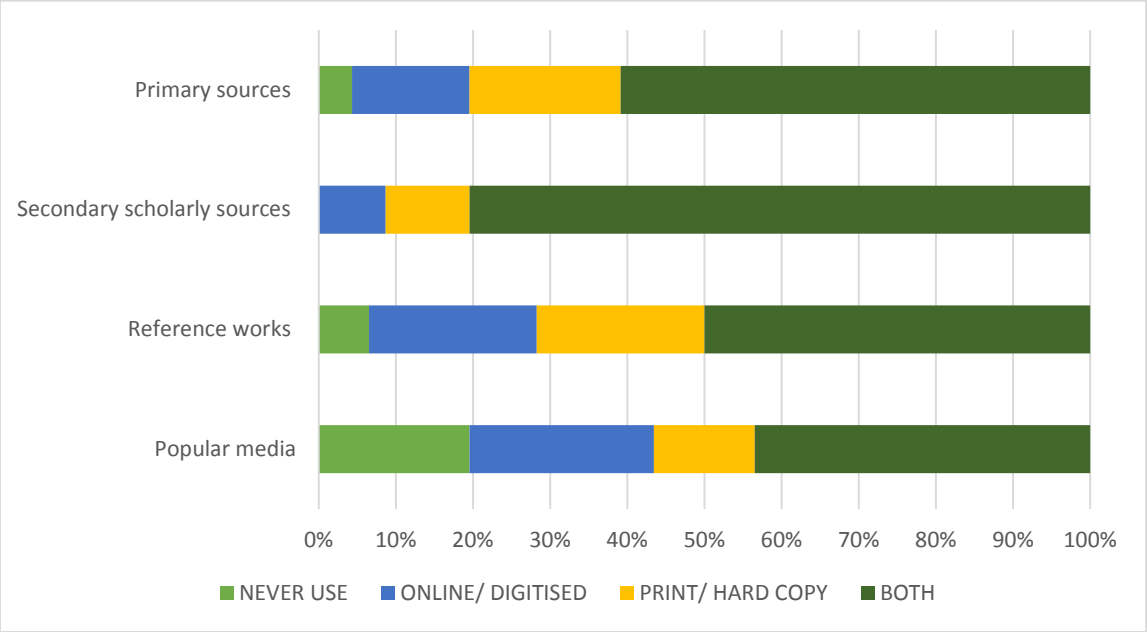

Figure 7.2—How resource types are accessed

Question 3 queried the importance of a number of defined factors when individuals were deciding whether or not an available digital resource was suitable for use in their research activities. Each option was weighted on a 5-point scale from ranging from 'not relevant' to 'very important'. Based on the results obtained (Figure 7.3; Appendix D) the options presented can be listed from most important to least relevant to the respondents as follows:

1. The reputation of the repository or organisation from which the resource originates
2. Information regarding the provenance of individual components of the resource and the resource as a whole
3. Completeness of the resource (is the hard copy/ original resource fully replicated or is the digitised/online resource only a sub-set or selection)
4. Ease of use of online finding aid or integrated search tool
5. Flexibility of online finding aid or integrated search tool (i.e. supports a range and variety of search types or methods)
6. Can the resource (in whole or in part) be downloaded
7. Clear, consistent and complete metadata
8. Use of internationally accepted metadata structures and standards
9. Support structure—ability to consult an archivist or similar professional with responsibility for the maintenance and development of the resource

The two most important factors (as indicated by the results) relate broadly to 'provenance'—who created the resource, what the resource derives from and that this information is clearly presented.

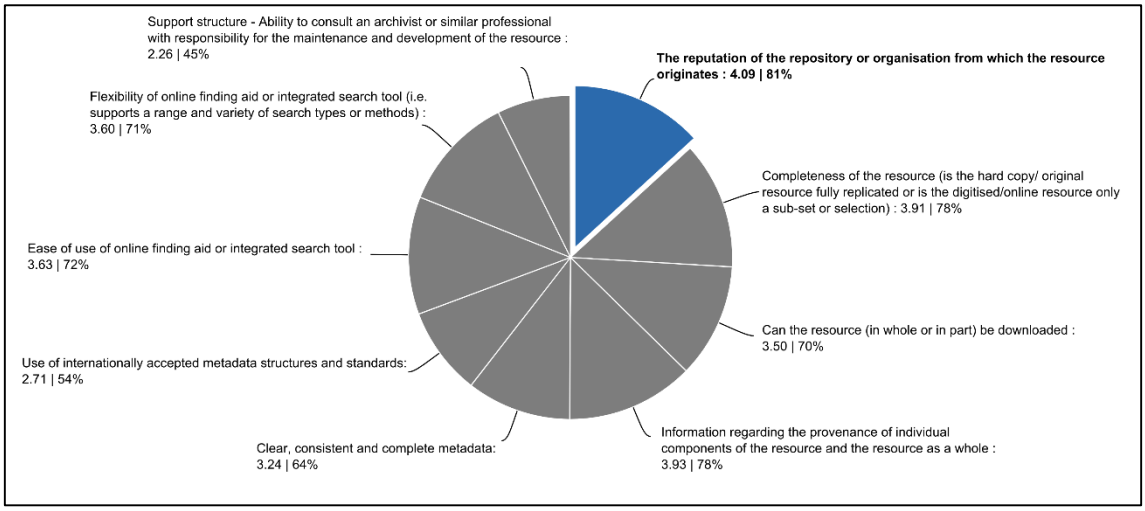

Figure 7.3—Factors affecting decision on the use of available digital resource

Question 4 returned to the broad resource types that were the focus of Question 2. This time, however, respondents were queried as to their preferred method of accessing these types of material (in contrast to their actual methods, as recorded in Question 2). The respondents showed a clear preference for accessing all types of material in an online or digitised format (Figure 7.4; Appendix D).

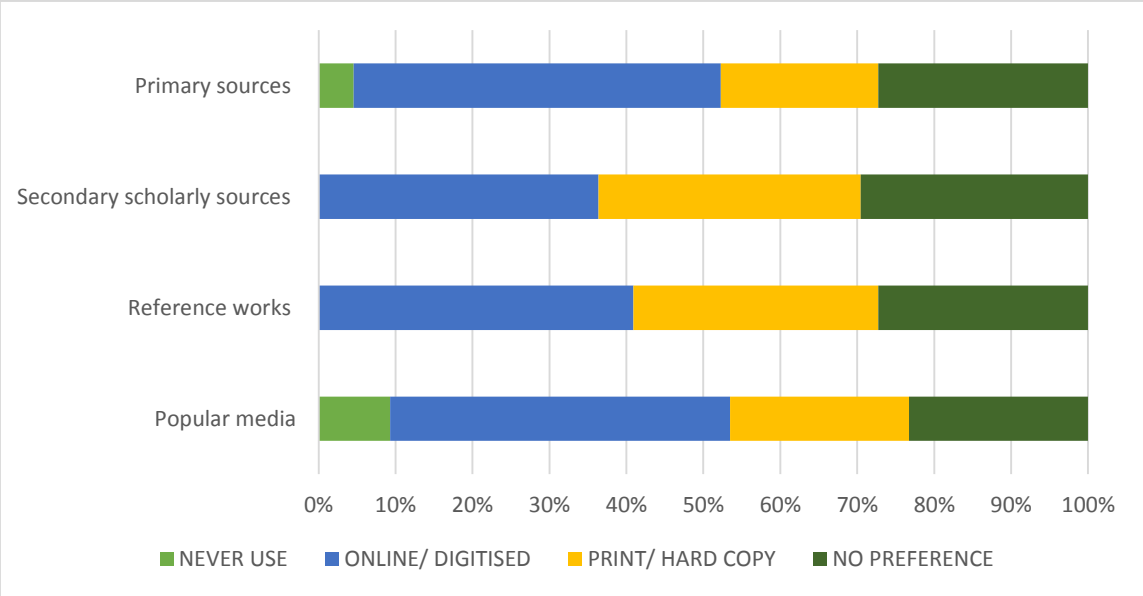

Figure 7.4—Preferred methods for accessing broad resource types

The final question in this section of the survey—Question 5—was open-ended and provided the respondents with an opportunity to describe any obstacles they perceived that would prevent them from utilising a digital resource in their research practice. Twenty-eight respondents commented on this topic. The responses were reviewed and common themes identified (Table 7.1); some

respondents mentioned multiple issues or themes, while others limited their comment to a single issue or theme.

	Theme	Count of Respondents
1	Provenance	8
2	No Impediments	5
3	Cost to access	4
4	Quality of Indexing/Finding Aids	4
5	Broadband Quality	3
6	Don't know how to cite properly	3
7	Usability of resource website	2
8	Technology Limitations (user end)	2
9	Resource is cited/used by others	2
10	Lack of Completeness of digitised resource	2
11	Inability to Download	1
12	Prefer Hard Copy	1

Table 7.1—Obstacles to use of digital resources

Some of the issues such as broadband quality or technological limitations at the user end are not ones that can be affected by a resource creator or maintainer. Most of the issues though, notably high ranking ones such as provenance, cost of access or quality of finding aids are ones that are within the control (to some degree) of the creator or maintainer of a digital resource.

7.5.3 Section B

The first question in this section—Question 6—sought to ascertain the respondents' awareness and frequency of use of the seven web resources that had been targeted for bibliometric and webometric analysis as part of this study (see Chapter 4). Respondents could 'rate' their awareness on a five-point scale ranging from 'never heard of it' to 'use regularly/frequently'. Both the *Excavations Bulletin* and *ASI Database* proved most heavily utilised with at least three-quarters of the respondents admitting to frequent or regular use (Figure 7.5).

Logainm also appears to be widely used. Though only 40.91% of respondents acknowledged frequent or regular use of this resource, the proportion of respondents who had never heard of it (2.27%) is close to that of both the *Excavations Bulletin* and *ASI Database* (0% in each case). This would suggest that awareness of all three resources is at a similar level.

Mapping Death and *Eachtra Journal* show significantly lower levels of frequent or regular usage, but the total proportion of respondents who have made use of these sources (to some degree) is fairly similar at 60.47% and 56.81% respectively.

Notably, however, over a third of respondents who replied to this question had never heard of either the *Ogham 3D* or *Inscribed Stones* resources and a similar proportion of respondents had heard of, but not used, both resources.

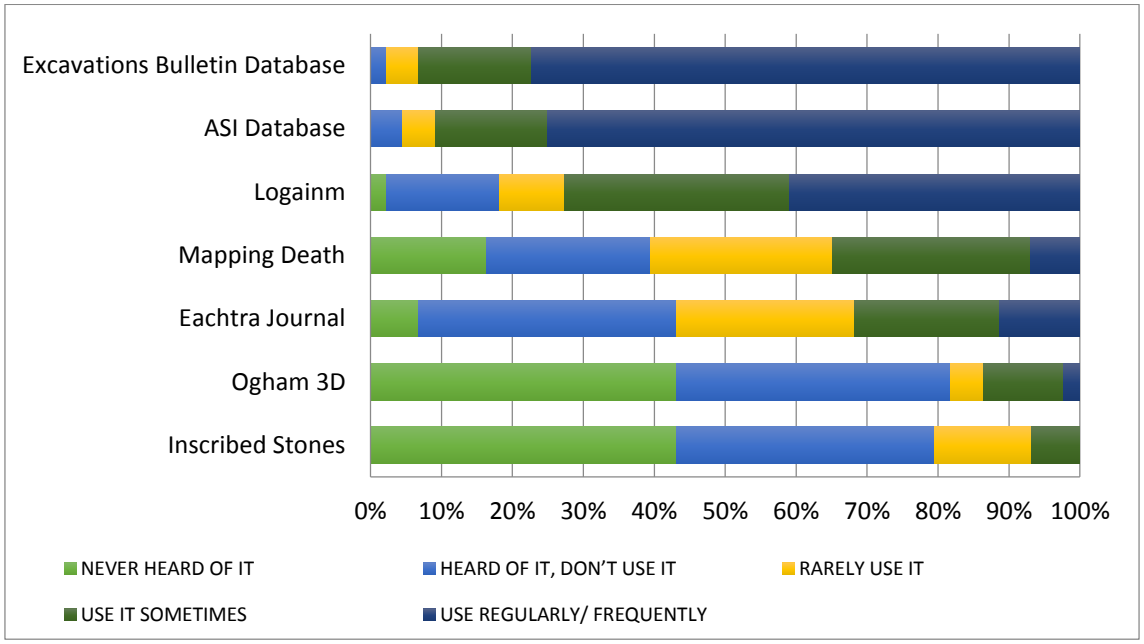

Figure 7.5—Awareness and usage of the target web resources

Question 7 also sought information about how respondents used the target web resources. In this case the focus of the question was citation practice. Aggregating the results from each resource (Figure 7.6) suggests that, in general, respondents are most likely to cite the version of the resource consulted (whether online or hard copy).

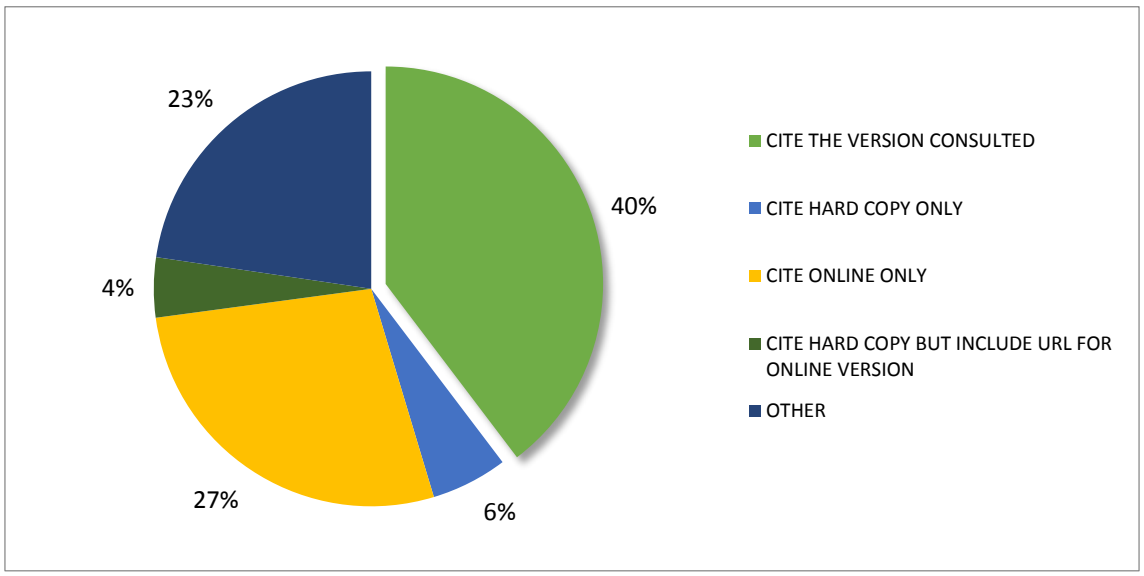

Figure 7.6—Aggregated responses on citation practice

Examining the individual results in relation to each resource (Figure 7.7) indicates that for the *Excavations Bulletin Database*, *ASI Database*, *Mapping Death* and *Eachtra Journal* respondents were most likely to cite the version consulted. In the case of *Logainm*, however, respondents were more likely to cite the online version only.

For both *Ogham 3D* and *Inscribed Stones* the dominant citation practice was 'other'. However, Question 6 demonstrated a significantly lower level of use and awareness of these two resources (by comparison with the other five). The prevalence of this response may simply reflect uncertainty as to how 'best' to cite a resource that respondents were (generally) less familiar with. Notably, in all cases, very few respondents claimed to cite hard copy only or to cite the hard copy but with supporting URL.

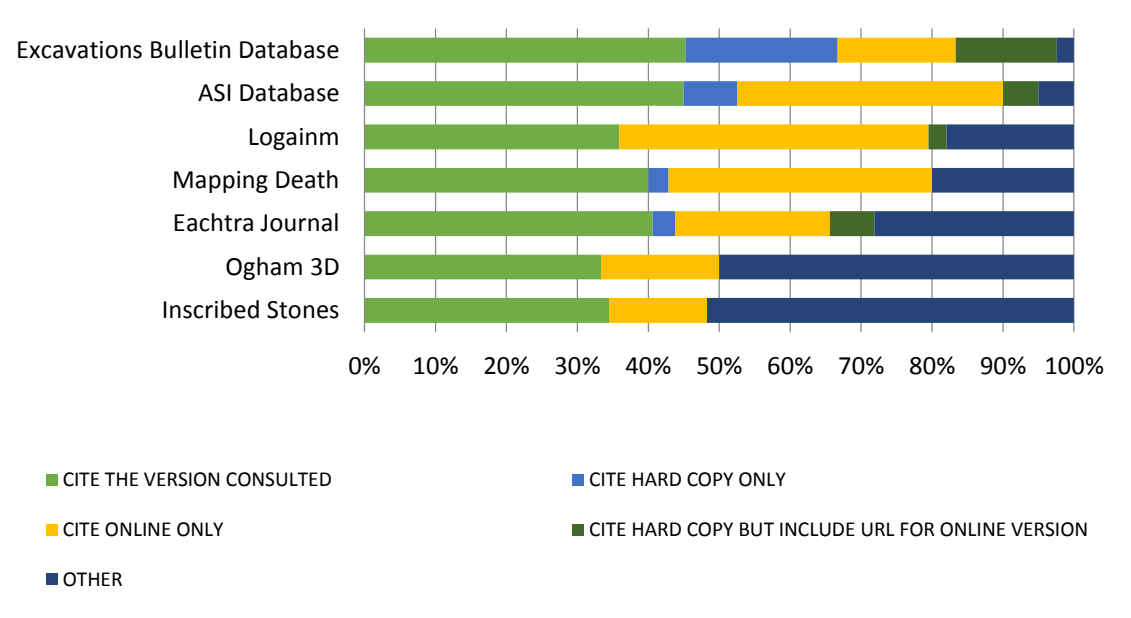

Figure 7.7—Citation practice in relation to each target web resource

Questions 8 and 9 were closely related. Question 8 asked respondents if there were other web resources that they found useful, while Question 9 asked them to provide examples of these. Twenty-nine respondents said that there were other resources that were useful and twenty-six provided examples. Most of those who supplied examples cited multiple resources.

A total of 37 'useful' web accessible resources can be identified from the information supplied (Table 7.2). Note, only specifically named resources (or cited URLs) have been listed and counted. References to generalised resource types (such as e-journals) or to resources not accessible online (such as the Ordnance Survey Namebooks) were excluded from consideration.

All URLs listed below were correct and functional at time of writing, except where otherwise stated.

	Resource Name	Resource URL	No. Respondents Citing
1	OSI mapviewer	maps.osi.ie/publicviewer/#V1,588882,739883,0,10	10
2	NRA Excavations Database	archaeology.nra.ie/ [not functioning - July 2014]	7
3	GoogleMaps	www.google.ie/maps/@53.3550067,-6.2500853,12z?hl=en	5
4	National Inventory of Architectural Heritage	www.buildingsofireland.ie/	5
5	Ask About Ireland	www.askaboutireland.ie	4
6	BingMaps	www.bing.com/maps/	4
7	Down Survey Project	downsurvey.tcd.ie/index.html	4
8	EMAP	www.emap.ie/	4
9	Clare County Library	www.clarelibrary.ie	3
10	GSI Online Mapping	www.gsi.ie/Mapping.htm	2
11	JSTOR	www.jstor.org/?__redirected	2
12	NIEA Map Viewer and Databases	maps.ehsni.gov.uk/MapViewer/Default.aspx	2
13	The Internet Archive	archive.org/index.php	2
14	Academia.edu	www.academia.edu/	1
15	Ancestry	www.ancestry.com/	1
16	Athens	www.openathens.net/	1
17	Canmore	canmore.rcahms.gov.uk/	1
18	Census of Ireland 1901/1911 and Census fragments and substitutes, 1821-51	www.census.nationalarchives.ie/	1
19	COPAC	copac.ac.uk/	1
20	Dublin City Library And Archive - Dublin Graveyards Directory	www.dublinheritage.ie/graveyards	1
21	Find My Place (sic)	www.findmypast.ie/	1
22	Heritage Council: Heritage Maps	www.heritagecouncil.ie/heritage-maps/heritage-maps/	1
23	Historic Graves	historicgraves.com/	1
24	INSTAR Web Archive	www.heritagecouncil.ie/archaeology/our-initiatives/instar-web-archive-grant-programme/	1
25	Ireland Reaching Out	www.irelandxo.com/	1
26	Irish Pollen Site Database	www.ipol.ie/	1
27	Irish Radiocarbon & Dendrochronological Dates	sites.google.com/site/chapplearchaeology/irish-radiocarbon-dendrochronological-dates	1

	Resource Name	Resource URL	No. Respondents Citing
28	Irish Spatial Data Exchange	catalogue.isde.ie/#/	1
29	M3 Motorway Archaeology Website	www.m3motorway.ie	1
30	Mapping Population Change in Ireland 1841-1851: Quantitative Analysis using Historical GIS	ncg.nuim.ie/content/projects/famine/	1
31	Meath Field Names Project	www.meathfieldnames.com/index.php/database-and-mapping	1
32	Open Street Map	www.openstreetmap.org/	1
33	Past Map	pastmap.org.uk/	1
34	Persee	www.persee.fr/web/guest/home	1
35	The IreAtlas Townland Database	www.thecore.com/seanruad/	1
36	UK Data Archive	www.data-archive.ac.uk/home	1
37	Wikipedia	en.wikipedia.org/wiki/Main_Page	1

Table 7.2—Other useful web resources cited by respondents

Some of these resources are archaeological resources such as NRA Excavations Database, EMAP, INSTAR Web Archive or Irish Radiocarbon & Dendrochronological Dates, but most are not. Instead, they are more broad resources (like JSTOR or the Internet Archive) that might include archaeological material or have a useful application for an archaeologist or they are resources that derive from cognate disciplines (for example National Inventory of Architectural Heritage or Irish Pollen Site Database). Mapping resources are particularly prevalent—OSI mapviewer, GoogleMaps, Bing Maps, Down Survey Project, GSI Online Mapping, Heritage Council: Heritage Maps, Open Street Map and Past Map—especially those that include aerial photography.

Resources that should be digitised	No. of Respondents
All Excavation Reports	11
Complete ASI Survey Files	9
National Museum Topographic Files	9
National Museum Catalogue/Artefact Database with supporting photography	5
All Geophysical Survey Reports	3
Complete 1930s Schools Folklore Survey	2
OS Letters and Field Name Books	2
Current/On-going OSi Aerial Photography	1
Desk-based Assessment Reports & EIA Cultural Heritage Chapters	1
Five-foot plans of Dublin (1848)	1
Irish Stone Axe Project Database/Dataset	1
Local History Books/Sources	1
Rocque's Map of Dublin	1
Thom's Directory of Dublin (All Years)	1
Nothing	1

Table 7.3—Resources that should be digitised or made accessible online

The final question in this section—Question 10—sought to identify any useful resources not currently digitised or available online that the respondents would like to be able to access digitally. A total of twenty-four respondents chose to comment on this question and most provided multiple examples of resources that they would like to see digitised or available online.

A total of 16 different resources were noted by respondents, while one respondent maintained that there were no other resources that should be digitised (Table 7.3). The three resources most frequently noted in the responses were the complete reports on all excavations (rather than just the bulletin summaries), the full ASI survey files (rather than just the summary dataset currently available through the *ASI Database*) and the National Museum of Ireland's Topographic Files.

7.5.4 Section C

The first question in this section—Question 11—examined the background of the respondents to identify which sector of the archaeological profession they belonged to. While the greatest proportion of the respondents came from the commercial or consultancy sector, other sectors such as academia and the public sector were also represented in the survey sample (Figure 7.8).

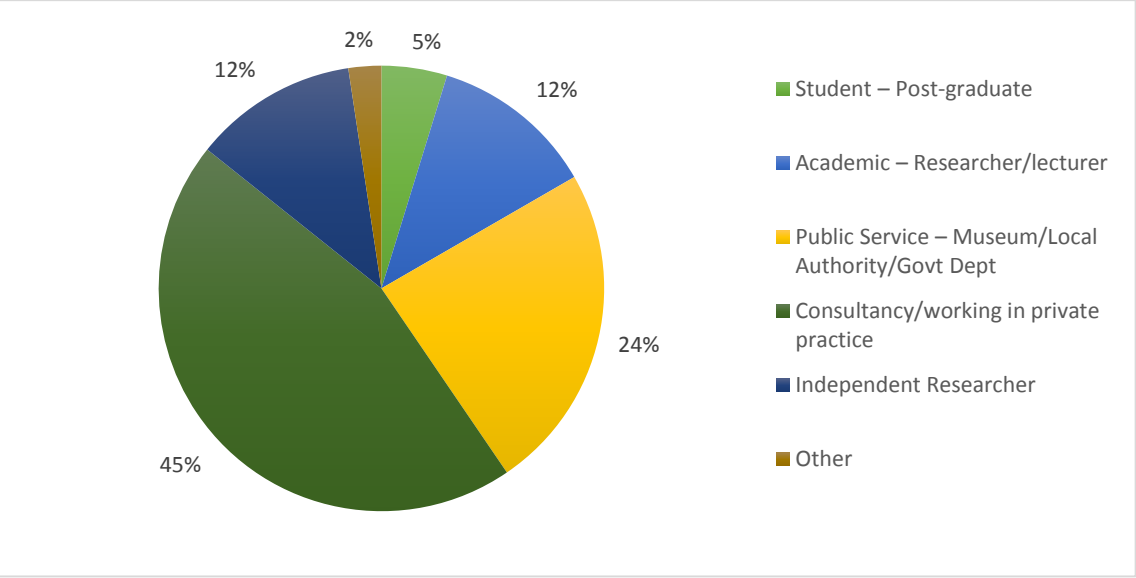

Figure 7.8—Profile of Respondents

The next question—Question 12—also elicited background information, this time regarding the respondents' expertise with technology. The majority (52.38%) claimed a good level of expertise, while 23.81% described their expertise as excellent and 19.05% as satisfactory. Only 4.76% of respondents admitted to a poor level of expertise.

The final three questions in the survey focused on the data-sharing and knowledge-sharing activities of the respondents—whether and how they, themselves, disseminate the results of their research activities.

The first question in this sequence—Question 13—took a high-level overview and queried the general use of websites and blogs to share information about research activities. The majority of respondents (54.76%) do not use websites or blogs to share research information and a small proportion (9.52%) acknowledged use in the past but not presently. Only 35.71% of respondents claimed to (currently) use a website or blog to share research information.

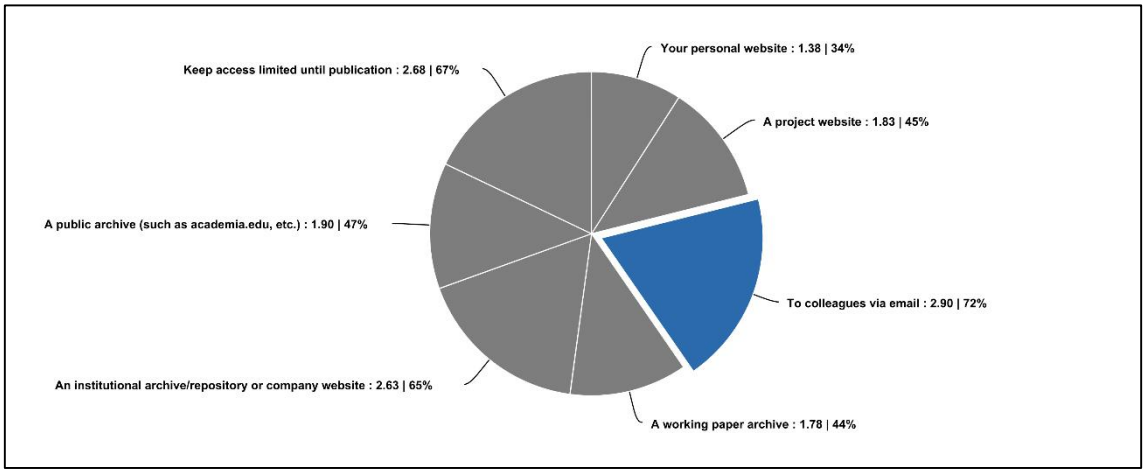

Figure 7.9—Weighted options for sharing research output (such as reports and publications)

Question 14 was designed to elicit information from the respondents about how they share the results of their research endeavours (such as reports and publications). Each option was rated on a five-point scale from ‘no, never’ to ‘yes, regularly’. This resulted in a weighted list of sharing options ranging from most to least likely as follows:

1. To colleagues via email
2. Keep access limited until publication
3. An institutional archive/repository or company website
4. A public archive (such as academia.edu, etc.)
5. A project website
6. A working paper archive
7. Your personal website

The final question—Question 15—examined perceived barriers to data-sharing or knowledge-sharing. This was an open-ended question and 28 respondents provided detail on reasons why

they were disinclined to share research output. Common themes were identified across the different responses; some responses covered multiple themes, others just a single one (Table 7.4).

	Theme	No. of Respondents
1	No perceived obstacles	6
2	Client Confidentiality/ Commercial Sensitivity	5
3	Copyright/ uncertainty about copyright status	5
4	Lack of technical expertise/ resources	4
5	Lack of Time or Resources	4
6	Preference for traditional publication	2
7	Publisher's stipulations or conditions	2
8	Absence of digital dissemination from project plan/design	1
9	Absence of peer review stamp of authority	1
10	Completeness of work	1
11	Concerns about Intellectual Property	1
12	Desire to limit circulation prior to publication	1
13	Difficulty in obtaining digital off-print	1
14	Financial Constraints	1
15	Habit	1
16	Possibility of resistance from other project team members	1

Table 7.4—Perceived obstacles to data-sharing and knowledge-sharing

A total of 16 different themes emerged from the analysis of the responses. The most common theme was a perceived absence of obstacles. Aside from this, the related themes of client confidentiality or commercial sensitivity and copyright issues featured strongly as did the, perhaps, similarly related themes of lack of time/resources and lack of technical expertise/resources.

7.6 Conclusions

The third analytical technique used in this study was a survey of practitioners. The methodology used to develop and circulate this survey has been described in this chapter. The target audience for the survey was Irish archaeologists and was accessed through the support of the Institute of Archaeologists of Ireland (IAI).

This chapter also outlines the results of the survey. The results are presented empirically and will be discussed in detail and compared to the results of the other two analytical techniques, as well as the results of other impact assessment studies, in the next chapter, Chapter 8.

8. ASSESSING IMPACT AND EVALUATING DEMONSTRATED KNOWLEDGE SHARING PRACTICE

8.1 INTRODUCTION

This chapter focuses on the evaluation and discussion of the results of the three analytical techniques used within this study. The contextual framework for the impact assessment of the target resources that emerged from the survey results is outlined and the key findings of the survey compared to the results from previous relevant studies. The results of both the bibliometric and webometric analyses are discussed in relation to previous relevant studies both in terms of the results obtained and also the implementation of these techniques. Finally the impact of each of the target web resources—as evidenced by the results of this study—are outlined and discussed.

8.2 CONTEXT AND FRAMEWORK

The survey dataset provides a context and framework for interpreting the results of webometric and bibliometric analysis as well as quantifiable evidence for the impact of each of the target web resources.

8.2.1 Seeking and Using

The results of the survey indicate that the two approaches most likely to be used by Irish archaeologists when seeking data were a standard web search or following leads (references in publications, footnotes, etc.). Following leads was also one of the preferred search methods of American historians (Chassanoff 2013, 467), though their other main preference for information seeking was online library catalogues. However, it should be noted that the American study respondents were entirely from the academic sector (Chassanoff 2013, 465), whereas the Irish archaeological community was cross-sectoral one—independent researchers and those working in private practice comprised over 50% of respondents. Individuals working outside of academia or similar large institutions may not have immediate (or free) access to an academic library network, which may make online library catalogues a less attractive information seeking tool. One of the responses received during this study on the obstacles to the use of digital resources noted that '*if you are not affiliated to an institution it can often be difficult to access library content, such as journal*'.

Interestingly 'asking colleagues' was one of the lowest ranked approaches amongst American historians (Chassanoff 2013, 467), whereas it was the fourth most likely approach for Irish archaeologists. This would suggest that peer-approval or tacit knowledge sharing is of greater importance to Irish archaeologists when information seeking. Equally it could reflect a smaller

professional or academic community with a different social framework (Dr Rob Sands, pers. comm.).

The survey results from the *Usage and Impact Study of JISC-funded Phase 1 Digitisation Project* (Meyer *et al.* 2009, 154) did not include directly comparable data on information seeking approaches, but did query the frequency of use of standard web search, library catalogue search and Google Scholar by respondents. Both general web search and library catalogue searches were frequently used by respondents but Google Scholar fared poorly (as was also found in the survey for this study). This may indicate that, though there may be some commonalities, different user communities and different communities of practice may have different preferences and approaches to information seeking.

These different search behaviours have implications for planning the creation and evolution of digital repositories. Tanner (2012, 25) notes the developing backlash against the simplistic 'build it and they will come' attitude to digitisation projects. Search behaviours potentially affect discovery and awareness of a resource and by implication usage—individuals are unlikely to utilise a resource that they do not know or cannot readily find out about.

The survey also examined how respondents currently access broad types of information resources (primary sources, secondary scholarly sources, reference works and popular media). The results demonstrated that most respondents undertake research in a hybrid environment—in all cases "*use of the material type in both hard copy and digitised formats*" was the dominant response. The survey results from the *JISC Usage and Impact Study* (Meyer *et al.* 2009, 153) noted a similar trend towards a hybrid working or research environment. However, the results when respondents in the current study were queried as to their preferred (as opposed to actual) method of access, a strong preference for digitised material emerged. This would suggest that there is a demand for and openness to accessible digital resources. Only one of the survey respondents—in relation to obstacles to the use of digital resources—expressed an overt preference for hard copy.

It is worth considering the survey findings in relation to the factors of importance to respondents when deciding to use a digital resource and the perceived obstacles together as they are, in many ways, complimentary—two sides of the same coin. The most important factors of importance related to provenance—who created the resource and what the resource derives from—followed by completeness. Provenance was also the dominant theme in the perceived obstacles with comments such as:

- *'I do prefer using a source that has multiple recommendations, where I can be confident of the data integrity'*

- *'Poorly or unreferenced source for the original data/ document. Unverifiable data.'*
- *'Lack of information about the provenance of the resource, author etc. I would generally look for digitised versions of resources I was already aware of in a hard copy form where I was sure of the source provenance and its acceptance as being of a good academic quality (referenced in other academic documents).'*
- *'I wouldn't use an online resource unless the provenance of the information is clear i.e. is it reliable and how do I reference it?'*

In Chassanoff's survey of American Historians (2013, 470) '*reputation of the archival repository*'—an aspect of provenance—and the quality of the integrated finding aids were the two dominant factors of importance. In that survey, as in the present study, the human support structure—the ability to consult an archivist with responsibility for the collection, for example—was also a low priority for respondents (Chassanoff 2013, 470).

Interestingly, metadata standards and metadata quality ranked near the bottom in the factors of importance to respondents in this study. The findings also echo the results of the earlier SHARE-IT project (2008, 27) which identified a lack of understanding of the importance of standards and metadata within the general archaeological profession. This is a striking contrast to the focus on the importance placed on metadata standards and quality by studies, organisations and research associations promoting digitisation and digital repository creation and development (e.g. SHARE-IT 2008, 51–4; O'Carroll & Web 2012, 32–6; ARIADNE 2014b, 92; 156). The team members driving these projects may be archaeologists or historians or archivists, but they are also technologists. It is possible that the importance of metadata and metadata standards is not being adequately communicated. It is also possible that the concept of 'provenance' as expressed in more colloquial language—'*information regarding the provenance of individual components of the resource and the resource as a whole*' i.e. data about the data—is a proxy for the importance of metadata. Metadata properly and consistently deployed (to recognised standards) would deliver the certainty about provenance that is important to users.

Cost of access was another obstacle identified by survey respondents:

- *'Financial constraints where you are charged for hidden information. JSTOR outside Ireland costs are also a disincentive to getting access.'*
- *'Access restrictions/prohibitive costs.'*
- *'Having to pay to access it'*

This concern about access costs and paywalls was also highlighted in the 2008 Survey of digital practices in Irish archaeology (SHARE-IT 2008, 23) and most recently in a European-wide survey

of archaeologists (ARIADNE 2014b, 92–3). This latter survey formed part of a user needs study to inform the on-going work of the ARIADNE project, which recommends that when '*developing a business model for the ARIADNE e-infrastructure, be very careful in demanding fees for using the services (if necessary at all)*' (ARIADNE 2014b, 170).

8.2.2 Knowledge Sharing Practice

The third section of the survey that formed part of this study included a series of questions to elicit information from respondents about their knowledge sharing and data sharing activities. This revealed, in the first instance, that the majority of respondents have never used a blog or website to share information about their research activities. So, unsurprisingly, when asked to rate a series of methods for sharing research result 'your personal website' came last and 'a project website' was in the bottom half of the results. The highest rated of the sharing options was 'to colleagues via email' followed by 'keep access limited until publication'. Publishers' stipulations of conditions were an issue identified in the perceived obstacles and the prevalence of these more restrictive sharing practices may reflect a sensitivity to this.

The survey results from the *JISC Usage and Impact Study* (Meyer *et al.* 2009, 160) also noted this trend, though in that case 'limit access until publication' was the highest ranked option followed by 'email outputs to colleagues'. The results of the 2008 survey of *Digital Practices in Irish Archaeology* indicated that email was the primary method of data-sharing used (SHARE-IT 2008, 25). This might suggest that there has been very little practical change in sharing methods in the intervening period.

Examining the other perceived obstacles to data and knowledge sharing expressed in the survey, there was a strong minority view (six of the 28 who commented) that there were no obstacles. However, almost as many respondents (five in each case) expressed reservations relating to both client confidentiality or commercial sensitivity and copyright. Comments included:

- *'I am a planning consultant and I suspect my clients don't want me to post publicly ongoing site work as so often these are part of ongoing planning situations.'*
- *'Copyright restrictions. Trying to ensure that other people working on the project don't get annoyed with me for releasing the information. All the delicate negotiations that go on in relation to permissions.'*
- *'Copyright is the major issue here with regard to previously published work.'*

Lack of technical expertise as well as time and resources was also expressed:

- *'Not up to speed in IT!'*

- *'Lack of knowledge of how it all works'*
- *'lack of technological know how'*
- *'As an independent researcher, access to online publications/outlets to publish research.'*

Some of these issues could be addressed through training and Continuous Professional Development (CPD). However, it also confirms the need for broader initiatives to provide and develop centralised accessible repositories to accept datasets, rather than relying wholly in the initiative of individuals and small organisation to develop their own *ad hoc* solutions.

The 2008 SHARE-IT project was the first significant attempt to understand digital practices in Irish archaeology and to develop a framework for their future direction (SHARE-IT 2008). This study identified a willingness to embrace open-access within the profession, but did note concerns relating to copyright (SHARE-IT 2008, 25). A key outcome of this project was to define the clear need for a national archaeological portal or digital repository (SHARE-IT 2008, 6).

The EU-funded ARIADNE project is underway focusing on the integration of existing archaeological research data infrastructures. This is a project that is aiming to facilitate and promote data-sharing and knowledge-sharing on a transnational basis. Initial outcomes from the project include recommendations for data sharing policies, including (ARIADNE 2014a, 37):

- Adoption of common methods of data citation
- Use of DOIs or an equivalent
- Use of the Creative Commons licence suite

Elsewhere (ARIADNE 2014b, 165–170), the project has recommended the development of services, as part of its remit, including:

- Promoting the awareness of existing data repositories among the research community
- Considering approaches for creating a portal that improves considerably on users' current search options; this would not only integrate existing services but would incorporate metasearch capabilities.

8.2.3 Client confidentiality and copyright issues

Copyright and concerns about copyright, as introduced above, are a significant issue for many Irish archaeologists when it comes to sharing the results of their activities. Where copyright rests is less than transparent. Journals and edited volumes often vest copyright in the individual authors but this practice does vary (Table 8.1). As a result, authors can still remain uncertain about circulating their papers digitally.

Publication	**Copyright Statement**
Journal of Irish Archaeology	The contributors
Journal of the Royal Society of Antiquaries	Not stated just 'all rights reserved'
Proceedings of the Royal Irish Academy: Section C	The publisher
C Corlett & M Potterton (eds) *Settlement in early medieval Ireland in light of recent archaeological excavations*. Dublin: Wordwell Ltd	The contributors
Manning, *c.* (ed.) 2007 *From ringforts to fortified houses: studies on castles and other monuments in honour of David Sweetman*. Dublin: Wordwell Ltd.	The publisher
Duffy, S. (ed.) 2003 Medieval Dublin IV. Dublin: Four Courts Press	The contributors and publisher

Table 8.1—Examples of how copyright is assigned in various journals and edited volumes

Archaeological research, as with research activities in most humanities disciplines, is, largely, work product. Archaeologists undertake the research activities as part of their normal employment. This would place a significant proportion of their work in the 'works made for hire' category of copyright law. Current Irish copyright legislation provides that 'if a work is made by an employee in the course of employment, the employer is the first owner of any copyright, subject to any agreement to the contrary' (Clark & Ní Shúilleabháin 2010, 45). This provision apply wholly to employees; it would only apply to sub-contracted sole traders if an appropriate clause is included in their contract for service (Clark & Ní Shúilleabháin 2010, 45). Academic staff in third level institutions have a degree of protection from this automatic presumption under the principle of 'academic freedom' as defined by the Universities Act 1997 (Clark & Ní Shúilleabháin 2010, 45). It is unlikely that the concept of 'academic freedom' could be extended to individuals employed by private companies. If the terms of a contract of employment explicitly vest copyright or intellectual property rights with the employee, then this would over-ride this provision (Clark & Ní Shúilleabháin 2010, 45). It should be noted though, that English case-law has recognised the existence of a principle of waiver or estoppel in a situation where, in day-to-day practice, employees have been allowed to retain and exercise copyright control (Clark & Ní Shúilleabháin 2010, 45).

The copyright relationship between client and contractor/consultant is also potentially complicated. Copyright can be transferred from the contractor to the client by signed written agreement (Clark & Ní Shúilleabháin 2010, 46); a provision which would presumably include an assignment as part of the terms of a contract. Case law recognises a division between legal and equitable (or beneficial) title in relation to commissioned works—such as artistic works or software—whereby the producer is assigned the legal rights and the commissioner the equitable rights (Clark & Ní Shúilleabháin 2010, 47). How this would apply to archaeological works of little commercial value is uncertain.

Research in other humanities disciplines takes place within academic institutions—universities and research institutes—which tend to have open policies towards data sharing and knowledge sharing. This is most clearly demonstrated in the growth of online institutional repositories where academic staff are expected to lodge their research papers (Chan 2004). Irish examples of these include:

- **Dublin Institute of Technology**: http://arrow.dit.ie/
- **UCD**: http://researchrepository.ucd.ie/
- **Trinity College, Dublin**: http://www.tara.tcd.ie/

Though archaeological research does take place in similar academic settings, a significant proportion takes place within the commercial sector. This is also work product but it is undertaken for a private company that may (or may not) have specific policies in place in relation to intellectual property (IP) and knowledge sharing. It is also undertaken by those companies on behalf of clients. Some of these clients may be publicly funded—for example the National Roads Authority (NRA), the Rail Procurement Agency (RPA) or County Councils—but many are private commercial entities. The archaeological work is commissioned to comply with the requirements of planning, similar to the 'polluter pays' principle of natural environment legislation (Department of Arts, Heritage, Gaeltacht and the Islands 1999a, 25).

The National Roads Authority (NRA) is a good example of a publicly funded client that actively promotes knowledge sharing and data-sharing. The online database of excavations undertaken on NRA road projects was the second most frequently cited '*useful resource*' by respondents during this study. It supports the publication of monographs and edited volumes as well as other methods of dissemination.

> *'It is also a key objective to ensure that the vast quantity of information created by the Authority's work can be realised to its full potential and that the knowledge generated feeds back not only into the decision making and project planning process, but also that this knowledge is disseminated to the general public. These activities also make a valuable contribution to promoting a greater awareness of the past among local communities through which national road schemes pass*.' (National Roads Authority n.d.)

However, such clear position on the issue may not be available from all clients.

In terms of legal requirements and professional best practice, specific to archaeology, the following policy positions pertain:

- National Monuments Service (DAHG)—regulatory body, Republic of Ireland
    - *… the licensee shall prepare a final report on the archaeological excavation and shall submit a copy of that report to both Dúchas* [now National Monuments Service] *and the NMI* [National Museum of Ireland]' (Department of Arts, Heritage, Gaeltacht and the Islands 1999b, 24).
    - *The Department … may decide at any time to provide access to the final report on an archaeological excavation … if such decision is in accordance with the wishes of the licensee and any conditions laid down by him/her. After a period of three years … the Department may decide, without the agreement of the licensee, to provide access to the final report … on the basis that a person consulting such a report gives a written undertaking to fully acknowledge the use of any data contained in the report … The usual provisions regarding copyright will still apply to all archaeological excavation reports … lodged with the Department* (Department of Arts, Heritage, Gaeltacht and the Islands 1999b, 13–4).
    - *The licensee shall submit a concise summary of the results of the archaeological excavation for publication in the Excavations bulletin* (Department of Arts, Heritage, Gaeltacht and the Islands 1999b, 24)
    - *…the licensee shall have a full account of the results of the archaeological excavation published in an appropriate format and to an appropriate standard* (Department of Arts, Heritage, Gaeltacht and the Islands 1999b, 24)
- Northern Ireland Environment Agency (NIEA)—regulatory body, Northern Ireland
    - *The licence will require that a summary report on the excavation is submitted to NIEA within four weeks of the end of the excavation or its temporary cessation. The summary should be published in an annual Excavations Bulletin. The licence will also specify what form of final publication is required. Forms of publication include articles and notes in journals and monographs and interim or summary reports in journals and bulletins* (NIEA n.d., 5).
- Institute of Archaeologist of Ireland (IAI)—professional body, Republic and Northern Ireland
    - *A members shall treat the affairs of his/her/their client or employer in strict confidence, except where the professional standards of the Institute have been compromised by the actions of the client of employer. This shall not preclude members from obligations relating to the dissemination of archaeological information* (IAI 2006, 3).

- *Members shall fully support the principal of facilitating the dissemination of the archaeological results gathered during the course of a commission or project* (IAI 2006, 3).
- *A member shall abide by copyright legislation; in particular a member must obtain written permission for the use of all original material, and acknowledge the source in any subsequent publicatio*n (IAI 2006, 3).

Though archaeologists often retain full control of their research output in practice, this ambiguity in relationships may mean that, where neither the employer nor client has a firm commitment to data and knowledge sharing and does not actively promote methods for so doing, archaeologists may not be comfortable making that material freely online in an unrestricted manner. As can be seen above, current guidance is 'dated', places emphasis on traditional publication and does not take account, explicitly, of more diverse methods of dissemination and sharing. Commitments to honouring copyright legislation and respecting client confidentiality are expressed, but no clear advice is provided as to how these commitments relate to work product and the intellectual property created as work product.

8.2.4 Relevance of citation practices

Irish archaeologists in all sectors of the profession engage in academic publication or the production of reports to an academic standard as part of their normal work and research practices. It would be expected that if they are utilising digital resources—and correctly citing those sources—that this would create an identifiable bibliometric dataset. Certainly the survey results indicate that the dominant response from Irish archaeologists is to '*cite the version consulted*' of any resource which is, arguably, the correct approach.

By contrast, in the *JISC Usage and Impact Study* (Meyer *et al.* 2009, 147) the results of an identical survey query indicated a marked tendency to cite the hard copy or original analogue copy, sometimes with the URL for the digital resource added. This tendency has significant implications for quantifiable methods of impact assessment, notably bibliometrics, but also webometrics. Without correct citation of a resource URL it cannot be confirmed that a researcher made use of it (Meyer *et al.* 2009, 147). It is possible that increased citation of an original/analogue resource post-digitisation of that resource might reflect use of the digitised version.

Though the results of direct questioning indicate that Irish archaeologists are likely to appropriately reference the online resource, there are still some indications of uncertainty around citation practices for digital resources. While the aggregated results indicate good citation

practices, the specific results for *Ogham 3D* and *Inscribed Stones*—the resources that respondents demonstrated least awareness and use of—showed that 'other' was the dominant choice selected. This would suggest a degree of uncertainty about how to cite an unfamiliar resource. Further responses on the subject of obstacles to use of digital resources included:

- *'If I cannot reference it easily'*
- *'Is it reliable and how do I reference it?'*

This problem of how to cite digital resources has been highlighted previously (Meyer *et al.* 2009, 61; 124–5; Meyer 2011, 40–1). In this study, the case of the *ASI Database* highlights the problem best; some users cite the actual resource while others cite the ASI information page (Dr Rob Sands, pers. comm.). When compiling the bibliometric data it was found that three papers cited the web resource URL, while four cited the information page URL. Webometric analysis found a total of 66 URLs with *site inlinks* to the web resource URL and a total of 33 to the information page URL. There is clearly no standard in practice for how this digital resource is cited. There is also a (separate) broader issue of how to correctly cite the Sites and Monuments Records (SMRs)—the main dataset delivered by this resource—which may also be a factor (Dr Rob Sands, pers. comm.). This latter issue is, however, beyond the remit of this study to address.

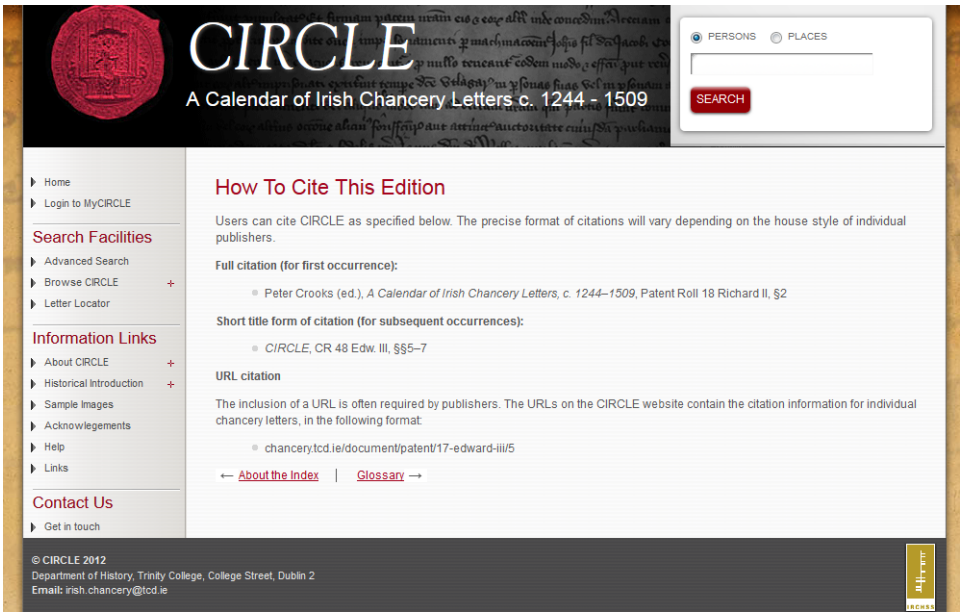

Figure 8.1—'How to cite this resource' information as presented on CIRCLE web resource

One solution to this is for digital resources to include 'how to cite this resource' information (Meyer 2011, 41). This should explain to users how to cite correctly cite the resource (within consistent incorporation of the correct URL) using some of the common formats such as the Harvard system. Web resources such as *Circle: Irish Chancery Letters* (Figure 8.1; Circle 2012)

include an information page explaining how to cite the resource, both in general and specific components or elements within it. Other resources incorporate citation information into each component of the resource. A good example of this, in practice, are the journal archives such as JSTOR, which will generate citations for each article on the landing page for that article. The Archaeological Data Service (ADS) in the UK now assigns each project archive it stores a DOI reference. The Digital Object Identifier (DOI) is a system for registering and identifying documents and other digital objects in a digital environment. It is permanent and has a framework for maintaining an updating the metadata and publishing URL so that the DOI provides a persistent record and link to the original document (DOI 2014).

Another issue that relevant to citation practice, and thus impact assessment, is the stability of the URL for the resource. This was not identified as an issue in this study. Most of the web resources are located on dedicated domains or sub-domains and have not been subject to change. Other studies, however, have examined resources where URLs were altered or changed—as can occur where resources are delivered within large institutional websites—and found that it had a negative effect on the capacity to undertake bibliometrics and webometrics (Meyer *et al.* 2009, 39). However, there still remains the long term issue—will the cited object still be accessible in 10, 15 years' time—there is still not digital equivalent to a copyright library (Dr Rob Sands, pers. comm.).

The final factor that could affect impact assessment is publication lag. It takes time for academic research to be completed, written up and accepted for publication; depending on the nature of a project and the particular publication this could be a span of several years. As a result, it may take several years after a web resource is first made available before it develops a measurable level of citation (Meyer *et al.* 2009, 19).

8.3 Impact Assessment

This section presents in an impact assessment of the resources targeted.

8.3.1 Overview

There are no absolute values or scales established against which the performance of the target web resources can be rated. The performance and relative impact of the target web resources can only be evaluated relative to each other.

Key metrics have been extracted from each of the assessment techniques used. The total number of papers which cite each resource and h-index value have been extracted from the bibliometric dataset. The h-index is rapidly becoming a standard metric for evaluating the work of individual

scholars (Bar-Ilan 2008, 262–3; García-Pérez 2010, 2070) as well as a creditable alternative to Journal Impact Factors (e.g. Vanclay 2008; Harzing & van der Wal 2009). The total number of sites citing each target web resource has been extracted from the webometrics dataset as well as the total number of different categories. These are indicative, respectively, of the size and diversity of the impact footprint of the resource. The key metrics from the survey dataset are awareness (percentage of respondent who have either heard of or used a resource) and usage (percentage of respondents who have used are resource, even if only rarely).

	Excavations Bulletin Database	**ASI Database**	**Logainm**	**Mapping Death**	**Eachtra Journal**	**Ogham 3D**	**Inscribed Stones**	**Mean Value**	**Values for each range**		
									Low	**Medium**	**High**
Bibliometrics											
Total no. of papers	79	7	32	2	8	2	0	18.00	0-9	9-48.5	48.5-79
h-index	6	0	2	1	1	0	0	1.43	0-0.71	0.71-3.71	3.71-6
Webometrics											
No. of Sites	240	60	103	10	17	25	4	62.86	4-33.43	33.43-151.43	151.43-240
Diversity of Sites	17	14	15	7	7	12	4	10.57	4-7.29	7.29-13.79	13.79-17
Survey											
Awareness	100%	100%	98%	84%	93%	57%	57%	84%	57-70%	70-92%	92-100%
Usage	98%	95%	82%	60%	57%	18%	20%	62%	18-40%	40-80%	80-98%

Table 8.2—Key metrics from each analysis technique; colour coded by range category

Each of these metrics has been categorised, relative to all others in the range, as high, medium or low (Table 8.2) on the following basis:

- High—value is equal to or closest to the highest value in the range
- Medium—value is equal to or closest to the mean value in the range
- Low—value is equal to or closest to the mean value in the range

From this it is possible to categorise the impact of each resource, based on the evidence for each of the analytical techniques used, as low, medium or high (Table 8.3). Note that where there are conflicting categorisations of the metrics (e.g. from webometrics, where the number of sites for *Logainm* is categorised as medium, but diversity is in the high range) the higher categorisation has been selected.

	Excavations Bulletin Database	**ASI Database**	**Logainm**	**Mapping Death**	**Eachtra Journal**	**Ogham 3D**	**Inscribed Stones**
Bibliometrics	High	Low	Medium	Medium	Medium	Low	Low
Webometrics	High	High	High	Low	Low	Medium	Low
Survey	High	High	High	Medium	High	Low	Low
Overall Performance	**High**	**Medium-High**	**High-Medium**	**Medium-Low**	**Medium**	**Low-Medium**	**Low**

Table 8.3—Categorisation of relative impact of each web resource

Very few of the target resources performed consistently across the different techniques. There are likely a variety of possible explanations for this (see below), some related to differences in impact footprint and others to the nature of the resource and length of time for which it has been available.

8.3.2 Comparison of Bibliometric Results

Bibliometric data was only found for six of the seven target web resources with a range of two (*Mapping Death* and *Ogham 3D*) to 79 (*Excavations Bulletin Database*) citation sources. No citation of the *Inscribed Stones* resource could be identified. Meyer's recent synthesis of a series of impact studies of digital resources funded by JISC indicates a range of 2–401 citation sources across 11 different resources (2011, 21–2). The resource with the greatest impact was British History Online (http://www.british-history.ac.uk/), established in 2002 it contains primary and secondary sources for the history of Britain. The one with the least impact was Siobhan Davies Replay (www.siobhandaviesreplay.com) a digital archive focused on the work of choreographer Siobhan Davies.

Both British History Online and the *Excavations Bulletin Database* are very broadly based digital resources covering national datasets and multi-period datasets within their respective disciplines. Both are also of potential relevance to cognate disciplines. Siobhan Davies Replay, by contrast, is a more specialised resource and has been described as more targeted at an education and learning audience than a scholastic one. *Inscribed Stones*, *Mapping Death* and *Ogham 3D* are also more specialised resources, focused a specific type and period of archaeological feature. It could be argued that, in general, resources than encompass broader datasets are more likely to have a larger impact footprint relative to more specialised ones.

Timespan may also be a factor in some of the variation. Meyer (2011, 21) was able to compare bibliometric data from Google Scholar from 2009 (Meyer *et al.* 2009, 64–1) with data from Google Scholar compiled at the time of his synthetic study for four of his target resources. In all

four cases the number of citation sources had increased, generally doubling or tripling in number. The resource with the strongest impact in this study—the *Excavations Bulletin Database*—is the 'oldest', going live in 2001; the resources with smaller impacts tend to be younger—*Mapping Death* (c. 2010) and *Ogham 3D* (c. 2012).

8.3.3 Comparison of Webometric Results

Webometric data was obtained for all of the target sites. The count of *site inlinks* ranged from 11 (*Inscribed Stones*) to 460 (*Excavations Bulletin Database*). Meyer's recent synthesis of JISC-funded impact studies indicates a range of 16–6,680 site inlinks across 12 different resources, which he divides into three orders of magnitude (2011, 19). The resources that have been categorised as medium or low in this study (see above) would fall into his lowest order of magnitude, while the resources categorised as high would wall into his second order of magnitude. None of the resources evaluated as part of this study demonstrated an impact footprint of similar scale to his highest order of magnitude. As with the bibliometric data, sites with a smaller impact footprint tended to be the more specialised resources. This would suggest that the smaller relative impact of the more specialised resources demonstrated in this study is to be expected.

For five resources comparative data was available from 2009 (Meyer *et al.* 2009, 45–56) and for four of these there was a definite increase in the number of *site inlinks*, suggestive of an increased impact footprint. There was one exception to this, however, this was a site that moved its web page (Meyer 2011, 20). This demonstrates the importance of a stable URL. This clear growth in online impact over time again suggests that the age of a resource will affect its relative impact.

8.3.4 Comparison of Usage and Awareness

The survey results provided evidence for the awareness and usage of the target web resources amongst Irish archaeologists. Awareness of the resources ranged from 57% (Inscribed Stone and *Ogham 3D*) to 100% (*Excavations Bulletin Database*) and use ranged from 18% (*Ogham 3D*) to 98% (*Excavations Bulletin Database*). These levels are actually quite high when compared with other studies.

The survey results from the *JISC Usage and Impact Study* (Meyer *et al.* 2009, 141) indicated awareness of the resources targeted by that study ranged from 12%–61%, while use ranged from 5%–25%. In all cases the overwhelming reason selected for non-use was 'it's not my topic area' (Meyer *et al.* 2009, 141). A recent European-wide survey of archaeologists (ARIADNE 2014b, 92–3) elicited information about nine different online repositories containing archaeological data. Awareness of these resources ranges from 7%–60%, while usage ranged from 4%–47%.

The most likely reason why the awareness and usage figures from this study are so high (relative to the other examples) is that this study targeted a specific and focused community of practice and targeted resources of definite relevance to them (both thematically and geographically). The *JISC Usage and Impact Study* (Meyer *et al.* 2009) was opportunistic, with the surveys circulated broadly using bulletin boards, discussion mailing lists and social networking tools so did not focus on a particular community of practice or user group. The ARIADNE survey (2014b) was targeted at archaeologists specifically, but it was an international survey and most of the repositories targeted are national/geographically specific resources. The country with the largest number of respondents to the survey was the UK (ARIADNE 2014b, 74) and the resource with the greatest awareness and use was the UK-based Archaeological Data Service (ADS), so it is likely that the geographic composition of the survey sample is reflected in the results (ARIADNE 2014b, 85). When put side by side with the ARIADNE survey, the results of this study lend weight to the argument '*most digital repositories still have, to a large extent, a national use context and user base, even if they are accessible for the international research community*' (ARIADNE 2014b, 85).

8.3.5 Excavations Bulletin Database

The *Excavations Bulletin Database* appears to have the strongest impact footprint of the seven resources evaluated. This resource has the strongest scholarly impact on the basis of the both the bibliometric and webometric analysis. It had the highest level of citation, arguably comparable to a peer-review journal of national significance. The webometric analysis indicates that this resources is referenced, in the largest part, by Public Sector, Archaeology Information, Heritage Information, Business and Social Media type sites. These results are consistent with the high level of awareness and use of this resource amongst professional archaeologists.

This resource was included in this study because it covers the whole island of Ireland and is not restricted by date or site type—it is a broad and inclusive resource. These characteristics are likely to have contributed positively to its impact (see Sections 8.3.2 and 8.3.3). It is the longest established of the seven resources and its URL is unchanged, again factors that would enhance its potential for a quantifiable impact.

8.3.6 ASI Database

The *ASI Database* showed distinct contrasts in its impact footprint. The results of the survey suggest a high level of awareness and use of the resource by Irish archaeologists. However, this is not reflected in the empirical evidence from the webometric and bibliometric analyses. The number of sites that link to it is only moderate but the diversity of those sites is high. Its performance in the bibliometric analysis is even poorer. Direct citation of the resource in scholarly

publications appears to be extremely low by comparison with both the *Excavations Bulletin Database* and *Logainm*, which have equivalent levels of use and awareness.

The possible reasons for this (apparent) discrepancy are worth considering. As has been highlighted earlier in this study, users who do cite this resource are likely to cite one of two different URLs. Though the resource itself is available on a dedicated sub-domain, many users are likely to cite the ASI information page, which provides an introduction and background to the resource (Dr Rob Sands, pers. comm.). However, this fragmentation of citation was accounted for in this study—data was collated for both URLs and metrics compiled on the basis of the aggregated dataset.

The main dataset accessible using this resource is the Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP). Hard copy maps and index volumes for this have not been produced since 1998. There are county archaeological inventory or survey volumes published after this date, but these do not have full national coverage. It has been commented that any researcher requiring current, up-to-date SMR or RMP data must be using the digital resource (Dr Rob Sands, pers. comm.).

It may well be that researchers are citing use of the SMR or RMP in their work but not including any URL. As pointed out by Meyer (2011, 40), in instances such as this, use of the digital resource can be inferred, but this does not provide solid grounds for evaluating impact. Analysis of impact needs explicit evidence of use, whether measurable citations (in publications or on websites), acknowledgement of use or awareness from surveys, interviews or focus groups or quantifiable data from log files or social network analysis (Oxford 2008–13). The relatively poor quantifiable metrics obtained by this study, in comparison to the survey data obtained, reinforce this point.

8.3.7 Logainm

Logainm also shows some variation in its impact footprint, but not as marked as that of the *ASI Database*. It has a high level of awareness and use amongst Irish archaeologists and this is reflected in its webometric footprint. It may not be linked to by as many sites as the *Excavations Bulletin Database*, but has a similar level of diversity in types of sites that link to it, though Language/Linguistic, Blog and Heritage Information site types are the most significant categories. Its academic or scholarly footprint is only moderate, however. The *Logainm* resource has only been available since 2008, so the age of the site may be a factor in its slightly smaller relative impact.

8.3.8 Mapping Death

Mapping Death is another resource that shows some variation in its impact footprint. Both awareness and use of the site are moderate and this is reflected in its moderate academic or scholarly footprint. Interestingly, the number of weblinks to the site and diversity of those links is quite low. However, when the types of sites that linked to were categorised there was as strong prevalence of academic-types sites—a similar number of *Logainm* despite that resource have a much larger online footprint. This similarity is not reflected in the bibliometric data. *Logainm* has a stronger footprint in scholarly publications. The relative age of the resources could be a factor—*Logainm* has been online since 2008, whereas *Mapping Death* has only been online since about 2010, though the research project it derived from commenced in 2008. It is also possible that *Mapping Death* is being cited online as a useful learning and education resource.

8.3.9 Eachtra Journal

The *Eachtra Journal* has a contrasting impact footprint, similar to that noted for the *ASI Database*. Again, the results of the survey suggest a high level of awareness of the resource by Irish archaeologists, though use of the site is markedly lower. Though the resource is (technically) not limited by period or geography, it is limited to the results of archaeological work undertaken by a single company. Its online impact is low relative to the other resources evaluated, but the analysis of the types of sites that linked to it indicated it had a very strong academic footprint. This is also mirrored in the bibliometric results; it has the third highest number of citation sources. The overall relative impact of this resource has been classed as '*medium*', but it has only been in existence since 2009 and is limited to the work done by a single archaeological company, so by all accounts this resource is performing very well.

8.3.10 Ogham 3D

Ogham 3D shows some variation in its impact footprint. Awareness and use of the site by Irish archaeologist is low. Its scholarly footprint is also low, as is the number of weblinks to the resource. However, the diversity of the types of sites that link to it moderate. This is the youngest of the resources evaluated—established *c.* 2012—so the fact that it produced bibliometric data, even if its relative scholarly footprint is still low, is significant. It suggests that there is a good chance that the impact of this resource will increase, possibly greatly, given time. Certainly, it would be interesting to resample the quantitative data for this resource in another year or two to assess any changes in its impact.

8.3.11 Inscribed Stones

Inscribed Stones appears to have the most limited impact footprint of the seven resources evaluated. There is no available evidence that it has ever been cited in a scholarly publication and webometric analysis could only identify a handful of sites that link to it. The survey results indicate that awareness and use of this resource by the professional archaeologists is low. This is a very similar type of resource to *Ogham 3D*. Both resources offer similar types of data. Though *Ogham 3D* also has quite a small relative impact footprint, overall it appears to be the stronger of the two and to have the greatest potential for future growth.

8.4 What Can Knowledge Management Do?

Some of the concepts within Knowledge Management could be potentially useful in addressing some of the issues highlighted in this study. The concept of centralising knowledge or where to find knowledge—whether a Knowledge Yellow Pages, Expert System or Knowledge Repository—could be transposed. The idea of a central over-arching digital repository for Irish archaeological datasets and research outputs along the lines of the Archaeological Data Service (ADS) in the UK may be the dream (SHARE-IT 2008, 6). However, a portal website (with or without its own published resources) that in a curated and organised fashion can direct users to the diversity of smaller, independent resources that currently exist could be hugely beneficial. The development of services that can be integrated or 'talk to each other' is also a key direction for future development (Dr Rob Sands, pers. comm.).

The ARIADNE project (2014b, 169–70) as part of its on-going and future work is considering the potential for the development of a portal site. This would be Europe-wide initiative, but could incorporate links to or even integrate existing Irish repositories. Since one of the aims of this portal would be to support metasearch across repositories, it is likely that design of the portal would target those repositories that support dynamic data consumption for integration. Of the seven resources targeted for this assessment only the *ASI Database* provides a dynamic content link; it currently provides both a Web Map Service (WMS) and a REST Web Service.

Knowledge acquisition tools and techniques could be adopted into the methods used at scoping stages for planned development of or changes to a digital resource. The elicitation techniques could be used to ensure that an understanding of information-seeking behaviours of key user communities and communities of practice is accounted for. One of the methodologies advocated in the *TIDSR toolkit* (Oxford Internet Institute 2008–13), but not utilised for this study, is Audience Analysis. Audience Analysis draws on techniques that would be familiar to a

knowledge engineer, such as semi-structured and unstructured interviews, user observation techniques and focus groups (Quirke *et al.* 2008, 33–42).

The fact that knowledge about metadata and its importance seems to be siloed with the technologists rather than more widely known and understood across the profession is, arguably, a knowledge management problem. This should be addressed through training and Continuous Professional Development (CPD).

8.5 Expert Review

A draft of the key analysis techniques used and findings was reviewed by Dr Rob Sands, School of Archaeology, UCD. Dr Sands is both an archaeologist and technologist; he is the IT Specialist in the School of Archaeology. His research activities focus both on the application of ICT to archaeological research and on the wooden and organic artefactual remains from archaeological excavations.

Relevant specific comments from Dr Sands have been integrated into the main text of the dissertation and alterations to both the structure and content have been made on foot of his advice and feedback. His over-arching comments included:

- *Your analytical approaches make sense, although watch how the results are expressed in terms of assessing significance, and introduced me to some things I had previously been vaguely aware of but had not really been properly introduced to. Your explanations are clear and I can see exactly what you are trying to do.*
- *The results are probably broadly what I would have expected. I think there is scope to pick apart the different perceptions and uses of the resources - there is a danger of comparing apples with oranges or at least creating a fruit salad that underplays the incorporated range of fruit!*

8.6 Conclusions

This chapter has presented an evaluation and discussion of the results of the three analytical techniques used within this study. The relevant issues relating to information seeking behaviours and knowledge sharing practices have been discussed, with a particular focus on the roles of client confidentiality and copyright to data/knowledge sharing and the relevance of citation practices to impact assessment.

The results of all three techniques used have been collated to present a relative impact assessment of each of the target resources and the relevant comparisons have been made to the results of

previous studies. There are no absolute scales or measures against which the results of analysis for each resource can be adjudicated. However, taken collectively it has been possible to suggest relative levels of impact within the overall range of evidence for each of the target resources in this study. In addition, a number of factors that influence impact have been identified and discussed. Some of these factors are inherent in the nature of an individual resource (such a geographic coverage), but others are variable or controllable factors that could be positively managed to enhance measurable impact.

9. CONCLUSIONS AND FUTURE WORK

9.1 INTRODUCTION

This chapter provides a final summary of the key findings and outcomes of this study. It also outline potentially interesting or productive avenues for future research, building on the work completed for this study as well as other (relevant) previous studies.

The results of this study demonstrate the potential value of impact assessment as a performance monitoring tool and have identified significant factors that can influence the impact of a digital resource, positively or negatively. The techniques used for this study were largely effective, though with certain caveats. The most significant challenge for impact assessment studies identified was the impact of poor citation practices on measurability. The potential for future work includes measures to improve the impact and utilisation of digital resources, as well as further impact assessment studies.

9.2 CONCLUSIONS

9.2.1 Measuring Impacts

The development of impact assessment methodologies to measure the effect of digital resources is not a product of a backlash against the 'build it and they will come' approach to digitisation. Rather, it is a result of the realisation that for digitisation projects to have 'life' and have a future they must be utilised.

Knowledge sharing is a key principle of Knowledge Management practice. Within humanities disciplines this is being increasingly facilitated by the growth and development of digital repositories. Measuring and understanding the real impact of these innovations provides concrete evidence of their efficacy in the sharing and dissemination of data and knowledge. It can highlight both planned and unplanned impacts as well as pointing to positive actions that can be undertaken to increase impact and by extension knowledge sharing.

The evidence from this study suggests that Irish archaeologists are open to both the use of digital resources and to sharing knowledge and data, broadly confirming that the attitudes identified by the previous SHARE-IT project (2008) persist. Certain concerns, notably in relation of copyright and client confidentiality, persist also.

Evaluation of the impact of each of the target resources suggests that inherent characteristics of a resource will influence its impact. Resources with a greater geographic reach or that were not

restricted by period or site type generally demonstrated greater levels of relative impact than more specialised resources. Longevity also influenced measurable impact—more long established resources had larger relative impact footprints. The evidence also supported the contention that the main user base for a resource is most likely within its country of origin (ARIADNE 2014b, 85).

Reviewing the results of this study, though, certain variable or controllable factors can be identified that are likely to influence the impact of a digital resource:

- Information-seeking behaviours of target users may affect discovery and awareness of a resource and by implication usage
- Clear and unambiguous information about the history and provenance of a resource and its contents; users like to know that a resource is reliable and traceable.
- Access charges or similar restrictions are a disincentive to use
- Participation in subject-matter or similar portals and the provision of 'consumable services' (e.g. WMS) that can be integrated into portal-type sites. This can raise awareness and increase use.
- Well-presented citation guidance (perhaps combined with DOIs or equivalent at an object/entity level within the resource) to promote proper and consistent citation of the resource by users. This ensures that impact, particularly scholarly impact, can be measured and tracked.
- Maintaining a stable URL for the resource assists in consistency of citations and hyperlinks and facilitates quantifiable methods for measuring and tracking impact.

9.2.2 Effectiveness of the analytical techniques

Meyer (2011, 17) has argued that a multi-strand approach is essential to any study attempting to define the impact of a digital resource, particularly one that incorporates a scholarly or academic target audience. The *Toolkit for the Impact of Digitised Scholarly Resources* (TIDSR) (Oxford Internet Institute 2008–13) describes a dozen different techniques that can be employed to assess the impact of digital resources. The three techniques used in this study form part of the toolkit and the specific methodologies and software tools used were selected with reference to the advice and guidance set out in the *TIDSR toolkit* (Oxford Internet Institute 2008–13), as well as previous studies where they had been employed (e.g. Meyer *et al.* 2009; Hughes *et al.* 2011; Meyer 2011; Eccles *et al.* 2012).

Bibliometric analysis is a standard and well-established technique for estimating the scholarly impact of individual researchers as well as the academic standing or weight of specific

publications such as journals (e.g. Meyer 2011, 21; Harzing 2013). Bibliometrics is effective at indicating academic impact; in principle, the limitations of the bibliometric analysis of a web resource are no different to those that apply to any other bibliometric study (e.g. Bar-Ilan 2008, 256).

It does rely, however, on users correctly and consistently citing the web resource. Where variations in URL citation are defined and known in advance—whether variant user practices as is the case in relation to the *ASI Database* in this study or changing URLs as noted in other studies (e.g. Meyer *et al.* 2009; Meyer 2011)—it is possible to adjust the methodology to incorporate this. It does create an added layer of complication to the analysis process, however, and may decrease the level of confidence in the outcome of such analysis as an accurate measure of impact.

The methodology was successfully applied in this study and meaningful results were achieved. Two of the three difficulties encountered—the return of invalid citations and merging datasets for multiple URLs—are problems that had been encountered in previous studies (e.g. Meyer *et al.* 2009; Meyer 2011). The issue of the Google Scholar search algorithm incorrectly parsing the search a text string was not noted in previous studies.

Further, the specific difficulties of invalid citations and incorrect parsing of search terms related to the citation database used—Google Scholar—so might not be an issue for impact studies using other citation data sources (provided they are suitable for the disciplines covered by any such studies). Any future impact studies of Irish digital resources, in any discipline, however, should take particular note of the parsing issue encountered during this study, if using Google Scholar as a citation data source. Any Irish digital resource is likely to be housed on a .ie domain, so the difficulty where the search function does not distinguish between the Top Level Domain (TLD) .ie and the abbreviation i.e. may be encountered.

Webometric analysis can also provide evidence of a scholarly or academic footprint in as much as it gives an indication of the scale and scope of the online impact of these resources. Academic discourse increasingly incorporates web-based methods of communication and dissemination of ideas—blogs, social networking, bulletin boards—as well as the traditional print-based fora (Eccles *et al.* 2012, 512).

Again, this methodology was successfully applied within this study and meaningful results were achieved. It was possible to examine both the geographic reach and diversity of types of sites for each resource targeted.

The limitations of this methodology encountered in other studies (e.g. Eccles *et al.* 2012, 513; Meyer 2011, 20; Thelwall 2013, 26) did not prove problematic in this instance. The only significant challenge was the need to combine the results from two URL searches for the *ASI Database*. It was possible to do this with some slight adjustments to the methodology. It is a difficulty that had been similarly addressed in other impact studies (e.g. Eccles *et al.* 2012), though it is an added complication and may decrease the level of confidence in the outcome of such analysis as an accurate measure of impact.

Surveys and questionnaires are a natural method of elicitation and knowledge acquisition. They are useful for collecting structured information from large groups of respondents. The results of this study (when compared to other similar surveys) demonstrate that deciding the appropriate target audience for an impact assessment survey will affect the results. Different user groups and different communities of practice are likely to return very different responses. Opportunistic surveys are also likely to return very different results to those targeted as specific groups.

Though these techniques may be quantifiable, they do not provide absolute measures or scales of impact, it is only possible to comment in terms of relative impact. Their effectiveness requires that resources be analysed in groups. These groups of resources should have some sort of thematic link so that degrees of 'sameness' and 'difference' are clear and can be accounted for in evaluating the relative impact. Each technique used has a specific focus and a more nuanced impression of impact emerges through the comparison of results. For example, robust numbers of citation sources and high levels of citation on academic type websites support the interpretation of a strong scholarly impact. Equally, contrasts in results may be significant a resource with high levels of use or awareness but relative low numbers of bibliometric citations may indicate a resource whose main impact is not in the scholarly arena (or, as outlined below, may highlight incidence of the 'citation problem').

The software tools used to deliver all three techniques—*Publish or Perish* 4.6.4, *Webometric Analyst* 2.0 and *QuestionPro*—were user-friendly with built-in searches or wizards suitable for the purposes of this study. The only significant limitation of both *Publish or Perish* and *Webometric Analyst* was that search results for each URL could only be returned individually. It was not possible within the programmes as currently designed to combine and analyse the results from two or more URLs directly (as was necessary for analysis of the *ASI Database* results). *Publish or Perish* did allow the data once combined using another tool—Excel—to be reimported for analysis. Integration and analysis of the webometric dataset for the *ASI Database* had to be undertaken wholly using Excel. It was not possible to combine the raw datasets for analysis by *Webometric Analyst*.

9.2.3 Measurement challenges and the citation problem

The most significant challenge for measurable impact assessment that is evident in this study is the so-called 'citation problem' (Meyer 2011, 40). Certain quantifiable methods of impact assessment—notably bibliometrics and webometrics—rely on citation of the resource URL as a basis for measurement.

This problem manifests in a number of different ways. Firstly, there is scholarly citation practice—are users of the resource correctly and consistently citing a URL in their research outputs. Some studies have identified a 'cultural' problem whereby individuals use the digital resource but cite the analogue original because it appears more authoritative (Meyer *et al.* 2009, 124–5). Equally, scholars may cite the analogue source because they do not know how to cite the digital resource correctly, so take the path of least resistance. Lack of guidance can also lead to inconsistent citation of URLs.

This issue only manifested explicitly in this study in relation to one resource—the *ASI Database*—but the evidence suggests that it may be a significant factor in the divergent and contrasting results in relation to that resource obtained from the various analytical techniques (see Chapter 8.3.6 for detailed discussion). However, survey respondents did express concerns on this issue in relation to the general use of digital resources.

9.3 Future Work

This study was effectively a snapshot impact assessment; datasets for bibliometrics and webometrics were compiled only once. Most other comparable studies (Meyer *et al.* 2009; Hughes *et al.* 2011; Meyer 2011; Eccles *et al.* 2012) are also snapshot or short-term studies compiling data at a single point in time or over a very limited timespan.

One potentially interesting avenue for further research in this area would be more long term or longitudinal impact studies. These could use both the techniques adopted in this study as well as other techniques such as Log File Analysis, Content Analysis, Referrer Analysis and Audience Feedback (Oxford Internet Institute 2008–13). Raw data to inform each of the analysis techniques could be captured on multiple occasions spread over a defined timespan (for example every 3 months over a year to 18 months or every 6 months over two to three years). This would allow changes in impact pattern over time or spread/increase of impact footprint over time to be evaluated.

Equally impact assessment techniques could be built into long term project plans for the management and development of digital resources. The (admitted limited) data presented in Meyer's (2011) synthesis of JISC-funded impact studies does suggest that the webometric and bibliometric techniques used in this study should be able to track and record change over time. It is likely that other techniques within the *TIDSR toolkit* (Oxford Internet Institute 2008–13), both quantitative and qualitative, could be adapted for longitudinal study.

Information-seeking behaviours and attitudes towards the use of digital resources amongst user communities and communities of practice are likely to affect up-take and use of a digital resources. Knowledge acquisition tools and techniques deployed at scoping stages for development or changes to a resource could potentially provide the understanding needed to account and plan for these factors. This may help address their impact on the awareness and use of a resource and enhance its relative measurable impact.

Resource creators and providers should also provide 'how to cite this resource' information as standard. Ideally, this should be integrated with each significant object in the resource, so that if the user accesses information on, for example, a specific excavation, the web resource returns not only the requested dataset but also a unique citation (such as a DOI reference). This may not be possible in established resources, particularly if there are funding limitations, but a 'how to cite' information page should be created and feature prominently on the home page. ARIADNE (2014a, 37) has recommended, as part of its on-going and future work, the adoption of common methods of data citation. Should these standards emerge, then it would be advisable for Irish resource providers to align their citation guidance towards them. These initiatives should increase the usability of the resource, increase user confidence in the resource and also improve the potential for quantifiable impact measurements to track its performance.

Training and Continuous Professional Development (CPD) might address the knowledge deficit noted in certain areas, in particular, in relation to metadata quality and standards and copyright/client confidentiality. Though there are well-described and well-established standards for metadata, knowledge and understanding of them and their importance is still limited to technologists rather than the wider archaeological profession. The Institute of Archaeologists of Ireland (IAI) requires members to complete a certain level of CPD annually and provides a programme of CPD courses to assist in this. Training in these areas could be incorporated into a future CPD programme. One of the methods suggested by the on-going ARIADNE project (2014a, 37) to promote data-sharing is the deployment of simple metadata applications.

Copyright issues could also be addressed by the wider adoption of Creative Commons licencing system, as standard, to all archaeological work product. The ARIADNE project (2014a, 37) is advocating for this as part of its recommended data sharing policies.

The on-going and future work of the ARIADNE project (ARIADNE 2014b, 165–170) offers considerable potential to help to address not only issues surrounding metadata, but also the integration of services. The ambition of the project to develop a portal to not only link to existing digital resources but also facilitate metasearch capabilities across those resources is laudable. It presents, perhaps, the best opportunity, at least in the short to medium term, to create something analogous to a knowledge repository for archaeology.

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APPENDIX A—WEBOMETRIC ANALYSIS: CLASSIFICATION OF SITES

EXCAVATIONS BULLETIN DATABASE

Site	URLs	%	Classification
pandastats.net	93	20.20%	Web Stats/Information
blogspot.com	19	4.10%	Blog
cyclopaedia.net	12	2.60%	Wiki/Encyclopedia
wikipedia.org	11	2.40%	Wiki/Encyclopedia
wordpress.com	7	1.50%	Blog
heritagecouncil.ie	6	1.30%	Heritage Information
linkedin.com	5	1.10%	Social Media
proz.com	4	0.90%	Other
ancestry.com	3	0.70%	Heritage Information
scribd.com	3	0.70%	Social Media
thefullwiki.org	3	0.70%	Wiki/Encyclopedia
ria.ie	2	0.40%	Academic
flickr.com	2	0.40%	Social Media
navanfortapp.com	2	0.40%	Heritage Information
killianhalpin.com	2	0.40%	Blog
google.com	2	0.40%	Search Engine
travelmania-ireland.com	2	0.40%	Tourism
iafs.ie	2	0.40%	Business - Archaeology
queenofpots.com	2	0.40%	Blog
ulster.ac.uk	2	0.40%	Academic
irishconcrete.ie	2	0.40%	Business - Other
clogherhistory.ie	2	0.40%	Local Heritage
westmeathcoco.ie	2	0.40%	Public Sector
savedwebhistory.org	2	0.40%	Web Stats/Information
anthropology-resources.net	2	0.40%	Archaeology Information
tcd.ie	2	0.40%	Academic
epa.ie	2	0.40%	Public Sector
brandigg.de	2	0.40%	Other
eirgridprojects.com	2	0.40%	Business - Other
springer.com	2	0.40%	Academic
irelus.com	2	0.40%	Web Stats/Information
themodernantiquarian.com	2	0.40%	Heritage Information
mega-what.com	2	0.40%	Archaeology Information
waset.org	2	0.40%	Academic
corkrdo.ie	2	0.40%	Public Sector
boards.ie	2	0.40%	Social Media
seandalaiocht.com	2	0.40%	Archaeology Information
irisharchaeology.ie	2	0.40%	Archaeology Information

Site	URLs	%	Classification
ireland24.ie	2	0.40%	Other
archaeolink.com	2	0.40%	Archaeology Information
academia.edu	2	0.40%	Academic
ucd.ie	2	0.40%	Academic
phouka.com	2	0.40%	Heritage Information
tuugo.info	2	0.40%	Web Stats/Information
alexa.com	2	0.40%	Web Stats/Information
theirisharchives.com	2	0.40%	Heritage Information
websitelooker.net	2	0.40%	Web Stats/Information
urlm.co	2	0.40%	Web Stats/Information
archaeology.ie	2	0.40%	Public Sector
meath.ie	2	0.40%	Public Sector
suctionexcavations.ie	2	0.40%	Business - Other
lithicsireland.ie	2	0.40%	Archaeology Information
slideshare.net	2	0.40%	Social Media
waterfordcoco.ie	2	0.40%	Public Sector
wordreference.com	2	0.40%	Wiki/Encyclopedia
rpa.ie	2	0.40%	Public Sector
irishexaminer.com	2	0.40%	News/Media
youtube.com	2	0.40%	Social Media
charles-mount.ie	2	0.40%	Blog
dublincity.ie	2	0.40%	Public Sector
nationalgeographic.com	2	0.40%	Academic
ipean.ie	2	0.40%	Archaeology Information
tipperarynorth.ie	2	0.40%	Public Sector
historicgraves.com	2	0.40%	Heritage Information
candaexcavations.ie	2	0.40%	Business - Other
eircom.net	2	0.40%	Business - Other
potiori.com	2	0.40%	Other
docstoc.com	2	0.40%	Other
archiseek.com	2	0.40%	Social Media
znate.ru	2	0.40%	Other
statscrop.com	2	0.40%	Web Stats/Information
answers.com	2	0.40%	Wiki/Encyclopedia
2000shareware.com	2	0.40%	Other
ucl.ac.uk	2	0.40%	Academic
newmail.ru	2	0.40%	Other
robtex.com	2	0.40%	Web Stats/Information
worddomination.com	1	0.20%	Other
oldwarrenpointforum.com	1	0.20%	Local Heritage
crosswords911.com	1	0.20%	Other
southtippheritage.ie	1	0.20%	Public Sector
urlm.co.uk	1	0.20%	Web Stats/Information

Site	URLs	%	Classification
dublinforum.net	1	0.20%	Social Media
clahs.com	1	0.20%	Local Heritage
myclonmel.com	1	0.20%	Local Heritage
taleofale.com	1	0.20%	Blog
galway.ie	1	0.20%	Local Heritage
geni.com	1	0.20%	Heritage Information
historyandheritageindublin15.com	1	0.20%	Local Heritage
ox.ac.uk	1	0.20%	Academic
courtneydeery.com	1	0.20%	Business - Archaeology
aegisarchaeology.com	1	0.20%	Business - Archaeology
yourirish.com	1	0.20%	Heritage Information
land.ru	1	0.20%	Other
saintsandstones.net	1	0.20%	Archaeology Information
navanhistory.ie	1	0.20%	Local Heritage
kerrycoco.ie	1	0.20%	Public Sector
eneclann.ie	1	0.20%	Business - Other
vimeo.com	1	0.20%	Social Media
wordwizard.com	1	0.20%	Other
bajr.org	1	0.20%	Archaeology Information
castlegarns.ie	1	0.20%	Education
ie10-download.org	1	0.20%	Other
uchebalegko.ru	1	0.20%	Other
digplanet.com	1	0.20%	Wiki/Encyclopedia
ucm.es	1	0.20%	Academic
erinhart.com	1	0.20%	Blog
ric.edu	1	0.20%	Academic
ucc.ie	1	0.20%	Academic
tarastreetstation.ie	1	0.20%	Business - Other
kiltullagh.com	1	0.20%	Local Heritage
sensagent.com	1	0.20%	Other
teagasc.ie	1	0.20%	Public Sector
tinet.ie	1	0.20%	Other
le.ac.uk	1	0.20%	Academic
oxfordshire.gov.uk	1	0.20%	Public Sector
cogg.ie	1	0.20%	Academic
gla.ac.uk	1	0.20%	Academic
chron.com	1	0.20%	News/Media
mythicalireland.com	1	0.20%	Heritage Information
rbcmail.ru	1	0.20%	Other
ballincolligheritage.org	1	0.20%	Local Heritage
archive.today	1	0.20%	Web Archive
nra.ie	1	0.20%	Public Sector
ruc.dk	1	0.20%	Academic

Site	URLs	%	Classification
goo.ne.jp	1	0.20%	Search Engine
metaheaders.net	1	0.20%	Web Stats/Information
tumblr.com	1	0.20%	Social Media
stcathns.com	1	0.20%	Education
leonardo.it	1	0.20%	News/Media
donegalcoco.ie	1	0.20%	Public Sector
lndp.lt	1	0.20%	Other
islandireland.com	1	0.20%	Heritage Information
ipmag.ie	1	0.20%	Archaeology Information
donaghmoyne.com	1	0.20%	Local Heritage
offaly.ie	1	0.20%	Public Sector
clarelibrary.ie	1	0.20%	Local Heritage
thegetrank.net	1	0.20%	Web Stats/Information
eomas.ie	1	0.20%	Business - Archaeology
front.ru	1	0.20%	Other
culturalheritageireland.ie	1	0.20%	Heritage Information
yqyq.net	1	0.20%	Other
building.co.uk	1	0.20%	Business - Other
eng-h.gov.uk	1	0.20%	Archaeology Information
blfunion.com.au	1	0.20%	Business - Other
sligococo.ie	1	0.20%	Local Heritage
rawlinson.co.uk	1	0.20%	Business - Other
macdaraconroy.com	1	0.20%	Blog
anu.edu.au	1	0.20%	Academic
eirgridnortheastprojects.com	1	0.20%	Business - Other
irishhighcrosses.com	1	0.20%	Archaeology Information
archaeology.org	1	0.20%	Archaeology Information
wolfhoundarchaeology.ie	1	0.20%	Business - Archaeology
archive.org	1	0.20%	Web Archive
google.de	1	0.20%	Search Engine
visionsofthepastblog.com	1	0.20%	Blog
online-literature.com	1	0.20%	Other
lumcloonenergypowerplant.com	1	0.20%	Business - Other
celbridgeonline.ie	1	0.20%	Local Heritage
apjpublications.co.uk	1	0.20%	Other
myfreeforum.org	1	0.20%	Social Media
gardengrow.eu	1	0.20%	Blog
ul.ie	1	0.20%	Academic
tarbertpowerproject.com	1	0.20%	Business - Other
leitrimcoco.ie	1	0.20%	Public Sector
seai.ie	1	0.20%	Public Sector
irith.org	1	0.20%	Heritage Information
indigo.ie	1	0.20%	Other

Site	URLs	%	Classification
frantzen.de	1	0.20%	Blog
burrenforts.ie	1	0.20%	Local Heritage
medievalists.net	1	0.20%	Heritage Information
koh-antique.com	1	0.20%	Other
yahoo.com	1	0.20%	Search Engine
kildare.ie	1	0.20%	Public Sector
m3motorway.ie	1	0.20%	Public Sector
mappingdeath.ie	1	0.20%	Academic
my-edu2.com	1	0.20%	Other
readtiger.com	1	0.20%	Wiki/Encyclopedia
bestacademicsurveys.com	1	0.20%	Other
qub.ac.uk	1	0.20%	Academic
rootschat.com	1	0.20%	Heritage Information
wordiq.com	1	0.20%	Wiki/Encyclopedia
sluggerotoole.com	1	0.20%	Blog
turner-white.com	1	0.20%	Business - Other
eachtra.ie	1	0.20%	Business - Archaeology
megalithic.co.uk	1	0.20%	Archaeology Information
bournemouth.ac.uk	1	0.20%	Academic
dbpedia.org	1	0.20%	Wiki/Encyclopedia
flickriver.com	1	0.20%	Social Media
askives.com	1	0.20%	Web Archive
textmirror.net	1	0.20%	Other
twitter.com	1	0.20%	Social Media
perfectlywrite.eu	1	0.20%	Business - Other
sciencedirect.com	1	0.20%	Academic
gecoloco.com	1	0.20%	Business - Other
seodigger.com	1	0.20%	Other
dicamillocompanion.com	1	0.20%	Heritage Information
greatislandpowerproject.com	1	0.20%	Business - Other
clonroadmorewwtp.ie	1	0.20%	Public Sector
humphrysfamilytree.com	1	0.20%	Local Heritage
factbites.com	1	0.20%	Search Engine
emap.ie	1	0.20%	Academic
itsabouttime.ie	1	0.20%	Education
brown.edu	1	0.20%	Academic
eng-tips.com	1	0.20%	Social Media
studyguidenow.com	1	0.20%	Academic
romanarmytalk.com	1	0.20%	Social Media
moghroith.com	1	0.20%	Archaeology Information
jpnunan.com	1	0.20%	Business - Archaeology
yasni.de	1	0.20%	Web Stats/Information
kerrylibrary.ie	1	0.20%	Local Heritage

Site	URLs	%	Classification
wordsdomination.com	1	0.20%	Other
intute.ac.uk	1	0.20%	Academic
genealogy.com	1	0.20%	Heritage Information
historychannel.com.au	1	0.20%	News/Media
realholidayreports.com	1	0.20%	Tourism
fingalcoco.ie	1	0.20%	Local Heritage
iai.ie	1	0.20%	Archaeology Information
contractortalk.com	1	0.20%	Social Media
blogspot.co.uk	1	0.20%	Blog
com.nu	1	0.20%	Other
geohazards.info	1	0.20%	Academic
indiamike.com	1	0.20%	Social Media
corribconnect.ie	1	0.20%	Local Heritage
theharoldschool.ie	1	0.20%	Education
louthheritage.ie	1	0.20%	Local Heritage
fluidr.com	1	0.20%	Social Media
illinois.edu	1	0.20%	Academic
iac.ie	1	0.20%	Business - Archaeology
voicesfromthedawn.com	1	0.20%	Archaeology Information
livinghistory.ie	1	0.20%	Social Media
midarc.ie	1	0.20%	Business - Archaeology
limerickpa.org	1	0.20%	Public Sector
texags.com	1	0.20%	Other
ringaskiddywastetoenergy.ie	1	0.20%	Business - Other
kilkennycoco.ie	1	0.20%	Local Heritage
wodan.ie	1	0.20%	Academic
wirestrungharp.com	1	0.20%	Heritage Information
typepad.com	1	0.20%	Blog
nypl.org	1	0.20%	Academic
kelticos.org	1	0.20%	Social Media

ASI DATABASE

Site	URLs	%	Classification
cyclopaedia.net	10	9.17%	Wiki/Encyclopedia
facebook.com	9	8.26%	Social Media
wordpress.com	4	3.67%	Blog
dit.ie	3	2.75%	Academic
scribd.com	3	2.75%	Social Media
virtualireland.ru	3	2.75%	Social Media
academia.edu	2	1.83%	Academic
blogspot.com	2	1.83%	Blog
boards.ie	2	1.83%	Social Media
charles-mount.ie	2	1.83%	Blog

Site	URLs	%	Classification
clonmelgraveyards.com	2	1.83%	Local Heritage
cyclopaedia.info	2	1.83%	Wiki/Encyclopedia
environ.ie	2	1.83%	Public Sector
granbypark.com	2	1.83%	Local Heritage
historicgraves.com	2	1.83%	Heritage Information
irelandxo.com	2	1.83%	Heritage Information
irishfables.com	2	1.83%	Heritage Information
irishhighcrosses.com	2	1.83%	Heritage Information
mythicalireland.com	2	1.83%	Heritage Information
owenrees.co.uk	2	1.83%	Blog
ox.ac.uk	2	1.83%	Academic
picturesbytom.tk	2	1.83%	Blog
pilgrimagemedievalireland.com	2	1.83%	Blog
politicalworld.org	2	1.83%	Social Media
roscommoncoco.ie	2	1.83%	Public Sector
rsdownie.co.uk	2	1.83%	Blog
themodernantiquarian.com	2	1.83%	Archaeology Information
weebly.com	2	1.83%	Blog
wikipedia.org	2	1.83%	Wiki/Encyclopedia
activeboard.com	1	0.92%	Social Media
ballyboughal.net	1	0.92%	Local Heritage
broadsheet.ie	1	0.92%	News/Media
buncranahistory.com	1	0.92%	Local Heritage
corkheritage.ie	1	0.92%	Local Heritage
duth.gr	1	0.92%	Academic
europa.eu	1	0.92%	Public Sector
gov.ie	1	0.92%	Public Sector
iehostweb.com	1	0.92%	Other
irishexaminer.com	1	0.92%	News/Media
kennylyons.ie	1	0.92%	Blog
lithicsireland.ie	1	0.92%	Archaeology Information
maryhenryarchaeology.ie	1	0.92%	Business - Archaeology
meath.ie	1	0.92%	Public Sector
megalithic.co.uk	1	0.92%	Archaeology Information
metaldetectingforum.co.uk	1	0.92%	Social Media
metaldetectingireland.com	1	0.92%	Blog
nigelborrington.com	1	0.92%	Blog
npws.ie	1	0.92%	Public Sector
ranklite.se	1	0.92%	Web Stats/Information
riverhavenselfcatering.ie	1	0.92%	Tourism
roaringwaterjournal.com	1	0.92%	Blog
rootschat.com	1	0.92%	Heritage Information
similarsites.com	1	0.92%	Search Engine

Site	URLs	%	Classification
stoneyfordonline.com	1	0.92%	Local Heritage
surcentro.com	1	0.92%	Web Stats/Information
tripadvisor.co.uk	1	0.92%	Tourism
twitter.com	1	0.92%	Social Media
vestures klubs.lv	1	0.92%	Other
wn.com	1	0.92%	News/Media
youtube.com	1	0.92%	Social Media

LOGAINM

Site	URLs	%	Classification
cyclopaedia.net	5	3.20%	Wiki/Encyclopedia
linkedin.com	4	2.50%	Social Media
gov.ie	3	1.90%	Public Sector
ancestry.com	3	1.90%	Heritage Information
wordpress.com	3	1.90%	Blog
wikipedia.org	3	1.90%	Wiki/Encyclopedia
potafocal.com	2	1.30%	Language/Linguistics
ainm.ie	2	1.30%	Language/Linguistics
dri.ie	2	1.30%	Academic
aughty.org	2	1.30%	Local Heritage
surveymonkey.com	2	1.30%	Other
gaelscoileanna.ie	2	1.30%	Education
facebook.com	2	1.30%	Social Media
irishgaelictranslator.com	2	1.30%	Language/Linguistics
siteslike.com	2	1.30%	Search Engine
thesession.org	2	1.30%	Social Media
slideshare.net	2	1.30%	Social Media
irelandxo.com	2	1.30%	Heritage Information
focal.ie	2	1.30%	Language/Linguistics
themodernantiquarian.com	2	1.30%	Heritage Information
ranganna.com	2	1.30%	Education
kerrycoco.ie	2	1.30%	Public Sector
ourlibrary.ca	2	1.30%	Social Media
irishtourist.com	2	1.30%	Tourism
pinterest.com	2	1.30%	Social Media
duchas.ie	2	1.30%	Heritage Information
pandastats.net	2	1.30%	Web Stats/Information
corkheritage.ie	2	1.30%	Local Heritage
gaelport.com	2	1.30%	Language/Linguistics
markosweb.com	2	1.30%	Web Stats/Information
w3snoop.com	2	1.30%	Web Stats/Information
crazygallery.info	2	1.30%	Other
irishgenealogical.org	2	1.30%	Heritage Information

Site	URLs	%	Classification
link286.com	2	1.30%	Web Stats/Information
placename.ie	2	1.30%	Language/Linguistics
irishplacenames.ie	2	1.30%	Language/Linguistics
answers.com	2	1.30%	Wiki/Encyclopedia
fiontar.ie	2	1.30%	Language/Linguistics
robtex.com	2	1.30%	Web Stats/Information
dinglenews.com	2	1.30%	News/Media
thecelebritypix.com	2	1.30%	Other
twitter.com	2	1.30%	Social Media
scriobh.ie	2	1.30%	Language/Linguistics
academia.edu	2	1.30%	Academic
doegen.ie	2	1.30%	Language/Linguistics
tuugo.info	1	0.60%	Other
pilgrimagemedievalireland.com	1	0.60%	Blog
weebly.com	1	0.60%	Blog
coolsocial.net	1	0.60%	Web Stats/Information
eastkerryroots.com	1	0.60%	Local Heritage
donegalcoco.ie	1	0.60%	Public Sector
chartshunt.com	1	0.60%	Other
mulley.net	1	0.60%	Blog
deri.ie	1	0.60%	Academic
fingal.ie	1	0.60%	Public Sector
gaeilge.ie	1	0.60%	Language/Linguistics
msn.com	1	0.60%	News/Media
waterfordcoco.ie	1	0.60%	Local Heritage
amazon.es	1	0.60%	Business - Other
websitelooker.net	1	0.60%	Web Stats/Information
seomraranga.com	1	0.60%	Education
coola.ie	1	0.60%	Education
realmagick.com	1	0.60%	Other
coimisineir.ie	1	0.60%	Public Sector
sitetool.org	1	0.60%	Other
savedwebhistory.org	1	0.60%	Web Stats/Information
informer.com	1	0.60%	Web Stats/Information
visionsofthepastblog.com	1	0.60%	Blog
snagero.com	1	0.60%	Blog
herokuapp.com	1	0.60%	Other
businessandleadership.com	1	0.60%	News/Media
cubestat.com	1	0.60%	Web Stats/Information
ancestry.ca	1	0.60%	Heritage Information
wikimapia.org	1	0.60%	Wiki/Encyclopedia
brandigg.de	1	0.60%	Other
statscrop.com	1	0.60%	Web Stats/Information

Site	URLs	%	Classification
academic.ru	1	0.60%	Academic
talkirish.com	1	0.60%	Language/Linguistics
mountainviews.ie	1	0.60%	Tourism
pwaldron.info	1	0.60%	Blog
tcdlife.ie	1	0.60%	Academic
digplanet.com	1	0.60%	Wiki/Encyclopedia
irishgenealogy.ie	1	0.60%	Heritage Information
ictarscoil.com	1	0.60%	Education
bisa-web.org	1	0.60%	Language/Linguistics
kieranmccarthy.ie	1	0.60%	Blog
arasinisgluaire.ie	1	0.60%	Local Heritage
corkpastandpresent.ie	1	0.60%	Local Heritage
pmoran.ie	1	0.60%	Blog
youtube.com	1	0.60%	Social Media
advertiser.ie	1	0.60%	Other
cogar.ie	1	0.60%	News/Media
merrionstreet.ie	1	0.60%	Public Sector
un.org	1	0.60%	Public Sector
dcu.ie	1	0.60%	Academic
blogspot.com	1	0.60%	Blog
reformal.ru	1	0.60%	Other
irishislands.info	1	0.60%	Tourism
europeana.eu	1	0.60%	Heritage Information
coppeenheritage.com	1	0.60%	Local Heritage
theirisharchives.com	1	0.60%	Heritage Information
gael-taca.com	1	0.60%	Language/Linguistics
pbworks.com	1	0.60%	Other

MAPPING DEATH

Site	URLs	%	Classification
cyclopaedia.net	9	42.90%	Wiki/Encyclopedia
cam.ac.uk	2	9.50%	Academic
discoveryprogramme.ie	2	9.50%	Academic
heritagecouncil.ie	2	9.50%	Public Sector
irishconferenceofhistorians.com	1	4.80%	Academic
uniflip.com	1	4.80%	Other
archive-ie.com	1	4.80%	Web Archive
ria.ie	1	4.80%	Academic
wordpress.com	1	4.80%	Blog
iai.ie	1	4.80%	Archaeology Information

EACHTRA JOURNAL

Site	URLs	%	Classification
cyclopaedia.net	10	27.80%	Wiki/Encyclopedia
blogspot.com	3	8.30%	Blog
awards.ie	2	5.60%	Other
brandigg.de	2	5.60%	Other
academia.edu	2	5.60%	Academic
cyclopaedia.nl	2	5.60%	Wiki/Encyclopedia
scribd.com	2	5.60%	Social Media
slideshare.net	2	5.60%	Social Media
dayofarchaeology.com	2	5.60%	Archaeology Information
brandigg.ch	2	5.60%	Other
metajnl.com	1	2.80%	Academic
sciencedirect.com	1	2.80%	Academic
uni-greifswald.de	1	2.80%	Academic
rssing.com	1	2.80%	Web Stats/Information
kgbpeople.com	1	2.80%	Other
charles-mount.ie	1	2.80%	Blog
ucl.ac.uk	1	2.80%	Academic

OGHAM 3D

Site	URLs	%	Classification
cyclopaedia.net	6	15.00%	Wiki/Encyclopedia
facebook.com	5	12.50%	Social Media
scoop.it	2	5.00%	Social Media
thecelebritypix.com	2	5.00%	Other
artec3d.com	2	5.00%	Business - Other
heritagecouncil.ie	2	5.00%	Public Sector
blogspot.com	2	5.00%	Blog
wn.com	2	5.00%	News/Media
youtube.com	1	2.50%	Social Media
omniglot.com	1	2.50%	Wiki/Encyclopedia
nuigalway.ie	1	2.50%	Academic
rte.ie	1	2.50%	News/Media
archaeology.ie	1	2.50%	Archaeology Information
urlm.co	1	2.50%	Web Stats/Information
megalithic.co.uk	1	2.50%	Archaeology Information
boards.ie	1	2.50%	Social Media
shetland-library.gov.uk	1	2.50%	Local Heritage
thegetrank.net	1	2.50%	Web Stats/Information
brueckenkopf-online.com	1	2.50%	Heritage Information
datadesign.co.jp	1	2.50%	Business - Other
jasoncolavito.com	1	2.50%	Blog
wordpress.com	1	2.50%	Blog

Site	URLs	%	Classification
twitter.com	1	2.50%	Social Media
heritageweek.ie	1	2.50%	Heritage Information
ning.com	1	2.50%	Other

INSCRIBED STONES

Site	URLs	%	Classification
cyclopaedia.net	8	72.70%	Wiki/Encyclopedia
lsu.edu	1	9.10%	Academic
wordpress.com	1	9.10%	Blog
youtube.com	1	9.10%	Social Media

APPENDIX B—INVITATION TO PARTICIPATE IN SURVEY

The following invitation email was circulated to all members of the Institute of Archaeologists of Ireland (IAI), inviting them to participate in the survey.

Digital Data Survey

1 message

Institute of Archaeologists of Ireland <iaiarchaeology@gmail.com> 14 May 2014 17:46

One of our members, Teresa Bolger, is working towards an MSc in Computing at Dublin Institute of Technology.

Dear Colleague

I am currently undertaking research for a dissertation as part of my studies towards an MSc in Computing at Dublin Institute of Technology. My dissertation research is looking at the impact of digitised datasets and digital repositories on research in humanities disciplines such as archaeology. As part of that research I am undertaking a survey of practitioners – in this case archaeologists – and would like to invite you to participate. The aim of this survey is to gather information about how Irish archaeologists use digital resources.

You can connect to the survey via this link: http://digitalimpact2014.questionpro.com

My research (and the survey topics) are based on similar research into measuring the impact of digital resources that has been conducted in the UK and America in relation to other humanities disciplines and datasets. I am not aware of any similar research work that has been undertaken in an Irish context, other than an evaluation of the impact of the Stormont Papers (a digitised historical archive), so I would greatly appreciate it if you could take the time to complete the survey. It should only take about 10 minutes.

My dissertation will be available online through the DIT OpenAccess Archive, once successfully completed. I would also contribute an article to a future edition of IAI News focusing on the results of the survey. I can be contacted at teresa.bolger+survey@gmail.com if you have any queries.

Please feel free to share this survey link with colleagues and associates working and researching in Irish archaeology. The survey will run until the 15 June 2014.

Kind Regards
Teresa Bolger

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Institute of Archaeologists of Ireland
63 Merrion Square,
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The following notice was also circulated in the weekly IAI Updates Bulletin.

Archaeological Digital Data Survey

One of our members, Teresa Bolger, is working towards an MSc in Computing at Dublin Institute of Technology. Her dissertation research is looking at the impact of digitised datasets and digital repositories on research in humanities disciplines such as archaeology. As part of that research she is undertaking a survey of practitioners – in this case archaeologists – and would like to invite IAI members to participate. The aim of this survey is to gather information about how Irish archaeologists use digital resources. The survey is accessible here: http://digitalimpact2014.questionpro.com. IAI will also be circulating invitations to participate in the survey by email to our members. Please feel free to circulate that email or the survey link to colleagues and associates working and researching in Irish archaeology. The survey will run until the 15 June 2014.

APPENDIX C—SURVEY QUESTIONAIRE

SURVEY: DIGITAL IMPACT SURVEY

EVALUATING THE IMPACT OF DIGITAL RESOURCES

Hello:
You are invited to participate in this survey which forms part of the research for my dissertation. I am working towards an MSc in Computing at Dublin Institute of Technology. I am conducting research related to knowledge sharing activities. I am examining the impact of digitised datasets and digital repositories on research in humanities disciplines such as archaeology. In particular I am evaluating methods that can be used to identify and quantify that impact.The aim of this survey is to gather information about how Irish archaeologists use digital resources. You will be asked 15 questions relevant to how and why you use digital resources as part of your work or research. It will take approximately 5-10 minutes to complete the questionnaire.Your participation in this study is completely voluntary. There are no foreseeable risks associated with this project. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point or simply skip the question concerned. You will not be asked for your name as part of this survey. Your survey responses will be strictly confidential and data from this research will be reported only in aggregate. Your information will be coded and will remain confidential. Neither Dublin Institute of Technology nor any other third party will identify your personal details, nor will it be possible to identify you in any way in the dissertation document or in any other publication derived from this research. My dissertation will be available online through the DIT Open Access Archive, once successfully completed.If you have questions at any time about the survey or the procedures, please contact me by email: teresa.bolger+survey@gmail.com.Thank you very much for your time and support. Please start with the survey now by clicking on the Continue button below.

SECTION A

Which of the following techniques or methods do you use when searching for archaeological information as part of your work or research?

	Never	Occasionally	Sometimes	Often	Very Often
Ask colleagues/other archaeologists	❑	❑	❑	❑	❑
Follow leads (footnotes, bibliographies, textual references found in books/articles)	❑	❑	❑	❑	❑
Use standard web search (e.g. Google, Yahoo)	❑	❑	❑	❑	❑
Use Google Books	❑	❑	❑	❑	❑
Use Google Scholar	❑	❑	❑	❑	❑
Use JSTOR Ireland	❑	❑	❑	❑	❑
Use online library catalogues	❑	❑	❑	❑	❑
Consult specialist online database sites (e.g. Web of Knowledge, Nielsen Bookdata Online or Proquest Dissertation and Theses)	❑	❑	❑	❑	❑
Consult Archaeological Data Service (ADS) online archives and databases	❑	❑	❑	❑	❑

When you use the following type of sources or resources in your work or research, how do you access them?

	NEVER USE	ONLINE/ DIGITISED	PRINT/ HARD COPY	BOTH
Popular media (newspapers, magazines, etc.)	❑	❑	❑	❑
Reference works (encyclopaedias, dictionaries, etc.)	❑	❑	❑	❑
Secondary scholarly sources (essays, articles, books, journals, etc.)	❑	❑	❑	❑
Primary sources (manuscripts, archival documents or files)	❑	❑	❑	❑

How important are the following factors to you when deciding to utilise an online or digitized resource in your work or research?

	Not Relevant	Slightly Relevant	Somewhat Relevant	Important	Very Important
The reputation of the repository or organisation from which the resource originates	❑	❑	❑	❑	❑
Completeness of the resource (is the hard copy/ original resource fully replicated or is the digitised/online resource only a sub-set or selection)	❑	❑	❑	❑	❑
Can the resource (in whole or in part) be downloaded	❑	❑	❑	❑	❑
Information regarding the provenance of individual components of the resource and the resource as a whole	❑	❑	❑	❑	❑
Clear, consistent and complete metadata	❑	❑	❑	❑	❑
Use of internationally accepted metadata structures and standards	❑	❑	❑	❑	❑
Ease of use of online finding aid or integrated search tool	❑	❑	❑	❑	❑
Flexibility of online finding aid or integrated search tool (i.e. supports a range and variety of search types or methods)	❑	❑	❑	❑	❑
Support structure - Ability to consult an archivist or similar professional with responsibility for the maintenance and development of the resource	❑	❑	❑	❑	❑

How do you prefer to access the following types of sources or resources?

	NEVER USE	ONLINE/ DIGITISED	PRINT/ HARD COPY	NO PREFERENCE
Popular media (newspapers, magazines, etc.)	❑	❑	❑	❑
Reference works (encyclopaedias, dictionaries, etc.)	❑	❑	❑	❑
Secondary scholarly sources (essays, articles, books, journals, etc.)	❑	❑	❑	❑
Primary sources (manuscripts, archival documents or files)	❑	❑	❑	❑

Is there anything in particular that would keep you from using an online or digitised resource in your work or research?

SECTION B

How familiar are you with each of the following resources?

	NEVER HEARD OF IT	HEARD OF IT, DON'T USE IT	RARELY USE IT	USE IT SOMETIMES	USE REGULARLY/ FREQUENTLY
Excavations Bulletin Database (Excavations.ie)	❑	❑	❑	❑	❑
Archaeological Survey of Ireland Database and Webviewer	❑	❑	❑	❑	❑
Logainm – Placenames Database	❑	❑	❑	❑	❑
Mapping Death Online Database	❑	❑	❑	❑	❑
Eachtra Journal (E-Publication)	❑	❑	❑	❑	❑
Ogham 3D	❑	❑	❑	❑	❑
Irish Inscribed Stones Project	❑	❑	❑	❑	❑

How do you cite the materials from these resources? Do you cite the electronic version of the resource, or the print/hard copy (where this is an option)?

	CITE THE VERSION CONSULTED	CITE HARD COPY ONLY	CITE ONLINE ONLY	CITE HARD COPY BUT INCLUDE URL FOR ONLINE VERSION	OTHER
Excavations Bulletin Database (Excavations.ie)	❑	❑	❑	❑	❑
Archaeological Survey of Ireland Database and Webviewer	❑	❑	❑	❑	❑
Logainm – Placenames Database	❑	❑	❑	❑	❑
Mapping Death Online Database	❑	❑	❑	❑	❑
Eachtra Journal (E-Publication)	❑	❑	❑	❑	❑
Ogham 3D	❑	❑	❑	❑	❑
Irish Inscribed Stones Project	❑	❑	❑	❑	❑

Do you use any other electronic resources in your work that you think are particularly good or useful?

1. YES
2. NO

Would you mind telling us what they are and why you like them?

Is there a particular source or resource not currently available online that you would want digitised?

SECTION C

Please choose the title that best describes your activities as an archaeologist:

1. Student – Undergraduate
2. Student – Post-graduate
3. Academic – Researcher/lecturer
4. Public Service – Museum/Local Authority/Govt Dept
5. Consultancy/working in private practice
6. Independent Researcher
7. Other (Please Specify) _____

How would you rate your expertise with technologies like the Internet and e-mail?

1. Excellent
2. Good
3. Satisfactory
4. Poor
5. Very poor

Do you use a website/blog to share information about your research (either in general or specific projects)

1. Yes
2. I have in the past, but do not presently
3. No

When you have completed a new paper, report or other research output, are you likely to make it available on:

	No, never	No, but I have tried	Yes, but this is an exception	Yes, regularly
Your personal website	❑	❑	❑	❑
A project website	❑	❑	❑	❑
To colleagues via email	❑	❑	❑	❑
A working paper archive	❑	❑	❑	❑
An institutional archive/repository or company website	❑	❑	❑	❑
A public archive (such as academia.edu, etc.)	❑	❑	❑	❑
Keep access limited until publication	❑	❑	❑	❑

Can you think of any particular obstacle that prevents you from making the results of your research available online or in digital format?

APPENDIX D—RESULTS OF SURVEY: SUMMARY REPORT

Survey Report: Digital Impact Survey

VIEWED	STARTED	COMPLETED	COMPLETION RATE	DROP OUTS	TIME TO COMPLETE
79	61	43	70%	18	15 mins

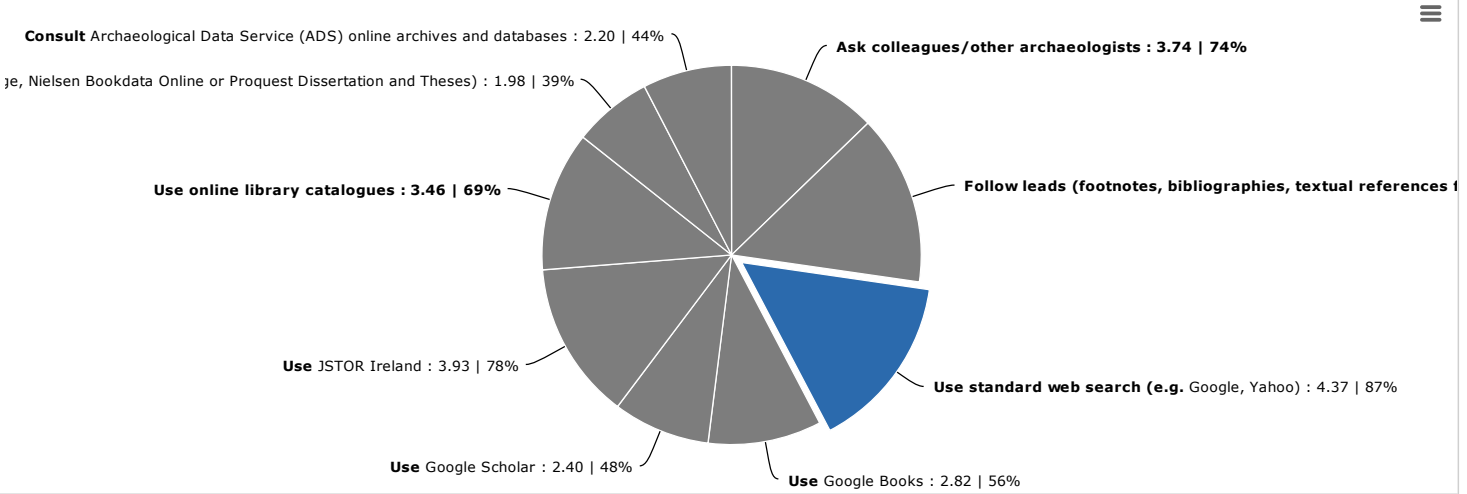
Response Distribution

List of countries

IE	88.52%
Outside Europe / Unknown	11.48%
Total	100.00%

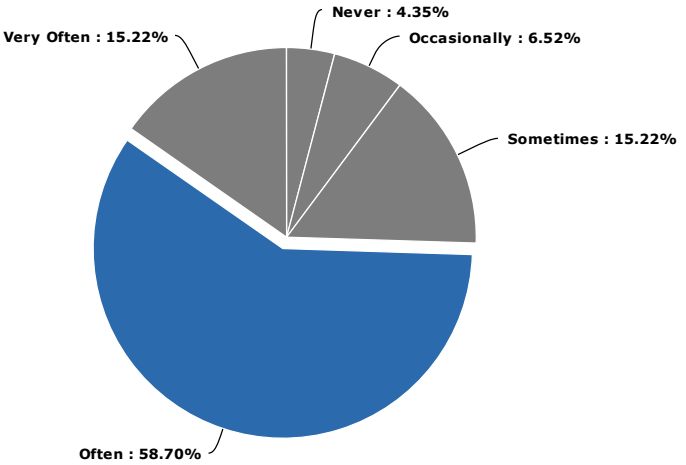
93%	DESKTOP LAPTOP	12%	Windows 8	2%	Mac	84%	Windows (other)	2%	Other
7%	SMARTPHONES	75%	Android	25%	iPhone	0%	Windows 8	0%	Other
0%	TABLETS	0%	iPad	0%	Android	0%	Windows 8	0%	Other

Which of the following techniques or methods do you use when searching for archaeological information as part of your work or research?



Question	Count	Score	Never Occasionally Sometimes Often Very Often
1. Ask colleagues/other archaeologists	46	3.74	
2. Follow leads (footnotes, bibliographies, textual references found in books/articles)	46	4.24	
3. Use standard web search (e.g. Google, Yahoo)	**46**	**4.37**	
4. Use Google Books	45	2.82	
5. Use Google Scholar	45	2.40	
6. Use JSTOR Ireland	44	3.93	
7. Use online library catalogues	46	3.46	
8. Consult specialist online database sites (e.g. Web of Knowledge, Nielsen Bookdata Online or Proquest Dissertation and Theses)	45	1.98	
9. Consult Archaeological Data Service (ADS) online archives and databases	45	2.20	
	Average	**3.24**	

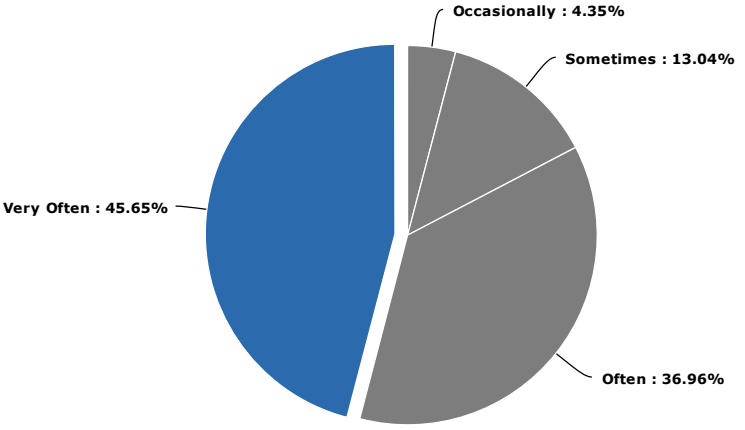
Ask colleagues/other archaeologists



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Never	2	4.35%					
2. Occasionally	3	6.52%					
3. Sometimes	7	15.22%					
4. Often	**27**	**58.70%**					
5. Very Often	7	15.22%					
Total	**46**	**100%**					

Mean: 3.739 Confidence Interval @ 95%: [3.464 - 4.015] Standard Deviation: 0.953 Standard Error: 0.141

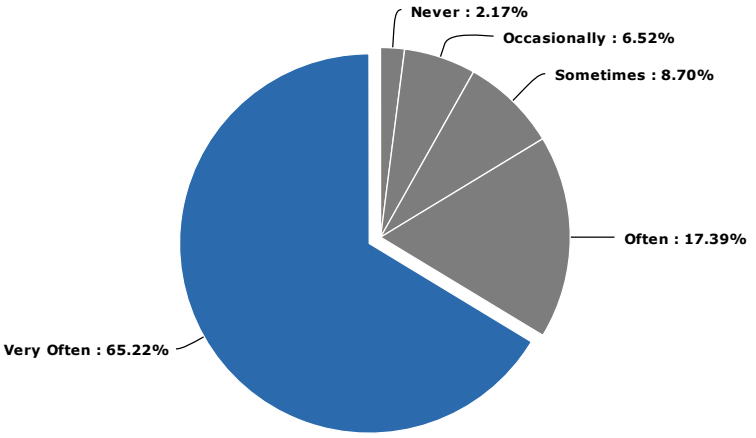
Follow leads (footnotes, bibliographies, textual references found in books/articles)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Never	0	0.00%					
2. Occasionally	2	4.35%					
3. Sometimes	6	13.04%					
4. Often	17	36.96%					
5. Very Often	**21**	**45.65%**					
Total	**46**	**100%**					

Mean: 4.239 Confidence Interval @ 95%: [3.994 - 4.484] Standard Deviation: 0.848 Standard Error: 0.125

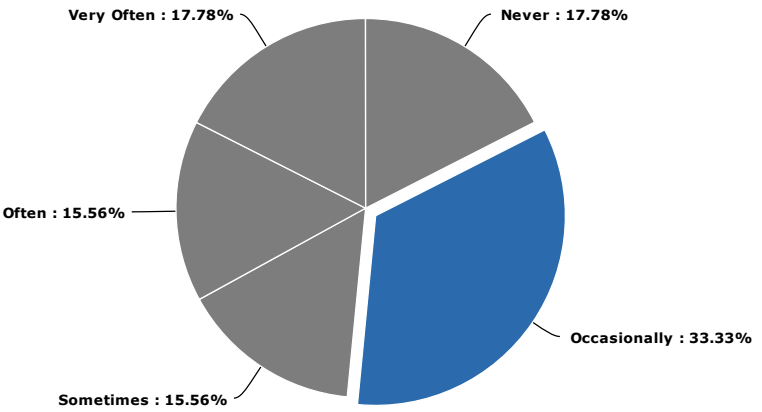
Use standard web search (e.g. Google, Yahoo)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Never	1	2.17%					
2. Occasionally	3	6.52%					
3. Sometimes	4	8.70%					
4. Often	8	17.39%					
5. Very Often	**30**	**65.22%**					
Total	**46**	**100%**					

Mean: 4.370 Confidence Interval @ 95%: [4.069 - 4.670] Standard Deviation: 1.040 Standard Error: 0.153

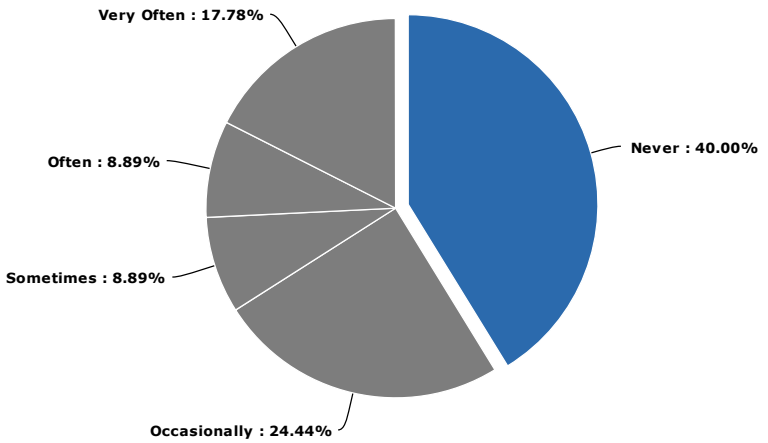
Use Google Books



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Never	8	17.78%					
2. Occasionally	**15**	**33.33%**					
3. Sometimes	7	15.56%					
4. Often	7	15.56%					
5. Very Often	8	17.78%					
Total	**45**	**100%**					

Mean: 2.822 Confidence Interval @ 95%: [2.417 - 3.227] Standard Deviation: 1.386 Standard Error: 0.207

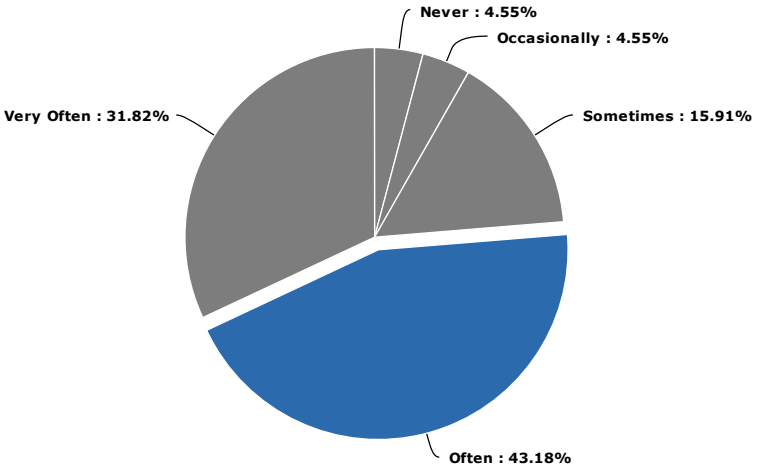
Use Google Scholar



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Never	**18**	**40.00%**					
2. Occasionally	11	24.44%					
3. Sometimes	4	8.89%					
4. Often	4	8.89%					
5. Very Often	8	17.78%					
Total	**45**	**100%**					

Mean: 2.400 Confidence Interval @ 95%: [1.953 - 2.847] Standard Deviation: 1.529 Standard Error: 0.228

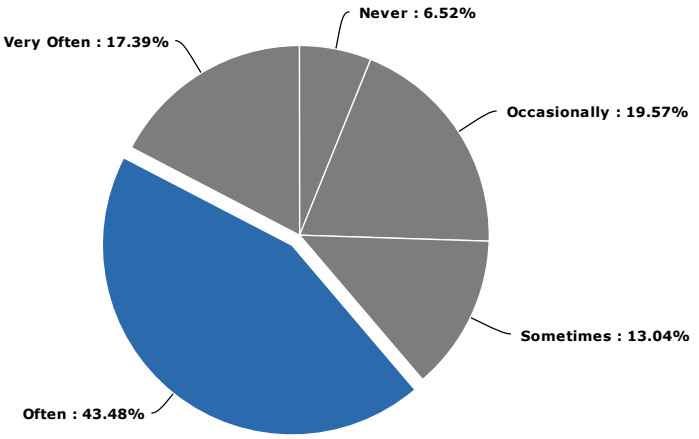
Use JSTOR Ireland



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Never	2	4.55%					
2. Occasionally	2	4.55%					
3. Sometimes	7	15.91%					
4. Often	**19**	**43.18%**					
5. Very Often	14	31.82%					
Total	**44**	**100%**					

Mean: 3.932 Confidence Interval @ 95%: [3.624 - 4.240] Standard Deviation: 1.043 Standard Error: 0.157

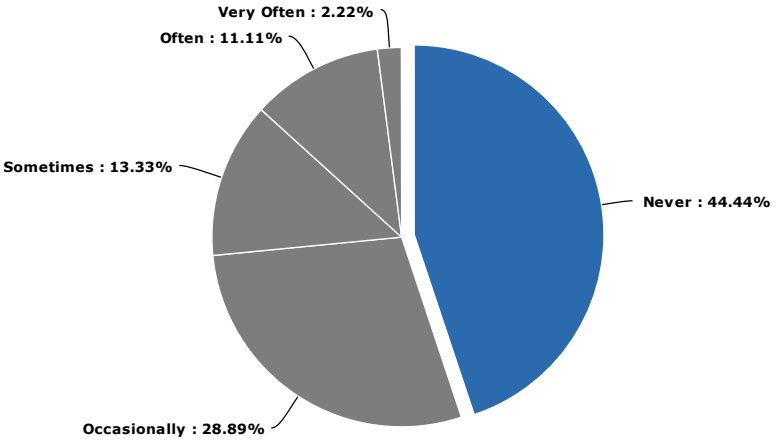
Use online library catalogues



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Never	3	6.52%					
2. Occasionally	9	19.57%					
3. Sometimes	6	13.04%					
4. Often	**20**	**43.48%**					
5. Very Often	8	17.39%					
Total	**46**	**100%**					

Mean: 3.457 Confidence Interval @ 95%: [3.113 - 3.800] Standard Deviation: 1.187 Standard Error: 0.175

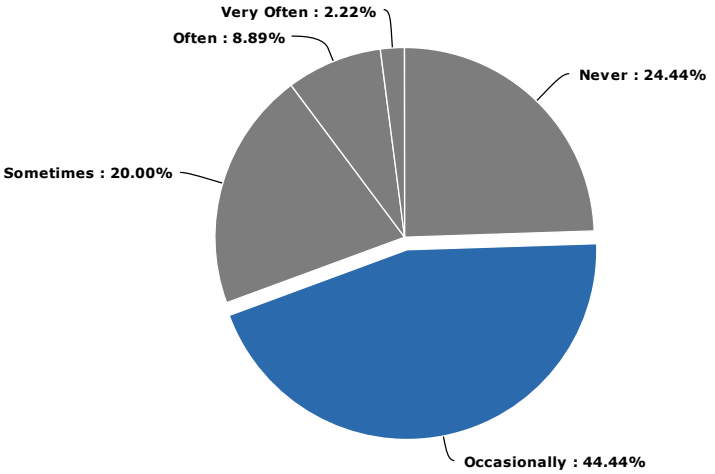
Consult specialist online database sites (e.g. Web of Knowledge, Nielsen Bookdata Online or Proquest Dissertation and Theses)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Never	20	44.44%					
2. Occasionally	13	28.89%					
3. Sometimes	6	13.33%					
4. Often	5	11.11%					
5. Very Often	1	2.22%					
Total	45	100%					

Mean: 1.978 Confidence Interval @ 95%: [1.651 - 2.304] Standard Deviation: 1.118 Standard Error: 0.167

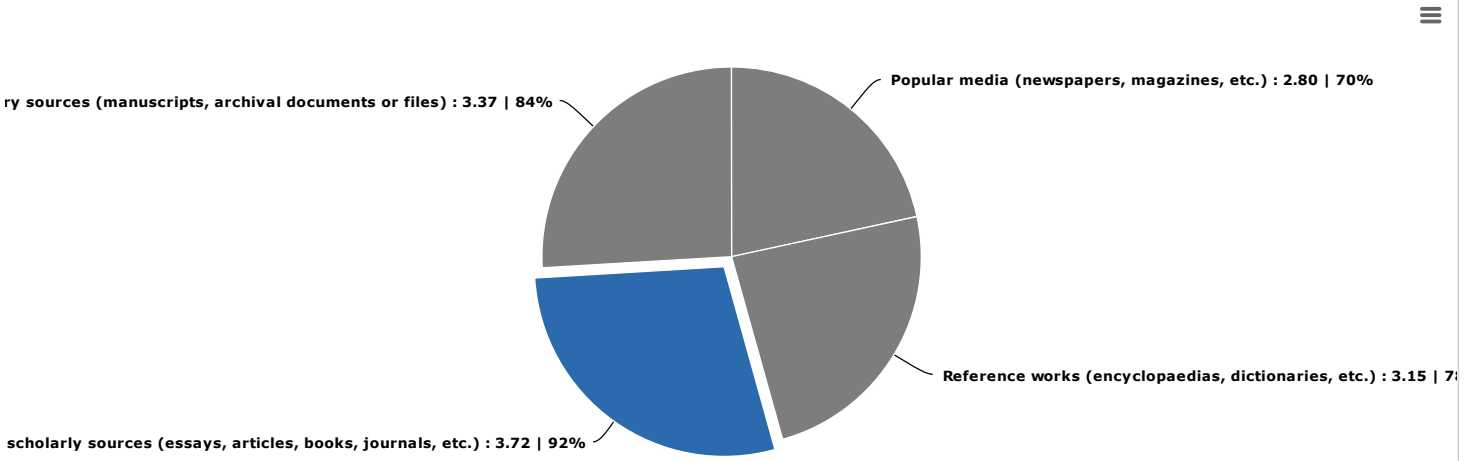
Consult Archaeological Data Service (ADS) online archives and databases



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Never	11	24.44%					
2. Occasionally	**20**	**44.44%**					
3. Sometimes	9	20.00%					
4. Often	4	8.89%					
5. Very Often	1	2.22%					
Total	**45**	**100%**					

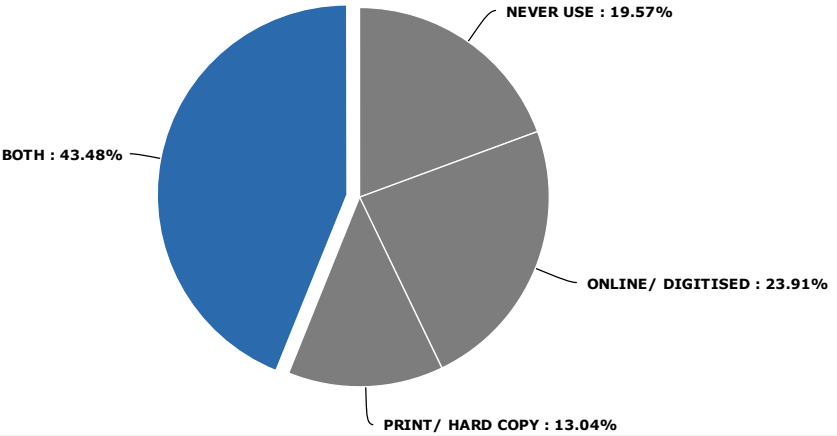
Mean: 2.200 Confidence Interval @ 95%: [1.910 - 2.490] Standard Deviation: 0.991 Standard Error: 0.148

When you use the following type of sources or resources in your work or research, how do you access them?



Question	Count	Score	NEVER USE ONLINE/ DIGITISED PRINT/ HARD COPY BOTH
1. Popular media (newspapers, magazines, etc.)	46	2.80	
2. Reference works (encyclopaedias, dictionaries, etc.)	46	3.15	
3. Secondary scholarly sources (essays, articles, books, journals, etc.)	**46**	**3.72**	
4. Primary sources (manuscripts, archival documents or files)	46	3.37	
	Average	**3.26**	

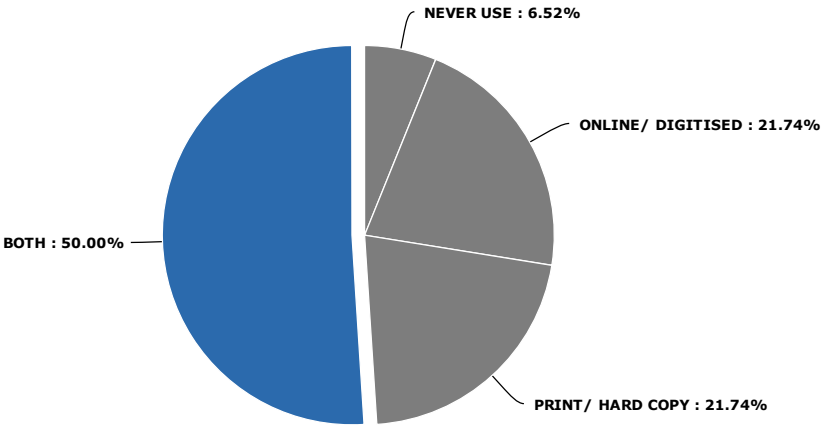
Popular media (newspapers, magazines, etc.)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. NEVER USE	9	19.57%					
2. ONLINE/ DIGITISED	11	23.91%					
3. PRINT/ HARD COPY	6	13.04%					
4. BOTH	**20**	**43.48%**					
Total	**46**	**100%**					

Mean: 2.804 Confidence Interval @ 95%: [2.456 - 3.152] Standard Deviation: 1.204 Standard Error: 0.178

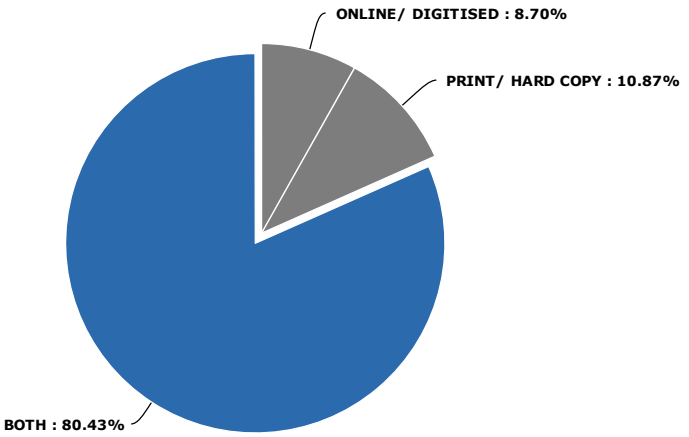
Reference works (encyclopaedias, dictionaries, etc.)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. NEVER USE	3	6.52%					
2. ONLINE/ DIGITISED	10	21.74%					
3. PRINT/ HARD COPY	10	21.74%					
4. BOTH	**23**	**50.00%**					
Total	**46**	**100%**					

Mean: 3.152 Confidence Interval @ 95%: [2.867 - 3.438] Standard Deviation: 0.988 Standard Error: 0.146

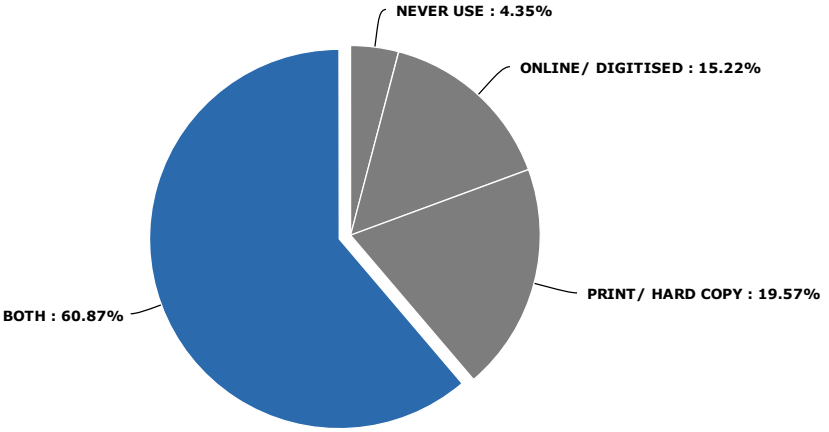
Secondary scholarly sources (essays, articles, books, journals, etc.)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. NEVER USE	0	0.00%					
2. ONLINE/ DIGITISED	4	8.70%					
3. PRINT/ HARD COPY	5	10.87%					
4. BOTH	**37**	**80.43%**					
Total	**46**	**100%**					

Mean: 3.717 Confidence Interval @ 95%: [3.538 - 3.897] Standard Deviation: 0.621 Standard Error: 0.091

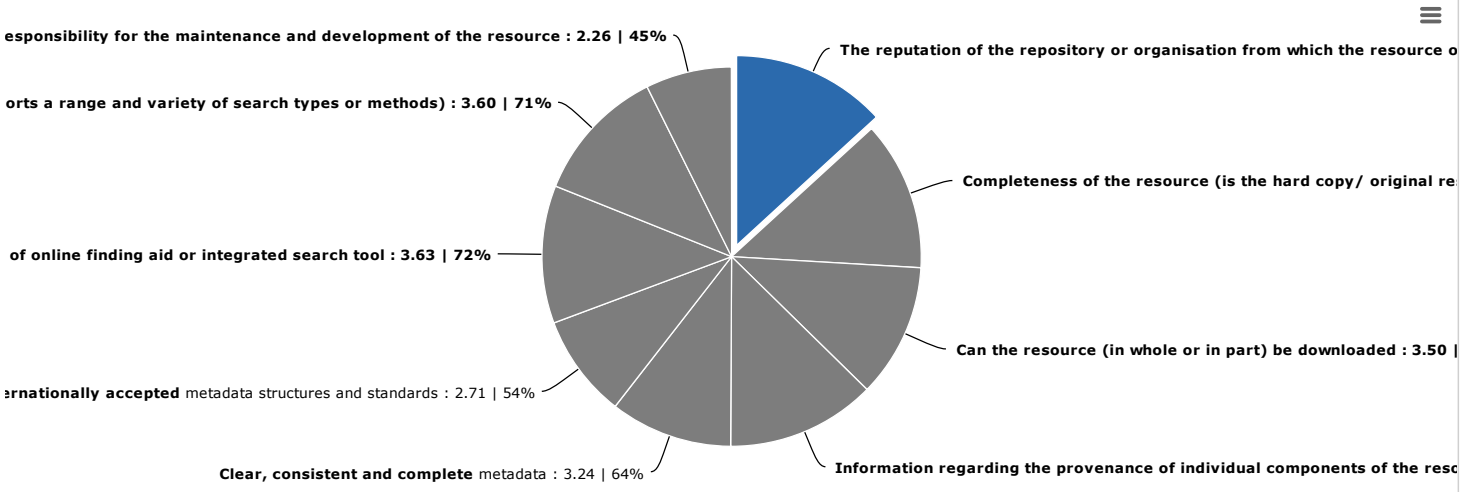
Primary sources (manuscripts, archival documents or files)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. NEVER USE	2	4.35%					
2. ONLINE/ DIGITISED	7	15.22%					
3. PRINT/ HARD COPY	9	19.57%					
4. BOTH	**28**	**60.87%**					
Total	**46**	**100%**					

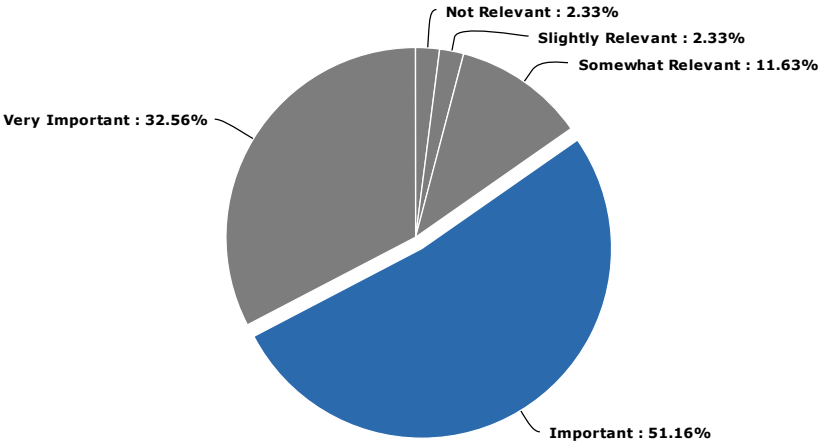
Mean: 3.370 Confidence Interval @ 95%: [3.109 - 3.631] Standard Deviation: 0.903 Standard Error: 0.133

How important are the following factors to you when deciding to utilise an online or digitized resource in your work or research?



Question	Count	Score	Not Relevant / Slightly Relevant / Somewhat Relevant / Important / Very Important
1. **The reputation of the repository or organisation from which the resource originates**	**43**	**4.09**	
2. Completeness of the resource (is the hard copy/ original resource fully replicated or is the digitised/online resource only a sub-set or selection)	43	3.91	
3. Can the resource (in whole or in part) be downloaded	42	3.50	
4. Information regarding the provenance of individual components of the resource and the resource as a whole	43	3.93	
5. Clear, consistent and complete metadata	42	3.24	
6. Use of internationally accepted metadata structures and standards	41	2.71	
7. Ease of use of online finding aid or integrated search tool	43	3.63	
8. Flexibility of online finding aid or integrated search tool (i.e. supports a range and variety of search types or methods)	42	3.60	
9. Support structure - Ability to consult an archivist or similar professional with responsibility for the maintenance and development of the resource	43	2.26	
	Average	**3.43**	

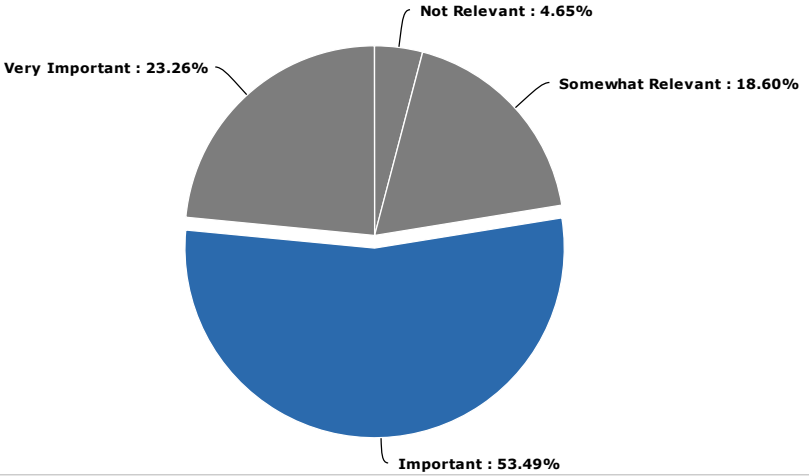
The reputation of the repository or organisation from which the resource originates



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Not Relevant	1	2.33%					
2. Slightly Relevant	1	2.33%					
3. Somewhat Relevant	5	11.63%					
4. Important	**22**	**51.16%**					
5. Very Important	14	32.56%					
Total	**43**	**100%**					

Mean: 4.093 Confidence Interval @ 95%: [3.834 - 4.352] Standard Deviation: 0.868 Standard Error: 0.132

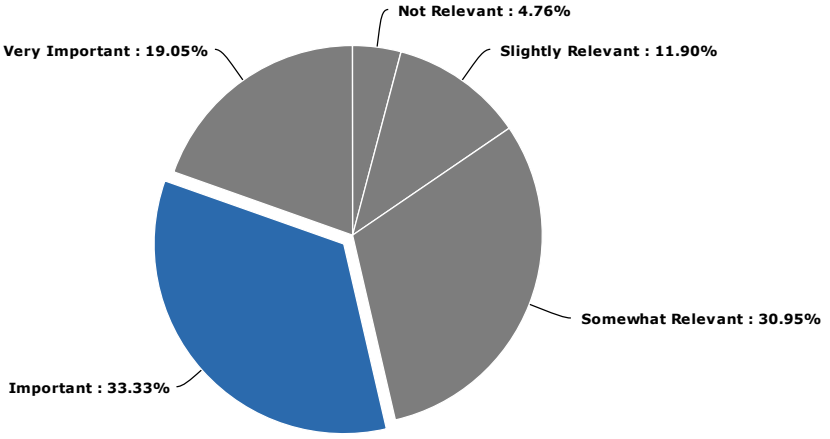
Completeness of the resource (is the hard copy/ original resource fully replicated or is the digitised/online resource only a sub-set or selection)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Not Relevant	2	4.65%					
2. Slightly Relevant	0	0.00%					
3. Somewhat Relevant	8	18.60%					
4. Important	**23**	**53.49%**					
5. Very Important	10	23.26%					
Total	**43**	**100%**					

Mean: 3.907 Confidence Interval @ 95%: [3.632 - 4.182] Standard Deviation: 0.921 Standard Error: 0.140

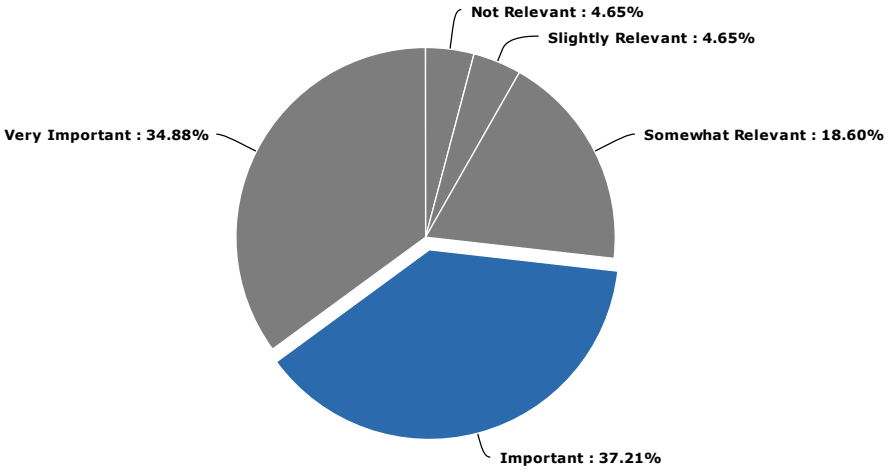
Can the resource (in whole or in part) be downloaded



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Not Relevant	2	4.76%					
2. Slightly Relevant	5	11.90%					
3. Somewhat Relevant	13	30.95%					
4. Important	**14**	**33.33%**					
5. Very Important	8	19.05%					
Total	**42**	**100%**					

Mean: 3.500 Confidence Interval @ 95%: [3.171 - 3.829] Standard Deviation: 1.088 Standard Error: 0.168

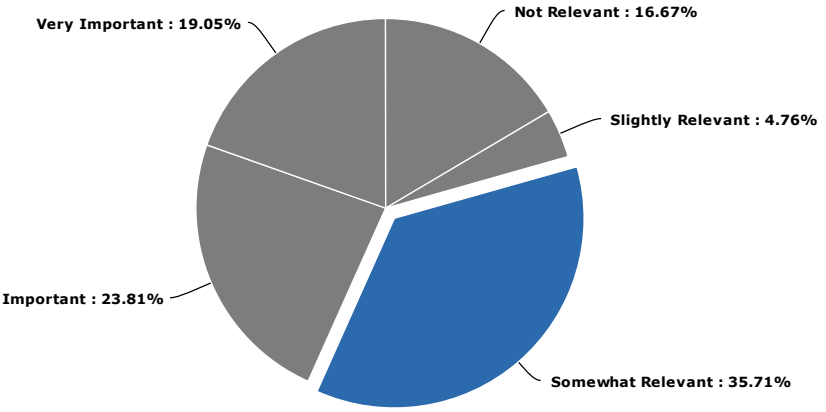
Information regarding the provenance of individual components of the resource and the resource as a whole



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Not Relevant	2	4.65%					
2. Slightly Relevant	2	4.65%					
3. Somewhat Relevant	8	18.60%					
4. Important	**16**	**37.21%**					
5. Very Important	15	34.88%					
Total	**43**	**100%**					

Mean: 3.930 Confidence Interval @ 95%: [3.608 - 4.252] Standard Deviation: 1.078 Standard Error: 0.164

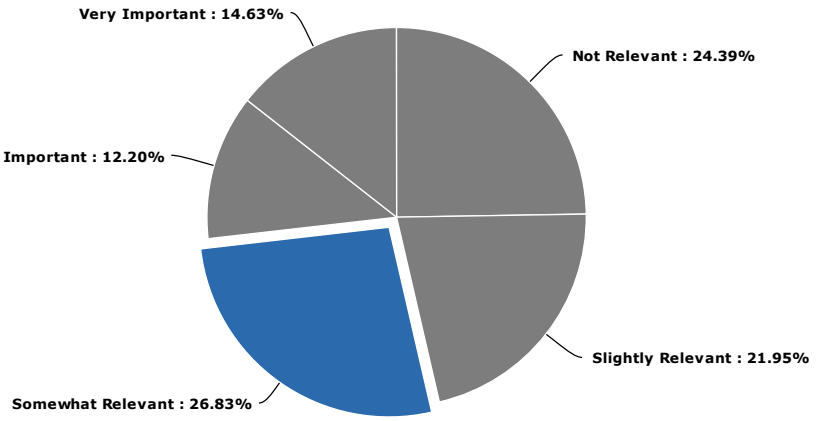
Clear, consistent and complete metadata



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Not Relevant	7	16.67%					
2. Slightly Relevant	2	4.76%					
3. Somewhat Relevant	**15**	**35.71%**					
4. Important	10	23.81%					
5. Very Important	8	19.05%					
Total	**42**	**100%**					

Mean: 3.238 Confidence Interval @ 95%: [2.844 - 3.632] Standard Deviation: 1.303 Standard Error: 0.201

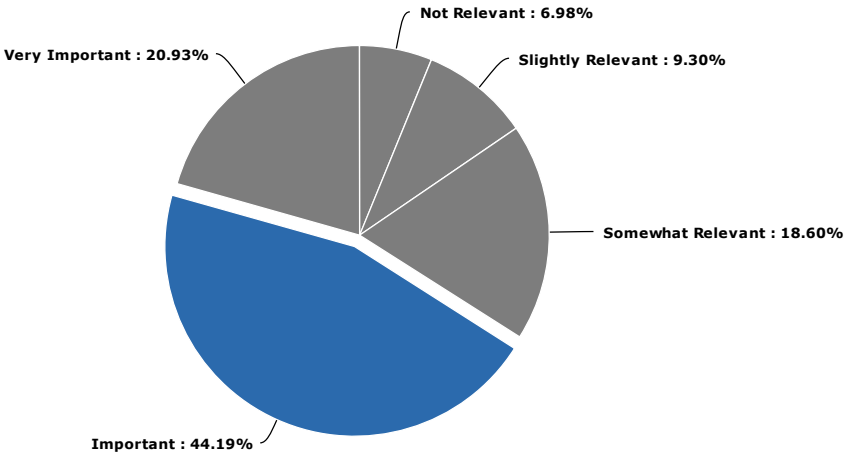
Use of internationally accepted metadata structures and standards



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Not Relevant	10	24.39%					
2. Slightly Relevant	9	21.95%					
3. Somewhat Relevant	**11**	**26.83%**					
4. Important	5	12.20%					
5. Very Important	6	14.63%					
Total	**41**	**100%**					

Mean: 2.707 Confidence Interval @ 95%: [2.290 - 3.125] Standard Deviation: 1.365 Standard Error: 0.213

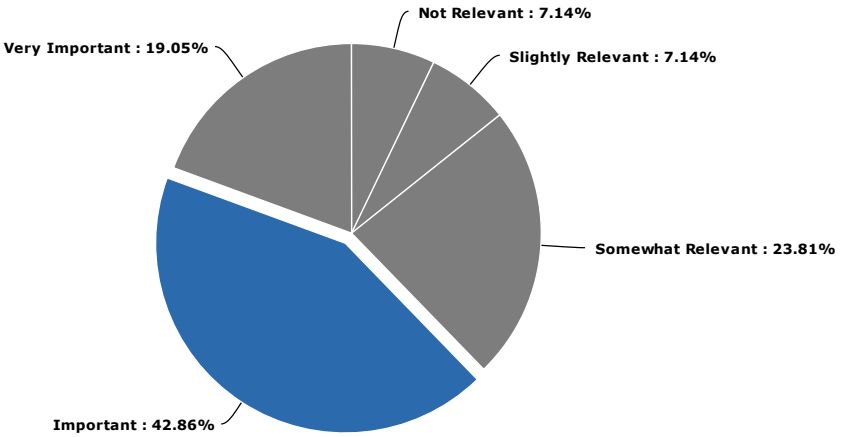
Ease of use of online finding aid or integrated search tool



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Not Relevant	3	6.98%					
2. Slightly Relevant	4	9.30%					
3. Somewhat Relevant	8	18.60%					
4. Important	**19**	**44.19%**					
5. Very Important	9	20.93%					
Total	**43**	**100%**					

Mean: 3.628 Confidence Interval @ 95%: [3.289 - 3.967] Standard Deviation: 1.134 Standard Error: 0.173

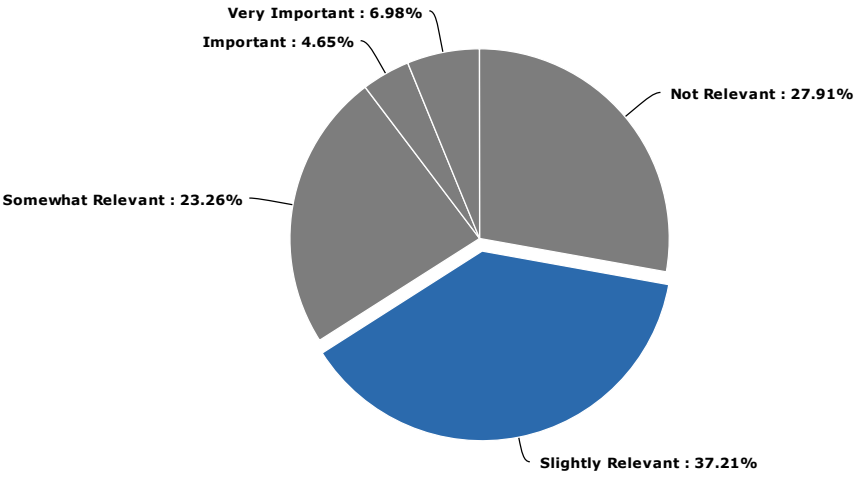
Flexibility of online finding aid or integrated search tool (i.e. supports a range and variety of search types or methods)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Not Relevant	3	7.14%					
2. Slightly Relevant	3	7.14%					
3. Somewhat Relevant	10	23.81%					
4. Important	**18**	**42.86%**					
5. Very Important	8	19.05%					
Total	**42**	**100%**					

Mean: 3.595 Confidence Interval @ 95%: [3.261 - 3.930] Standard Deviation: 1.106 Standard Error: 0.171

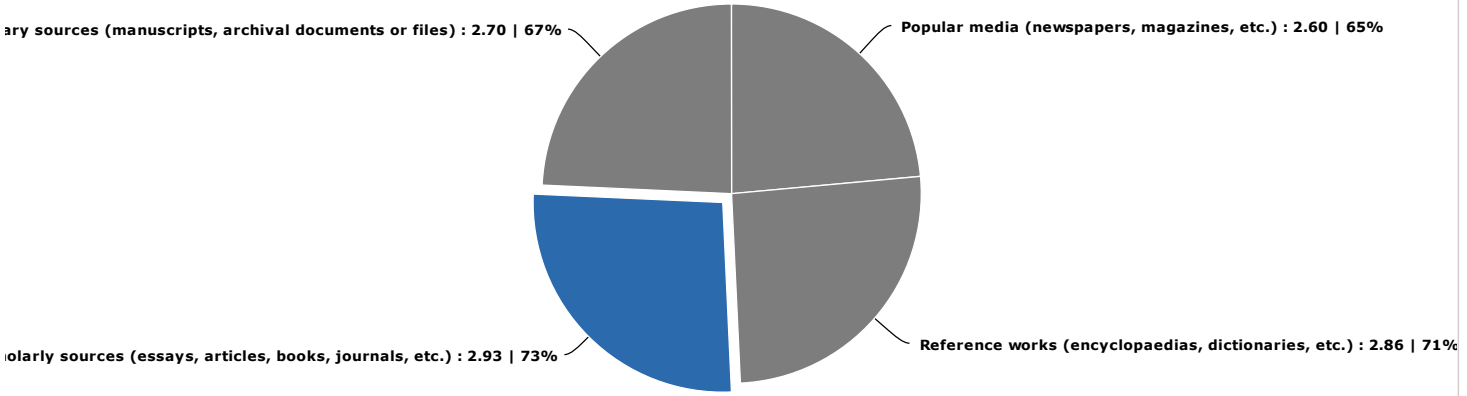
Support structure - Ability to consult an archivist or similar professional with responsibility for the maintenance and development of the resource



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Not Relevant	12	27.91%					
2. Slightly Relevant	**16**	**37.21%**					
3. Somewhat Relevant	10	23.26%					
4. Important	2	4.65%					
5. Very Important	3	6.98%					
Total	**43**	**100%**					

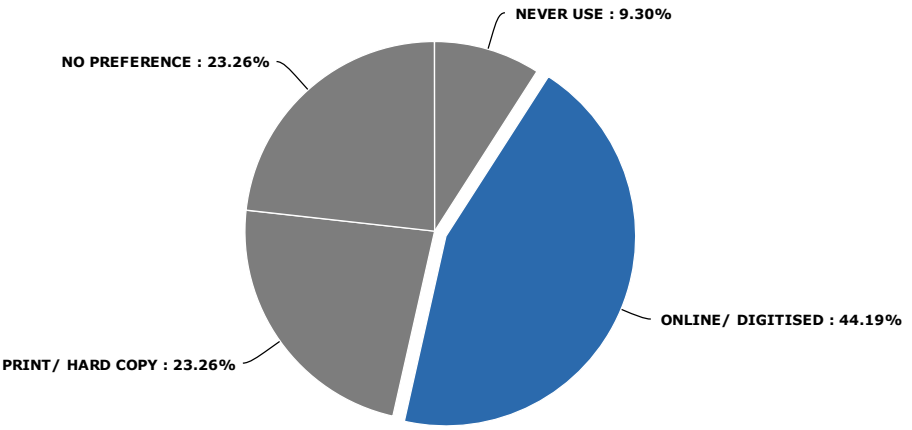
Mean: 2.256 Confidence Interval @ 95%: [1.916 - 2.595] Standard Deviation: 1.136 Standard Error: 0.173

How do you **prefer** to access the following types of sources or resources?



Question	Count	Score	NEVER USE — ONLINE/ DIGITISED — PRINT/ HARD COPY — NO PREFERENCE
1. Popular media (newspapers, magazines, etc.)	43	2.60	
2. Reference works (encyclopaedias, dictionaries, etc.)	44	2.86	
3. Secondary scholarly sources (essays, articles, books, journals, etc.)	**44**	**2.93**	
4. Primary sources (manuscripts, archival documents or files)	44	2.70	
	Average	**2.78**	

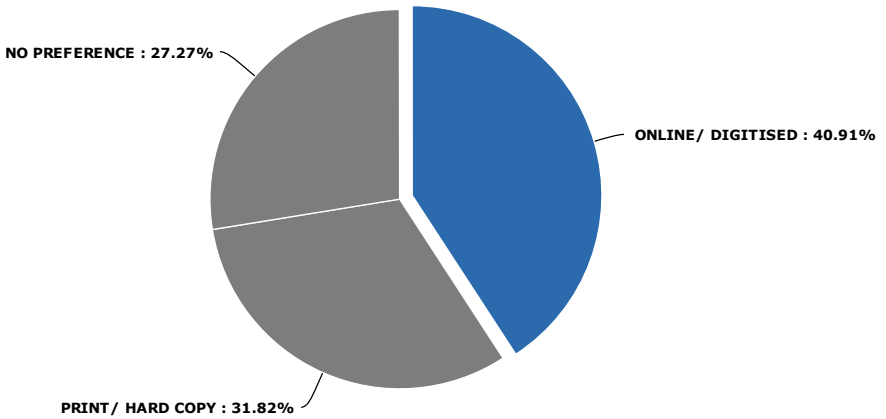
Popular media (newspapers, magazines, etc.)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. NEVER USE	4	9.30%					
2. ONLINE/ DIGITISED	**19**	**44.19%**					
3. PRINT/ HARD COPY	10	23.26%					
4. NO PREFERENCE	10	23.26%					
Total	**43**	**100%**					

Mean: 2.605 Confidence Interval @ 95%: [2.319 - 2.890] Standard Deviation: 0.955 Standard Error: 0.146

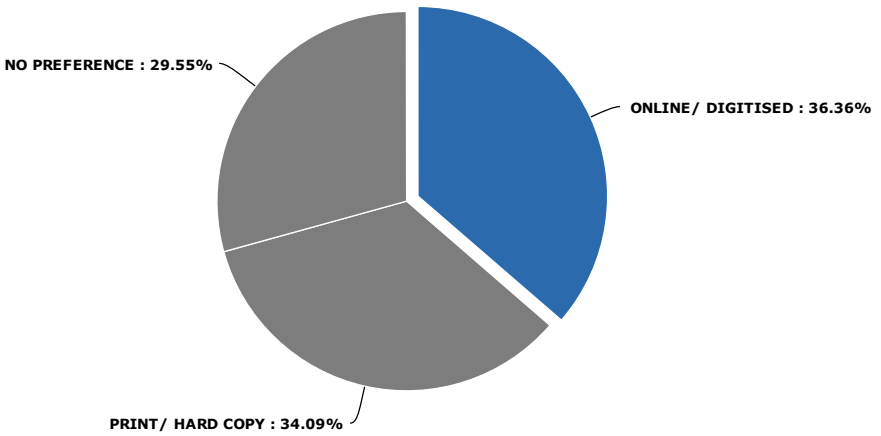
Reference works (encyclopaedias, dictionaries, etc.)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. NEVER USE	0	0.00%					
2. ONLINE/ DIGITISED	**18**	**40.91%**					
3. PRINT/ HARD COPY	14	31.82%					
4. NO PREFERENCE	12	27.27%					
Total	**44**	**100%**					

Mean: 2.864 Confidence Interval @ 95%: [2.620 - 3.107] Standard Deviation: 0.824 Standard Error: 0.124

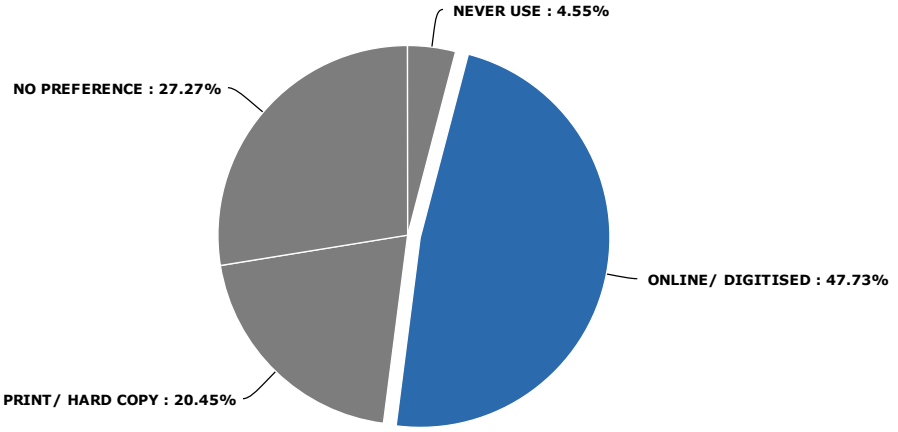
Secondary scholarly sources (essays, articles, books, journals, etc.)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. NEVER USE	0	0.00%					
2. ONLINE/ DIGITISED	**16**	**36.36%**					
3. PRINT/ HARD COPY	15	34.09%					
4. NO PREFERENCE	13	29.55%					
Total	**44**	**100%**					

Mean: 2.932 Confidence Interval @ 95%: [2.690 - 3.174] Standard Deviation: 0.818 Standard Error: 0.123

Primary sources (manuscripts, archival documents or files)

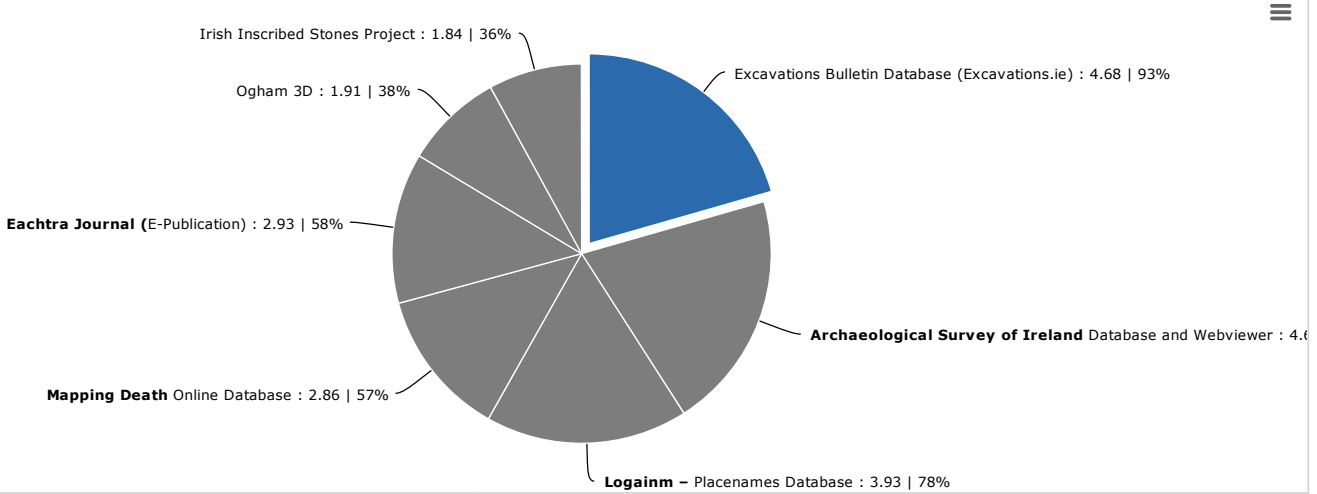


Answer	Count	Percent	20%	40%	60%	80%	100%
1. NEVER USE	2	4.55%					
2. ONLINE/ DIGITISED	**21**	**47.73%**					
3. PRINT/ HARD COPY	9	20.45%					
4. NO PREFERENCE	12	27.27%					
Total	**44**	**100%**					

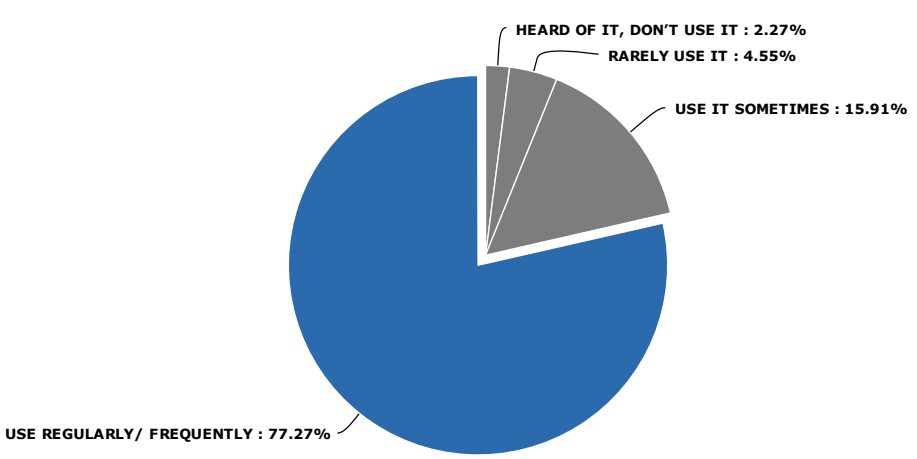
Mean: 2.705 Confidence Interval @ 95%: [2.430 - 2.979] Standard Deviation: 0.930 Standard Error: 0.140

Is there anything in particular that would keep you from using an online or digitised resource in your work or research?		
5902708	05/13/2014	
5909342	05/14/2014	
5909577	05/14/2014	Cost
5909606	05/14/2014	
5909537	05/14/2014	Inability to download and print off
5909544	05/14/2014	
5909647	05/14/2014	
5909980	05/14/2014	Poor broadband connection, which is still a problem outside of large urban areas.
5910052	05/14/2014	
5910284	05/14/2014	
5910265	05/14/2014	No although I do prefer using a source that has multiple recommendations, where I can be confident of the data integrity.
5910808	05/14/2014	
5911069	05/14/2014	Time it takes to download and of there is no index.
5911634	05/14/2014	
5914562	05/15/2014	Poor unreliable access. Slow internet.complicated search engine.
5914643	05/15/2014	Need to be able to trust that it's a proper reproduction of original source
5914795	05/15/2014	
5914786	05/15/2014	If I cannot reference it easily
5914841	05/15/2014	Financial constraints where you are charged for hidden information. JSTOR outside Ireland costs are also a disincentive to getting access. Difficulty in using a website. Easy access will always be more agreeable.
5915017	05/15/2014	
5915260	05/15/2014	No. I would always use it if it was decent and useful.
5915310	05/15/2014	If the resource is not properly authenticated and indexed.
5915869	05/15/2014	Windows 8!
5916029	05/15/2014	Ease of Access and Knowldge of what is available
5916229	05/15/2014	
5945265	05/15/2014	Poorly or unreferenced source for the original data/ document. Unverifiable data.
5972882	05/16/2014	Lack of information about the provenance of the resource, author etc. I would generally look for digitised versions of resources I was already aware of in a hard copy form where I was sure of the source provenance and its acceptance as being of a good academic quality (referenced in other academic documents)
5975098	05/16/2014	
5975549	05/16/2014	Where it is impossible to verify or trust the resource or provider
5976200	05/16/2014	No
6013294	05/16/2014	i prefer a book or a map or ????? in the hand - it is my age
6026879	05/17/2014	
6066803	05/19/2014	Incomplete records is the most problematic - such as referring to specialist work but not including those reports, or at least how one can access them
6072332	05/19/2014	Yes. If I wasn't able to access the entire item I was looking for.
6077520	05/20/2014	Access restrictions/prohibitive costs - if you are not affiliated to an institution it can often be difficult to access library content, such as journals.
6077963	05/20/2014	I am somtimes prevented from accessing certain sites by my company's firewall.
6086259	05/20/2014	
6101310	05/21/2014	
6102136	05/21/2014	NO
6103755	05/21/2014	Lack of proper references, eg page numbers
6155561	05/26/2014	
6164582	05/27/2014	I wouldn't use an online resource unless the provenance of the information is clear i.e. is it reliable and how do I reference it?
6204316	05/29/2014	Has to be to academic standards citing references etc.
6277005	06/04/2014	No
6277014	06/04/2014	Having to pay to access it
6277313	06/04/2014	
6302122	06/05/2014	

How familiar are you with each of the following resources?

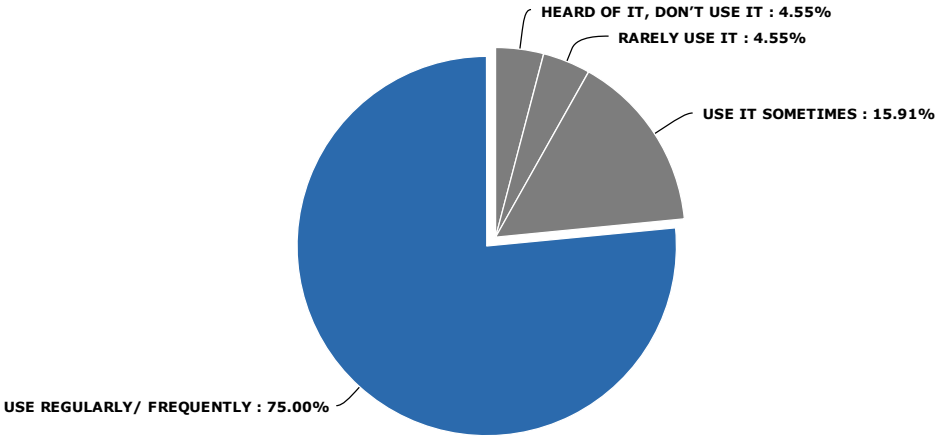


Question	Count	Score	NEVER HEARD OF IT / HEARD OF IT, DON'T USE IT / RARELY USE IT / USE IT SOMETIMES / USE REGULARLY/ FREQUENTLY
1. **Excavations Bulletin Database (Excavations.ie)**	**44**	**4.68**	
2. Archaeological Survey of Ireland Database and Webviewer	44	4.61	
3. Logainm – Placenames Database	44	3.93	
4. Mapping Death Online Database	43	2.86	
5. Eachtra Journal (E-Publication)	44	2.93	
6. Ogham 3D	44	1.91	
7. Irish Inscribed Stones Project	44	1.84	
	Average	**3.25**	



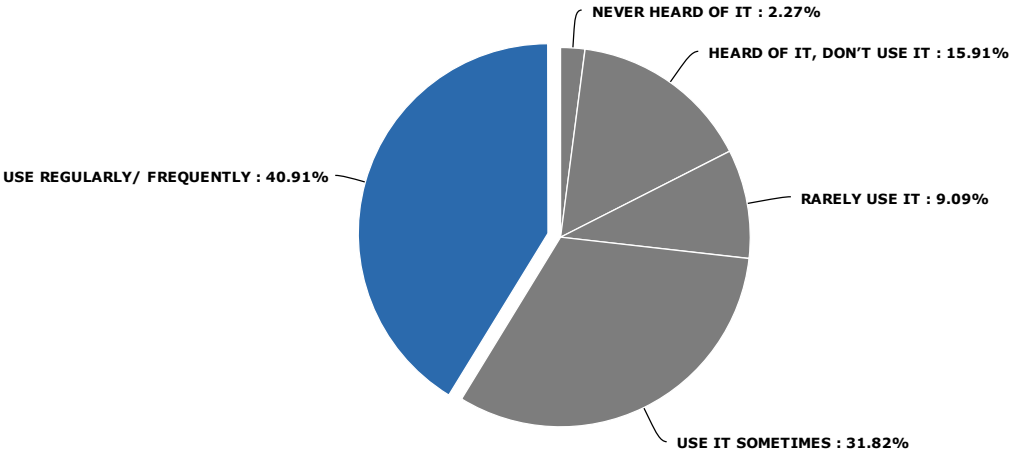
Answer	Count	Percent	20%	40%	60%	80%	100%
1. NEVER HEARD OF IT	0	0.00%					
2. HEARD OF IT, DON'T USE IT	1	2.27%					
3. RARELY USE IT	2	4.55%					
4. USE IT SOMETIMES	7	15.91%					
5. USE REGULARLY/ FREQUENTLY	**34**	**77.27%**					
Total	**44**	**100%**					

Mean: 4.682 Confidence Interval @ 95%: [4.483 - 4.881] Standard Deviation: 0.674 Standard Error: 0.102



Answer	Count	Percent	20%	40%	60%	80%	100%
1. NEVER HEARD OF IT	0	0.00%					
2. HEARD OF IT, DON'T USE IT	2	4.55%					
3. RARELY USE IT	2	4.55%					
4. USE IT SOMETIMES	7	15.91%					
5. USE REGULARLY/ FREQUENTLY	**33**	**75.00%**					
Total	**44**	**100%**					

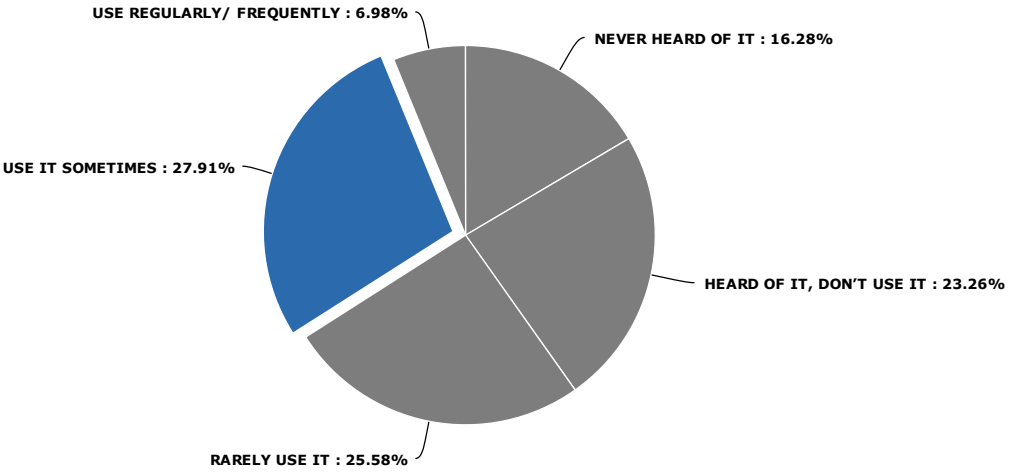
Mean: 4.614 Confidence Interval @ 95%: [4.382 - 4.845] Standard Deviation: 0.784 Standard Error: 0.118



Answer	Count	Percent	20%	40%	60%	80%	100%
1. NEVER HEARD OF IT	1	2.27%					
2. HEARD OF IT, DON'T USE IT	7	15.91%					
3. RARELY USE IT	4	9.09%					
4. USE IT SOMETIMES	14	31.82%					
5. USE REGULARLY/ FREQUENTLY	**18**	**40.91%**					
Total	**44**	**100%**					

Mean: 3.932 Confidence Interval @ 95%: [3.586 - 4.277] Standard Deviation: 1.169 Standard Error: 0.176

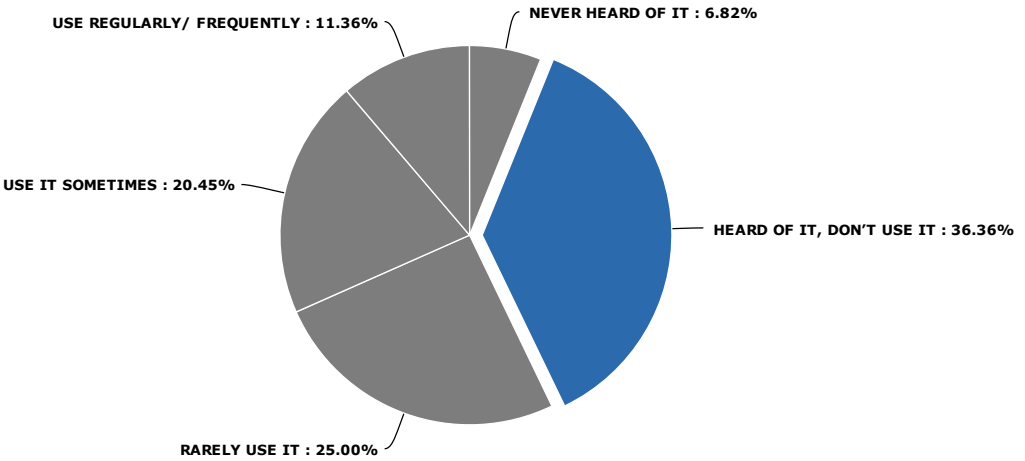
Mapping Death Online Database



Answer	Count	Percent	20%	40%	60%	80%	100%
1. NEVER HEARD OF IT	7	16.28%					
2. HEARD OF IT, DON'T USE IT	10	23.26%					
3. RARELY USE IT	11	25.58%					
4. USE IT SOMETIMES	**12**	**27.91%**					
5. USE REGULARLY/ FREQUENTLY	3	6.98%					
Total	**43**	**100%**					

Mean: 2.860 Confidence Interval @ 95%: [2.500 - 3.221] Standard Deviation: 1.207 Standard Error: 0.184

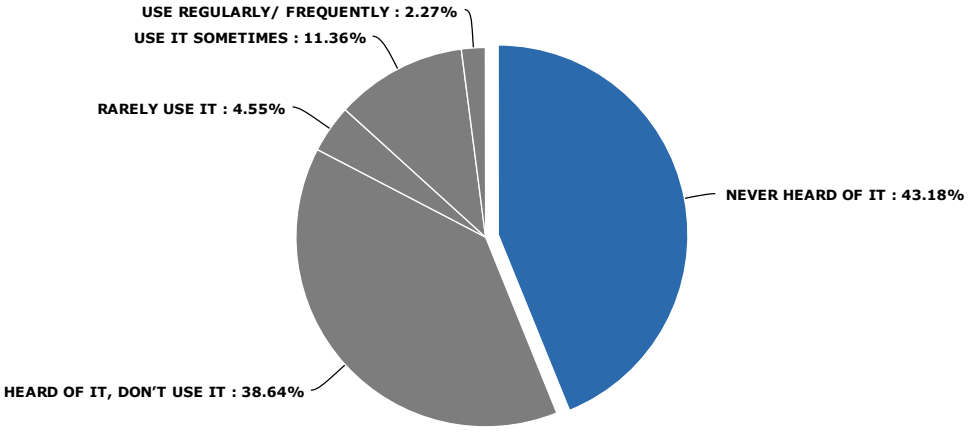
Eachtra Journal (E-Publication)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. NEVER HEARD OF IT	3	6.82%					
2. HEARD OF IT, DON'T USE IT	**16**	**36.36%**					
3. RARELY USE IT	11	25.00%					
4. USE IT SOMETIMES	9	20.45%					
5. USE REGULARLY/ FREQUENTLY	5	11.36%					
Total	**44**	**100%**					

Mean: 2.932 Confidence Interval @ 95%: [2.592 - 3.271] Standard Deviation: 1.149 Standard Error: 0.173

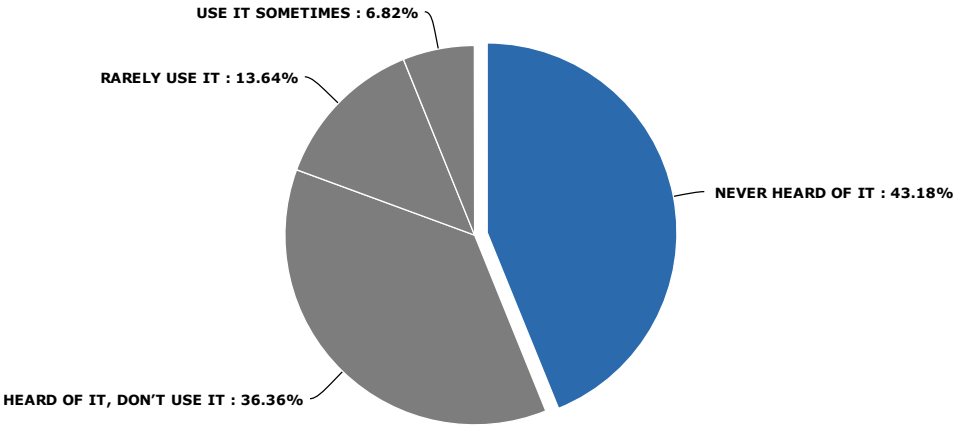
Ogham 3D



Answer	Count	Percent	20%	40%	60%	80%	100%
1. **NEVER HEARD OF IT**	**19**	**43.18%**					
2. HEARD OF IT, DON'T USE IT	17	38.64%					
3. RARELY USE IT	2	4.55%					
4. USE IT SOMETIMES	5	11.36%					
5. USE REGULARLY/ FREQUENTLY	1	2.27%					
Total	**44**	**100%**					

Mean: 1.909 Confidence Interval @ 95%: [1.592 - 2.227] Standard Deviation: 1.074 Standard Error: 0.162

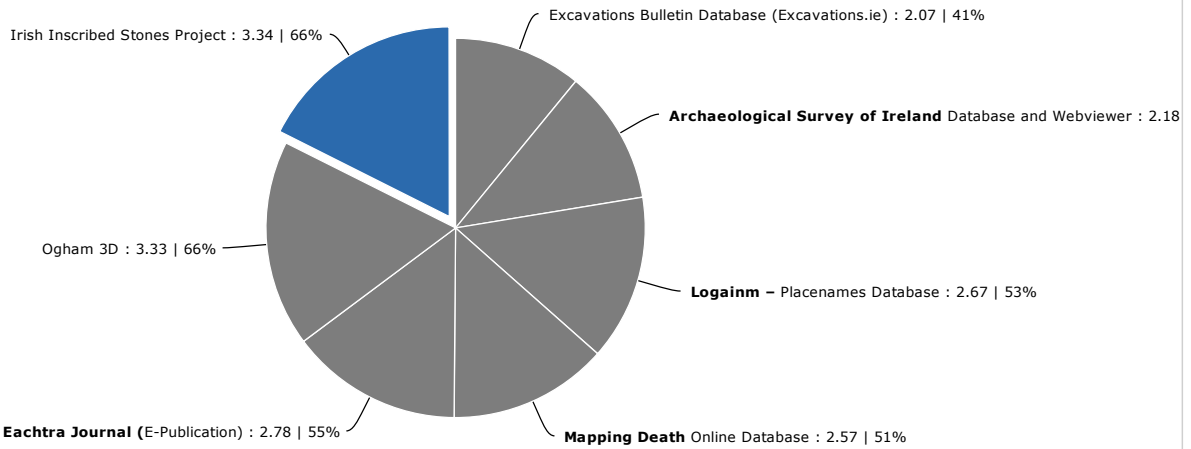
Irish Inscribed Stones Project



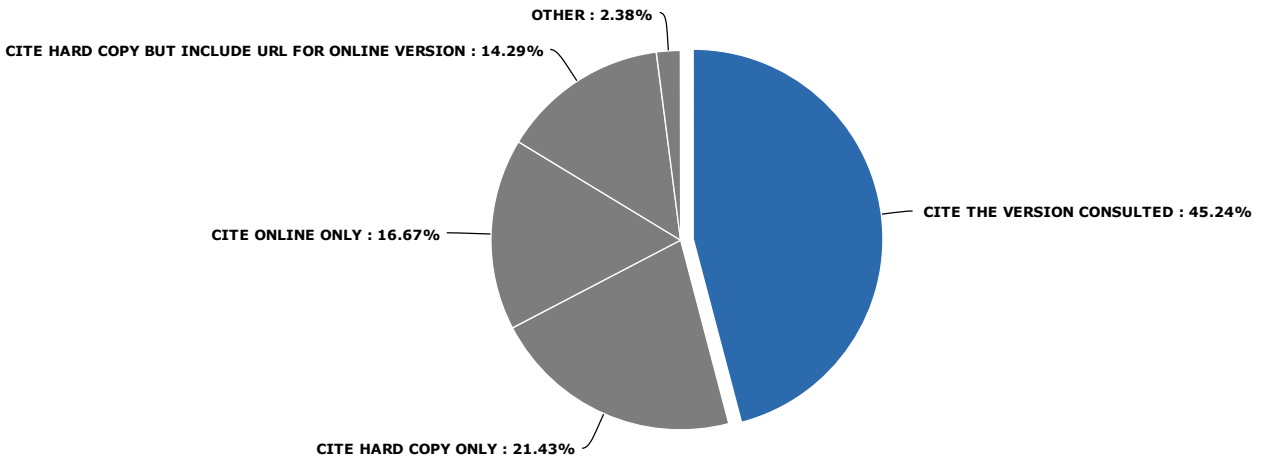
Answer	Count	Percent	20%	40%	60%	80%	100%
1. **NEVER HEARD OF IT**	**19**	**43.18%**					
2. HEARD OF IT, DON'T USE IT	16	36.36%					
3. RARELY USE IT	6	13.64%					
4. USE IT SOMETIMES	3	6.82%					
5. USE REGULARLY/ FREQUENTLY	0	0.00%					
Total	**44**	**100%**					

Mean: 1.841 Confidence Interval @ 95%: [1.571 - 2.111] Standard Deviation: 0.914 Standard Error: 0.138

How do you cite the materials from these resources? Do you cite the electronic version of the resource, or the print/hard copy (where this is an option)?

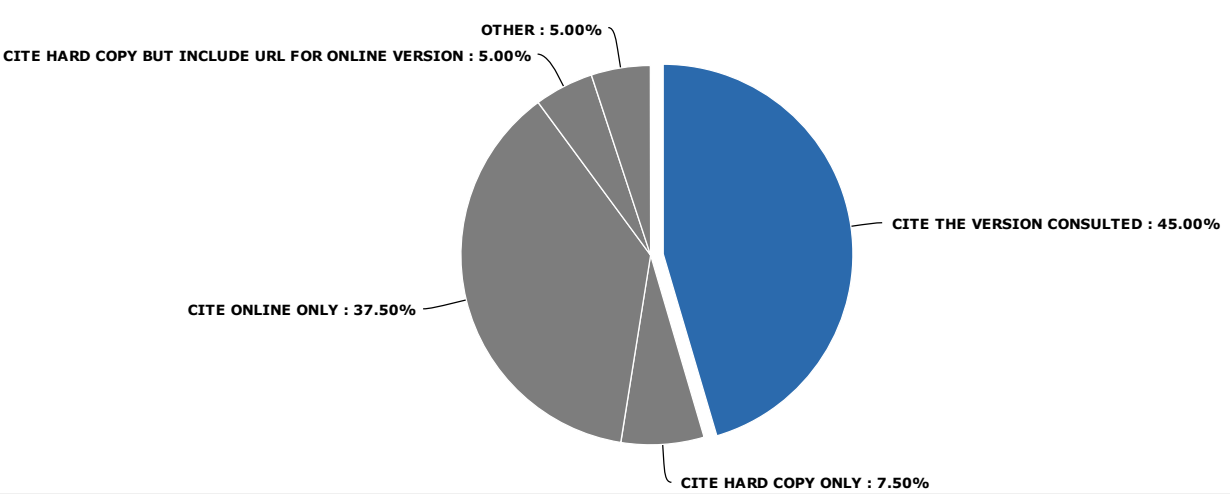


Question	Count	Score	CITE THE VERSION CONSULTED	CITE HARD COPY ONLY	CITE ONLINE ONLY	CITE HARD COPY BUT INCLUDE URL FOR ONLINE VERSION	OTHER
1. Excavations Bulletin Database (Excavations.ie)	42	2.07					
2. Archaeological Survey of Ireland Database and Webviewer	40	2.18					
3. Logainm – Placenames Database	39	2.67					
4. Mapping Death Online Database	35	2.57					
5. Eachtra Journal (E-Publication)	32	2.78					
6. Ogham 3D	30	3.33					
7. Irish Inscribed Stones Project	**29**	**3.34**					
	Average	**2.71**					



Answer	Count	Percent	20%	40%	60%	80%	100%
1. CITE THE VERSION CONSULTED	19	45.24%					
2. CITE HARD COPY ONLY	9	21.43%					
3. CITE ONLINE ONLY	7	16.67%					
4. CITE HARD COPY BUT INCLUDE URL FOR ONLINE VERSION	6	14.29%					
5. OTHER	1	2.38%					
Total	42	100%					

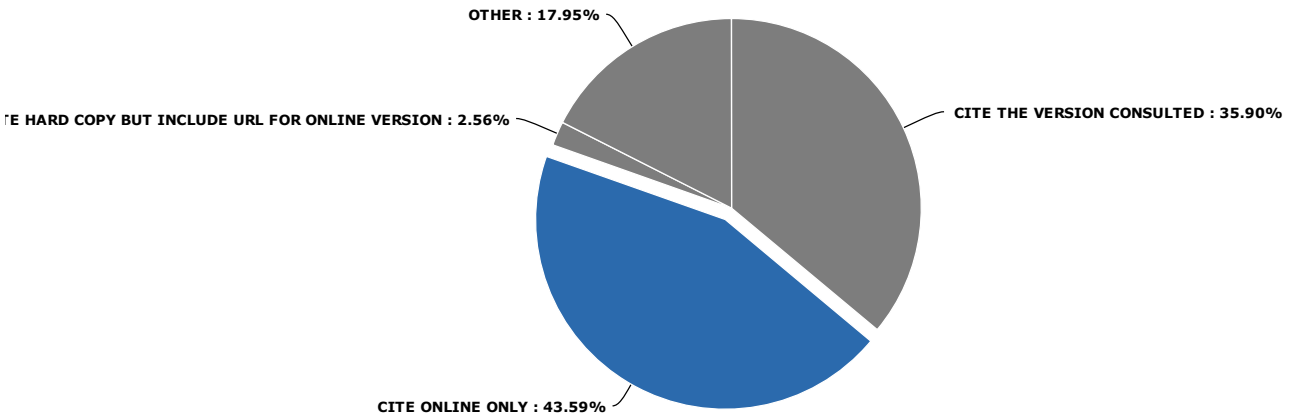
Mean: 2.071 Confidence Interval @ 95%: [1.709 - 2.434] Standard Deviation: 1.197 Standard Error: 0.185



Answer	Count	Percent	20%	40%	60%	80%	100%
1. **CITE THE VERSION CONSULTED**	18	45.00%					
2. CITE HARD COPY ONLY	3	7.50%					
3. CITE ONLINE ONLY	15	37.50%					
4. CITE HARD COPY BUT INCLUDE URL FOR ONLINE VERSION	2	5.00%					
5. OTHER	2	5.00%					
Total	**40**	**100%**					

Mean: 2.175 Confidence Interval @ 95%: [1.798 - 2.552] Standard Deviation: 1.217 Standard Error: 0.192

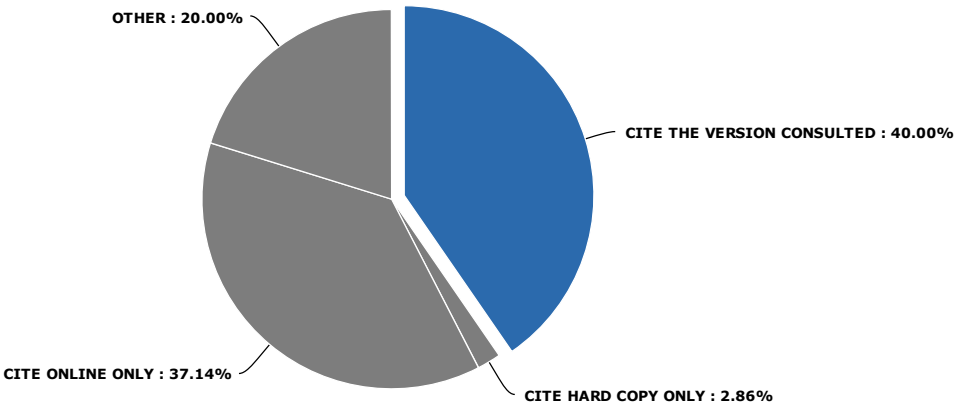
Logainm – Placenames Database



Answer	Count	Percent	20%	40%	60%	80%	100%
1. CITE THE VERSION CONSULTED	14	35.90%					
2. CITE HARD COPY ONLY	0	0.00%					
3. CITE ONLINE ONLY	**17**	**43.59%**					
4. CITE HARD COPY BUT INCLUDE URL FOR ONLINE VERSION	1	2.56%					
5. OTHER	7	17.95%					
Total	**39**	**100%**					

Mean: 2.667 Confidence Interval @ 95%: [2.209 - 3.124] Standard Deviation: 1.457 Standard Error: 0.233

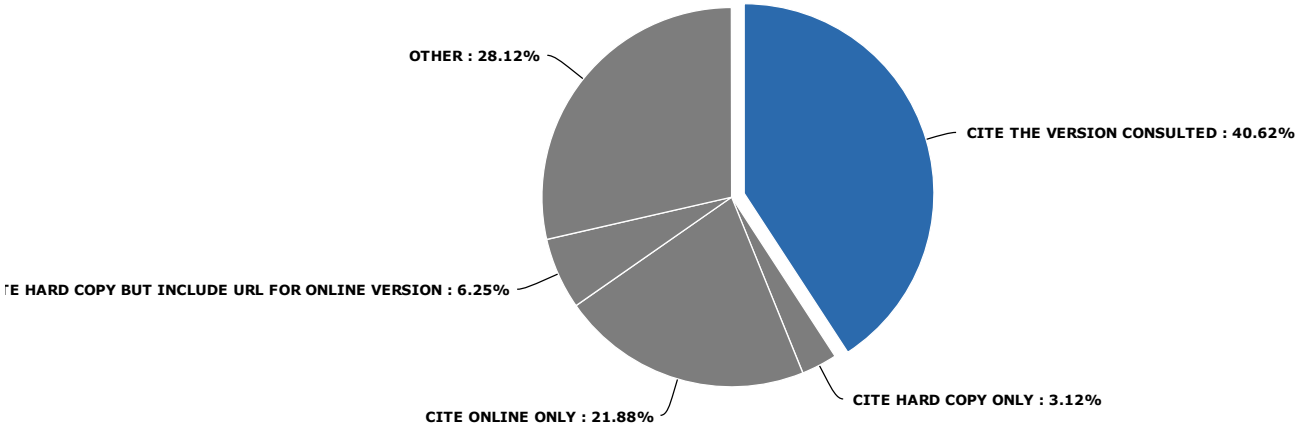
Mapping Death Online Database



Answer	Count	Percent	20%	40%	60%	80%	100%
1. **CITE THE VERSION CONSULTED**	14	40.00%					
2. CITE HARD COPY ONLY	1	2.86%					
3. CITE ONLINE ONLY	13	37.14%					
4. CITE HARD COPY BUT INCLUDE URL FOR ONLINE VERSION	0	0.00%					
5. OTHER	7	20.00%					
Total	**35**	**100%**					

Mean: 2.571 Confidence Interval @ 95%: [2.068 - 3.075] Standard Deviation: 1.520 Standard Error: 0.257

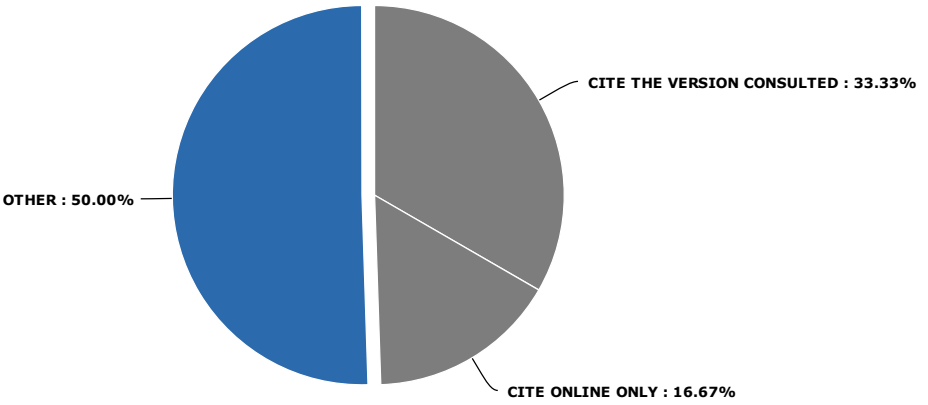
Eachtra Journal (E-Publication)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. **CITE THE VERSION CONSULTED**	13	40.62%					
2. CITE HARD COPY ONLY	1	3.12%					
3. CITE ONLINE ONLY	7	21.88%					
4. CITE HARD COPY BUT INCLUDE URL FOR ONLINE VERSION	2	6.25%					
5. OTHER	9	28.12%					
Total	**32**	**100%**					

Mean: 2.781 Confidence Interval @ 95%: [2.193 - 3.370] Standard Deviation: 1.699 Standard Error: 0.300

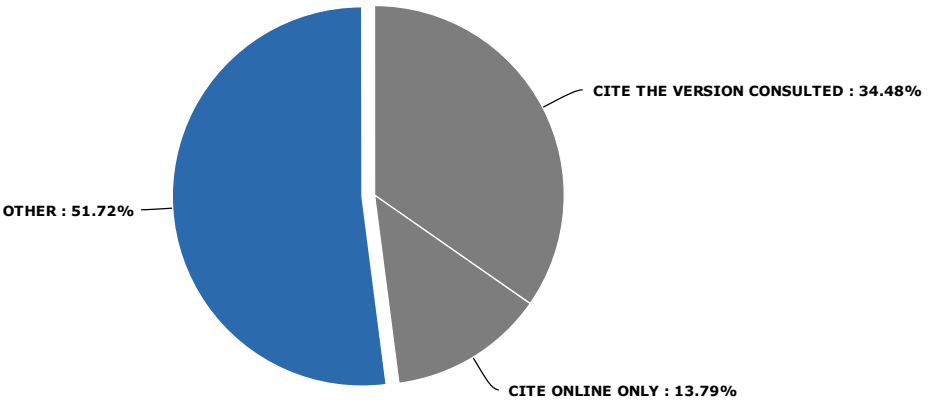
Ogham 3D



Answer	Count	Percent	20%	40%	60%	80%	100%
1. CITE THE VERSION CONSULTED	10	33.33%					
2. CITE HARD COPY ONLY	0	0.00%					
3. CITE ONLINE ONLY	5	16.67%					
4. CITE HARD COPY BUT INCLUDE URL FOR ONLINE VERSION	0	0.00%					
5. OTHER	**15**	**50.00%**					
Total	**30**	**100%**					

Mean: 3.333 Confidence Interval @ 95%: [2.680 - 3.987] Standard Deviation: 1.826 Standard Error: 0.333

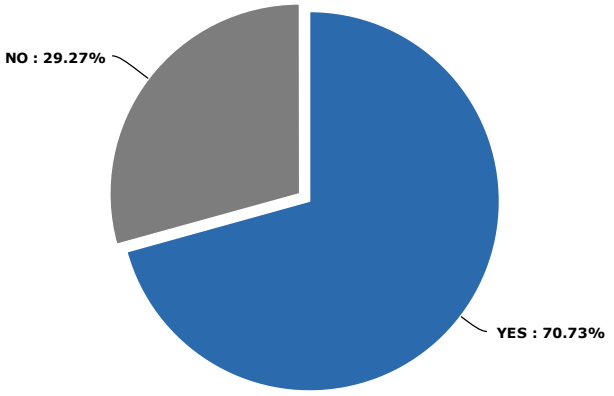
Irish Inscribed Stones Project



Answer	Count	Percent	20%	40%	60%	80%	100%
1. CITE THE VERSION CONSULTED	10	34.48%					
2. CITE HARD COPY ONLY	0	0.00%					
3. CITE ONLINE ONLY	4	13.79%					
4. CITE HARD COPY BUT INCLUDE URL FOR ONLINE VERSION	0	0.00%					
5. OTHER	**15**	**51.72%**					
Total	**29**	**100%**					

Mean: 3.345 Confidence Interval @ 95%: [2.669 - 4.021] Standard Deviation: 1.857 Standard Error: 0.345

Do you use any other electronic resources in your work that you think are particularly good or useful?



	Answer	Count	Percent	20%	40%	60%	80%	100%
1.	**YES**	29	70.73%					
2.	NO	12	29.27%					
	Total	**41**	**100%**					

Mean: 1.293 Confidence Interval @ 95%: [1.152 - 1.434] Standard Deviation: 0.461 Standard Error: 0.072

Would you mind telling us what they are and why you like them?

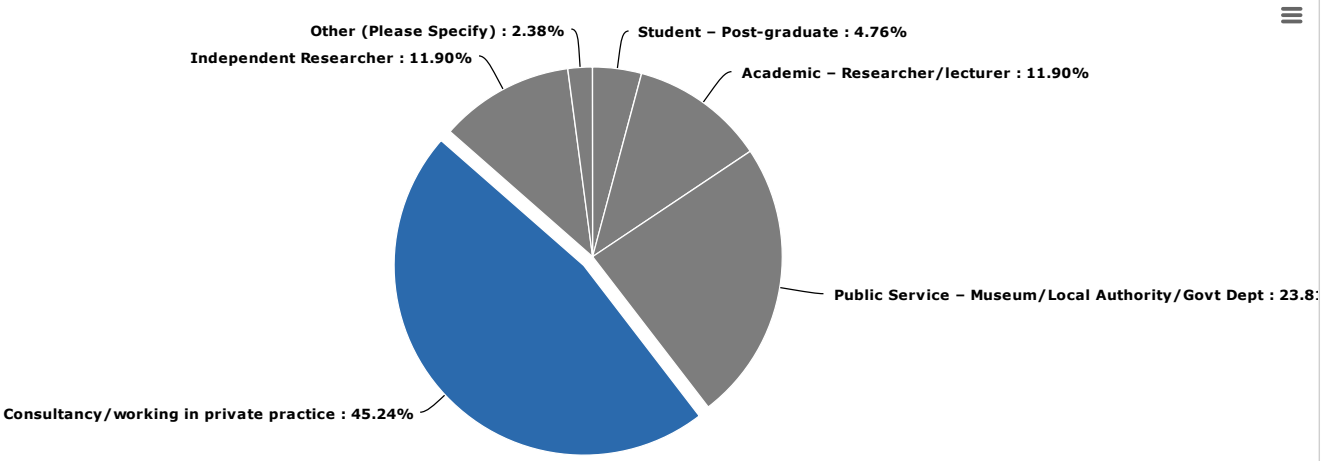
5902708	05/13/2014	
5909342	05/14/2014	
5909577	05/14/2014	OSI Ireland for historic maps- free and easy to use Google Maps and Bing Map for aerial photos of sites
5909606	05/14/2014	
5909537	05/14/2014	
5909544	05/14/2014	
5909647	05/14/2014	JSTOR and Academia.edu Both have solid academic papers not easily accessible in hard copy.
5909980	05/14/2014	
5910284	05/14/2014	archive.org and similar eg Persee
5910265	05/14/2014	OSI historical mapping GSI mapping OSI name books NRA archaeo-geophysical reports NRA excavation database
5910808	05/14/2014	
5911069	05/14/2014	
5911634	05/14/2014	
5914562	05/15/2014	Historic os maps -fantastic resource Jstor
5914795	05/15/2014	
5914786	05/15/2014	The Early Medieval Archaeological Project Has massive amounts of unpublished information all in one place
5914841	05/15/2014	Excavation reports in NMS archive
5915017	05/15/2014	www.buildingsofireland.ie - historic gardens www.dublinheritage.ie/graveyards www.emap.ie - lots of free downloadable up-to-date information www.m3motorway.ie completely out of date but all the excavation reports are downloadable
5915260	05/15/2014	1) OSI Historic Maps - best thing ever! 2) Google Maps & Bing Maps satellite view to see vegetation anomalies 3) Wikipedia! (is that wrong?) 4) Down Survey online - these are amazing
5915310	05/15/2014	I use Athens for accessing British material, and Copac for sourcing publications/and for referencing publications.
5915869	05/15/2014	
5916029	05/15/2014	
5916229	05/15/2014	
5945265	05/15/2014	[http://www.thecore.com/seanruad/] Useful townland/ parish/ barony index. [http://www.heritagecouncil.ie/heritage-maps/heritage-maps/] General heritage maps, combines archaeology & architectural heritage. [http://www.buildingsofireland.ie/] Architectural and garden survey data. [http://ncg.nuim.ie/content/projects/famine/] Population & agricultural statistics [http://www.data-archive.ac.uk/home] GIS data for historic land divisions, Census & Famine Relief data from 1821-1871. [http://www.openstreetmap.org/] & [http://download.geofabrik.de/] geospatial data [http://catalogue.isde.ie/#/] Irish geospatial data [http://www.census.nationalarchives.ie/] census data for households [http://www.origins.net/irishorigins/users/iouserHome.aspx] census and historical data [http://www.meathfieldnames.com/index.php/database-and-mapping] County Meath field names [http://www.askaboutireland.ie/griffith-valuation/index.xml?action=placeSearch] Historical Data [http://www.clarelibrary.ie/] All-round excellent website for information, data and maps on Clare. [http://downsurvey.tcd.ie/index.html] Down Survey map viewer online [http://www.nra.ie/archaeology/nra-archaeological-database/] NRA excavation database. [http://www.ipol.ie/] Database of Irish pollen core data.
5972882	05/16/2014	Local Library online resources, in particular the Clare Local Library online collection. Covers all the areas required for a desktop study in the county-archaeological monuments, history, census and has digitised versions of many relevant sources such as Lewis, Westropp, OS Letters etc. Ask about Ireland is not a website I am a fan of but they do link to the Griffiths Valuations. Have recently started to use genealogy websites such as Ireland Reaching Out, Find My Place and Ancestry, contains sources such as the Griffiths Valuations cancelled lists.
5975098	05/16/2014	
5975549	05/16/2014	Google Earth/Maps Bing maps Historic graves Many other local websites
5976200	05/16/2014	OSi.ie. Range of APs and historical mapping available at a glance.
6013294	05/16/2014	
6026879	05/17/2014	Ask about Ireland - Griffiths Valuation OSI.ie - historic maps & Lewis' Topographical Survey of Ireland
6066803	05/19/2014	Northern Ireland Sites & Monuments Record and NRA database of sites (although it is very patchy on the records included).
6072332	05/19/2014	N/A
6077520	05/20/2014	Maybe not relevant here, but I use electronic versions of journals all the time. Cite hardcopy with DOI. Very good referencing system now established for citing e-journals.
6077963	05/20/2014	OSI Mapviewer. I use it with archaeology.ie. Archaeology.ie uses the same maps but the OSI version has a very useful search tool for finding specific addresses that I can then find on archaeology.ie to see if and what types of monuments are close by.
6086259	05/20/2014	MapInfo GIS with a supporting suite of map layers provided by my employer including aerial photos and Ordnance Survey maps.
6101310	05/21/2014	Irish Radiocarbon & Dendrochronological Dates (https://sites.google.com/site/chapplearchaeology/irish-radiocarbon-dendrochronological-dates). Ordnance Survey of Ireland map viewer (http://maps.osi.ie/publicviewer/#V1,591271,743300,0,10). NRA database Geological Survey of Ireland on-line map viewer
6102136	05/21/2014	
6103755	05/21/2014	OSI historic maps Trinity Down Survey Maps NIAH NRA database askaboutireland (Griffith Valuation mostly but also other sources being added) EMAP Local libraries - Clare Local Studies is excellent All convenient as save travelling to libraries - especially important for those of us not based in Dublin or near a university
6155561	05/26/2014	
6164582	05/27/2014	Google maps/photos, Bing aerial photos, archive.org, buildingsofireland.ie, TCD Down Survey Project, OSi mapviewer for early edition OS maps
6204316	05/29/2014	NRA Database Instar Database These are well structured and searchable resources.
6277005	06/04/2014	Social Media tools for gathering and querying information
6277014	06/04/2014	EMAP - all publications are online and very broad range of information that can be followed up NRA database- good source of info on road schemes- but could be more complete OSI online map viewer- good for historic maps NIEA map viewer for information on Northern Ireland County council websites- for development plants etc. and lists of protected structures. NIAH database- for architectural heritage
6277313	06/04/2014	
6302122	06/05/2014	Canmore and PastMap are excellent for Scotland

Is there a particular source or resource not currently available online that you would want digitised?

5902708	05/13/2014	
5909342	05/14/2014	
5909577	05/14/2014	Archaeological Survey Records for several counties including Kilkenny are digitized but are unavailable to public due to "copyright issues"
5909606	05/14/2014	
5909537	05/14/2014	Excavation Reports, Geophysical Survey reports
5909544	05/14/2014	

5909647	05/14/2014	The field records of the Archaeological Survey of Ireland and the Archaeological Files of the National Museum -records of artefacts, archives etc
5909980	05/14/2014	
5910284	05/14/2014	
5910265	05/14/2014	NMI files Excavation reports NMS files EIS and Cultural Heritage Assessments
5910808	05/14/2014	Nope
5911069	05/14/2014	
5911634	05/14/2014	
5914562	05/15/2014	Yes archaeological survey of Ireland's field notes and photographs
5914795	05/15/2014	topographic files of NMI
5914786	05/15/2014	
5914841	05/15/2014	As above, but could be made available online rather than just in the archive
5915017	05/15/2014	
5915260	05/15/2014	Yes - I want Rocque's map of Dublin digitised and I want the 1848 5-foot plans of Dublin digitised. These would be an amazing resource. Also I would like the NMI topo files digitised (or at least properly searchable!) and I would like the NMS RMP Files fully digitised, not the half-assed job they currently do, along with PROPER CONSTRAINT ZONES for features like town defences and watercourses, which are currently not implemented on the constraint zone layer in the map database. Also I would love to have Thom's directory of Dublin online for more years that the 1 or 2 currently available. Also I would like a list of geophysical licenses (R-numbers) with site location online, like we have for excavation E-numbers, so I can tell if a site has been geophysic'd in the past.
5915310	05/15/2014	
5915869	05/15/2014	
5916029	05/15/2014	I would like as much digatised as possible. The Archaeological Survey records would be brillant in particular and the museum files
5916229	05/15/2014	
5945265	05/15/2014	Excavations reports, linked to a webmap and database, available to download. NMI finds database - viewable on the Heritage Council's website, but you can't download them and the list is not comprehensive. Mapping death, ipol, the 3D ogham project, and other similar projects should be drawn together and linked to a single geospatial search engine. This would act as a one-stop-shop for researchers looking for geospatial data on heritage data.
5972882	05/16/2014	1930's Schools Folklore Survey All of the OS letters and field name books There are many good local history books (of which a limited supply exists), it would be great to see them online.
5975098	05/16/2014	
5975549	05/16/2014	
5976200	05/16/2014	NMI Topographic files SMR/Archaeological Survey archive Database of full submitted excavation reports Geophysical surveys undertaken in Ireland (similar to excavations.ie)
6013294	05/16/2014	
6026879	05/17/2014	NMI Topographical Files ASI - Primary Files (not summaries) NMS - submitted reports
6066803	05/19/2014	PDFs of all NRA excavations would be great and other infrastructural driven excavations could follow suit, such as BGE. Other archaeological companies could also follow the example set by Eachtra. It would be good to have The Irish Stone Axe Project database available on-line as I don't think it currently is.
6072332	05/19/2014	The actual excavation reports rather than just the summary in the excavations bulletin
6077520	05/20/2014	Grey literature, especially archaeological excavation reports.
6077963	05/20/2014	I believe that there are more recent OSI aerial photos than the 2005 ones that are currently used. I think they should be updated regularly to remotely keep an eye on the continuing existence/disappearance of monuments.
6086259	05/20/2014	Photographs of artefacts (i.e. museum objects) with a brief postcard description citing material, date, use and provenance.
6101310	05/21/2014	National Museum of Ireland catalogues and topographic files. Journal of Kildare Archaeological Society
6102136	05/21/2014	Yes, the National Museum of Ireland topographical files as well as all of the files relating to recorded monuments and excavation reports (I believe this is not completed yet)
6103755	05/21/2014	The seanruad.com townland index search was very handy OS Field Name Books would be very useful 1930s schools project also patchy availability online
6155561	05/26/2014	
6164582	05/27/2014	
6204316	05/29/2014	Access to Excavation reports
6277005	06/04/2014	National Museum of Ireland's collections database
6277014	06/04/2014	
6277313	06/04/2014	
6302122	06/05/2014	

Please choose the title that best describes your activities as an archaeologist:



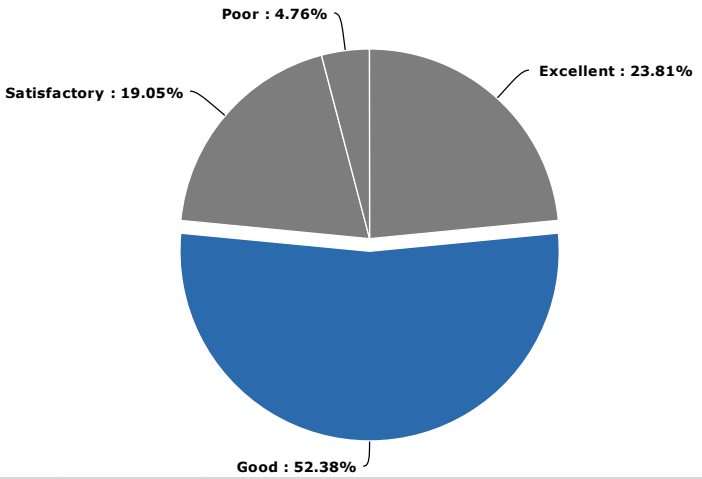
Answer	Count	Percent	20%	40%	60%	80%	100%
1. Student – Undergraduate	0	0.00%					
2. Student – Post-graduate	2	4.76%					
3. Academic – Researcher/lecturer	5	11.90%					
4. Public Service – Museum/Local Authority/Govt Dept	10	23.81%					
5. Consultancy/working in private practice	**19**	**45.24%**					
6. Independent Researcher	5	11.90%					
7. Other (Please Specify)	1	2.38%					
Total	**42**	**100%**					

Mean: 4.548 Confidence Interval @ 95%: [4.219 - 4.876] Standard Deviation: 1.087 Standard Error: 0.168

Please choose the title that best describes your activities as an archaeologist: - [Text Data for Other (Please Specify)]

5909980	05/14/2014	Part-time museum employee, but also do a variety of other things (teach, edit, consultancy).

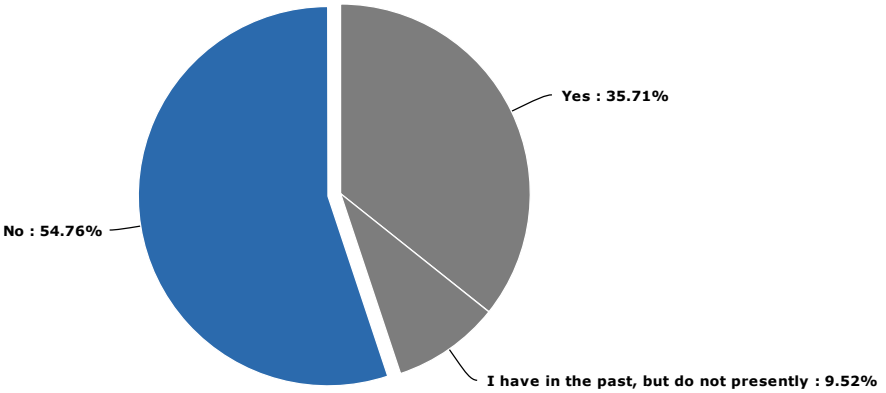
How would you rate your expertise with technologies like the Internet and e-mail?



Answer	Count	Percent	20% 40% 60% 80% 100%
1. Excellent	10	23.81%	
2. Good	**22**	**52.38%**	
3. Satisfactory	8	19.05%	
4. Poor	2	4.76%	
5. Very poor	0	0.00%	
Total	**42**	**100%**	

Mean: 2.048 Confidence Interval @ 95%: [1.807 - 2.288] Standard Deviation: 0.795 Standard Error: 0.123

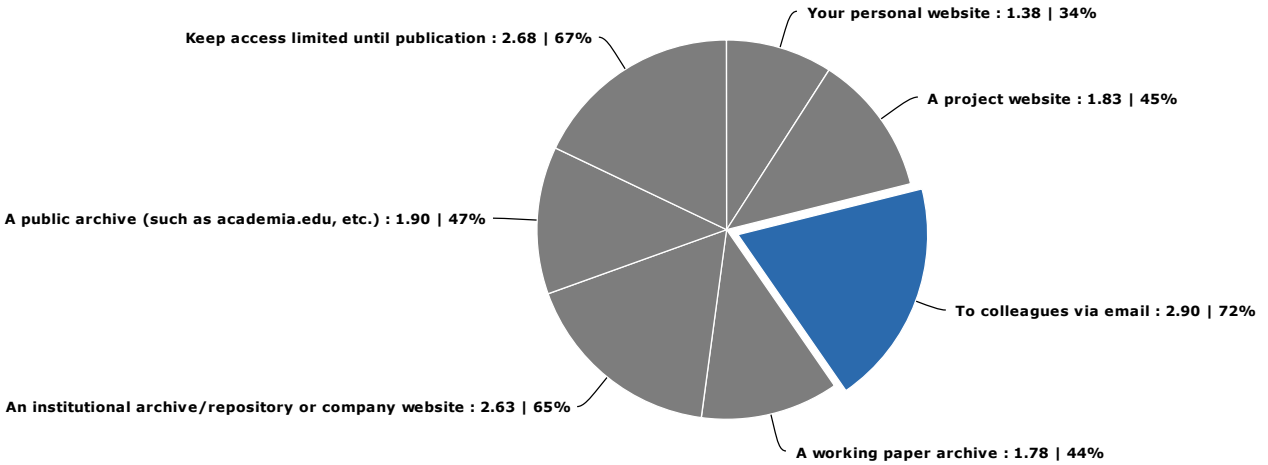
Do you use a website/blog to share information about your research (either in general or specific projects)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. Yes	15	35.71%					
2. I have in the past, but do not presently	4	9.52%					
3. No	**23**	**54.76%**					
Total	**42**	**100%**					

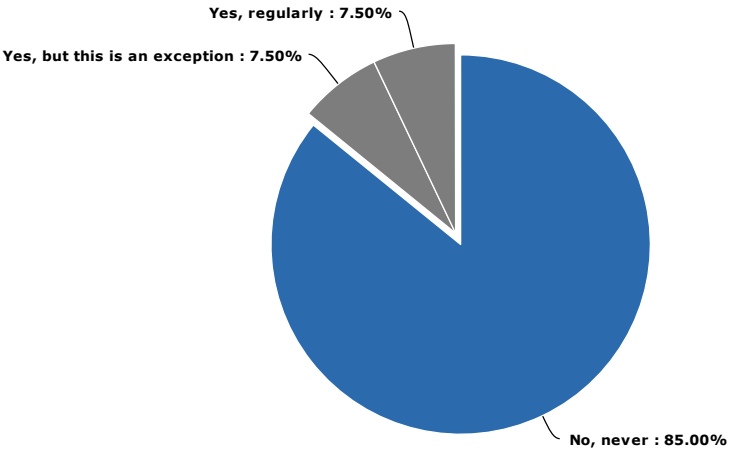
Mean: 2.190 Confidence Interval @ 95%: [1.905 - 2.476] Standard Deviation: 0.943 Standard Error: 0.146

When you have completed a new paper, report or other research output, are you likely to make it available on:



Question	Count	Score	No, never / No, but I have tried / Yes, but this is an exception / Yes, regularly
1. Your personal website	40	1.38	
2. A project website	41	1.83	
3. To colleagues via email	**41**	**2.90**	
4. A working paper archive	41	1.78	
5. An institutional archive/repository or company website	41	2.63	
6. A public archive (such as academia.edu, etc.)	42	1.90	
7. Keep access limited until publication	38	2.68	
	Average	**2.16**	

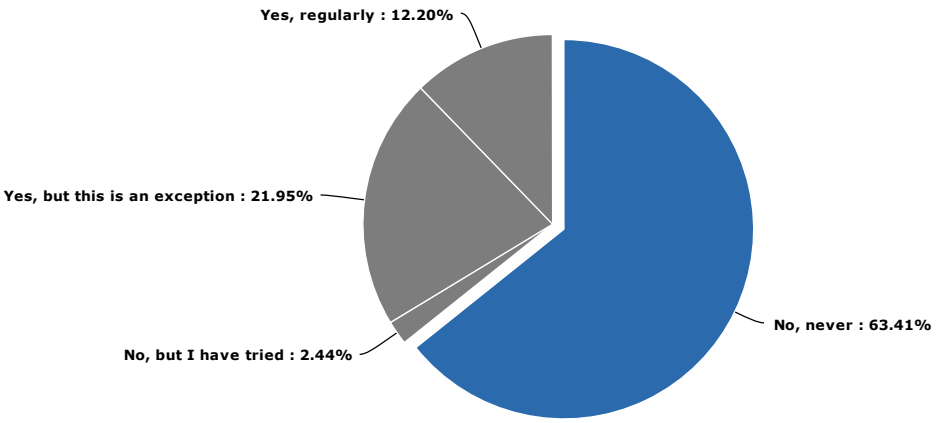
Your personal website



Answer	Count	Percent	20%	40%	60%	80%	100%
1. **No, never**	34	85.00%					
2. No, but I have tried	0	0.00%					
3. Yes, but this is an exception	3	7.50%					
4. Yes, regularly	3	7.50%					
Total	**40**	**100%**					

Mean: 1.375 Confidence Interval @ 95%: [1.088 - 1.662] Standard Deviation: 0.925 Standard Error: 0.146

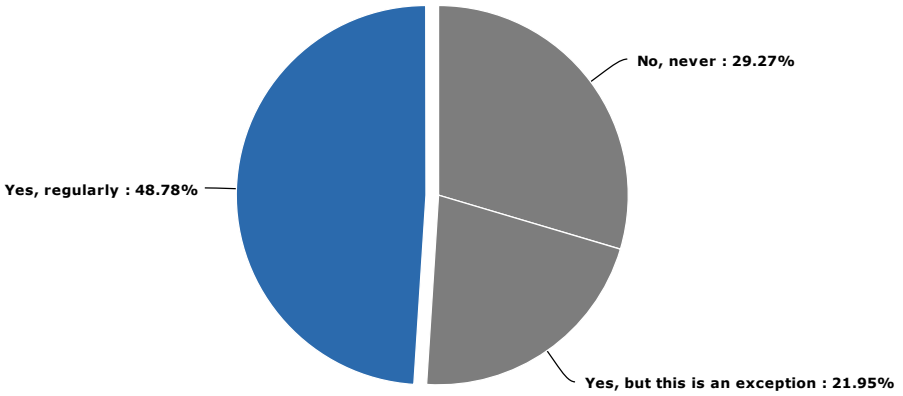
A project website



Answer	Count	Percent	20%	40%	60%	80%	100%
1. No, never	**26**	**63.41%**					
2. No, but I have tried	1	2.44%					
3. Yes, but this is an exception	9	21.95%					
4. Yes, regularly	5	12.20%					
Total	**41**	**100%**					

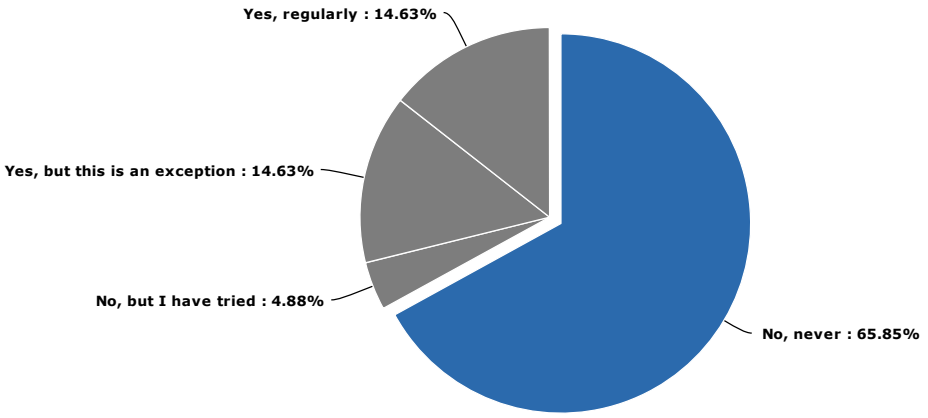
Mean: 1.829 Confidence Interval @ 95%: [1.474 - 2.184] Standard Deviation: 1.160 Standard Error: 0.181

To colleagues via email



Answer	Count	Percent	20%	40%	60%	80%	100%
1. No, never	12	29.27%					
2. No, but I have tried	0	0.00%					
3. Yes, but this is an exception	9	21.95%					
4. Yes, regularly	**20**	**48.78%**					
Total	**41**	**100%**					

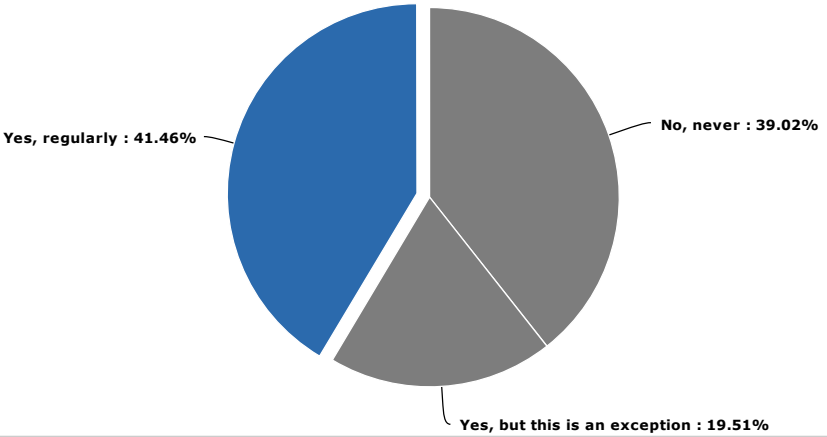
Mean: 2.902 Confidence Interval @ 95%: [2.504 - 3.300] Standard Deviation: 1.300 Standard Error: 0.203



Answer	Count	Percent	20%	40%	60%	80%	100%
1. No, never	**27**	**65.85%**					
2. No, but I have tried	2	4.88%					
3. Yes, but this is an exception	6	14.63%					
4. Yes, regularly	6	14.63%					
Total	**41**	**100%**					

Mean: 1.780 Confidence Interval @ 95%: [1.421 - 2.140] Standard Deviation: 1.173 Standard Error: 0.183

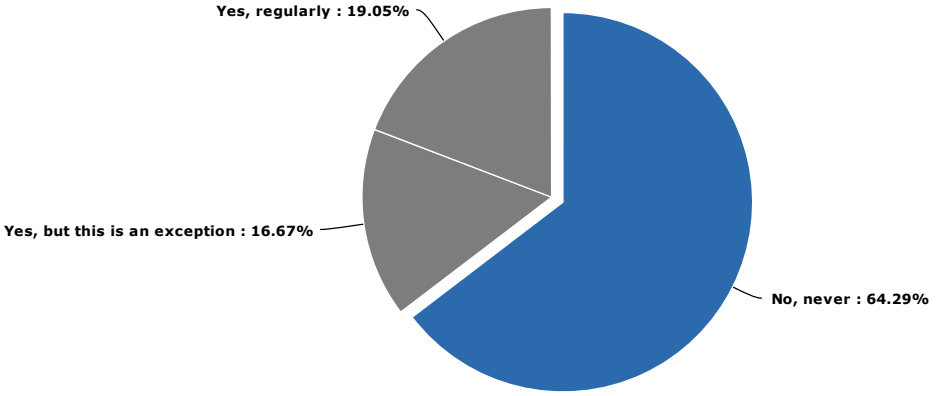
An institutional archive/repository or company website



Answer	Count	Percent	20%	40%	60%	80%	100%
1. No, never	16	39.02%					
2. No, but I have tried	0	0.00%					
3. Yes, but this is an exception	8	19.51%					
4. Yes, regularly	**17**	**41.46%**					
Total	**41**	**100%**					

Mean: 2.634 Confidence Interval @ 95%: [2.214 - 3.055] Standard Deviation: 1.374 Standard Error: 0.215

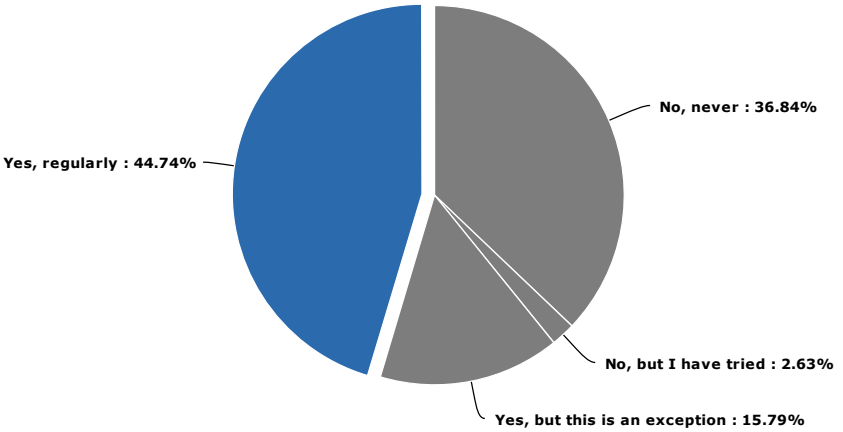
A public archive (such as academia.edu, etc.)



Answer	Count	Percent	20%	40%	60%	80%	100%
1. No, never	27	64.29%					
2. No, but I have tried	0	0.00%					
3. Yes, but this is an exception	7	16.67%					
4. Yes, regularly	8	19.05%					
Total	42	100%					

Mean: 1.905 Confidence Interval @ 95%: [1.522 - 2.287] Standard Deviation: 1.265 Standard Error: 0.195

Keep access limited until publication



Answer	Count	Percent	20%	40%	60%	80%	100%
1. No, never	14	36.84%					
2. No, but I have tried	1	2.63%					
3. Yes, but this is an exception	6	15.79%					
4. Yes, regularly	**17**	**44.74%**					
Total	**38**	**100%**					

Mean: 2.684 Confidence Interval @ 95%: [2.246 - 3.122] Standard Deviation: 1.378 Standard Error: 0.223

Can you think of any particular obstacle that prevents you from making the results of your research available online or in digital format?		
5909342	05/14/2014	Commercially sensitive information
5909577	05/14/2014	Copyright Time
5909544	05/14/2014	
5909537	05/14/2014	Getting pdfs form publishers
5909647	05/14/2014	No
5909980	05/14/2014	
5910284	05/14/2014	
5910265	05/14/2014	
5910808	05/14/2014	Time
5911069	05/14/2014	Client confidentiality
5911634	05/14/2014	
5914562	05/15/2014	Not up to speed in IT! Lazy!
5914795	05/15/2014	lack of technological know how
5914786	05/15/2014	No peer review Issues of intellectual property
5914841	05/15/2014	Completion of the work. Financial constraints
5915017	05/15/2014	
5915260	05/15/2014	I am a planning consultant (antoine here) and I suspect my clients don't want me to post publicly ongoing site work as so often these are part of ongoing planning situations.
5915310	05/15/2014	The only obstacle I can think of is with copyright for original research.
5915869	05/15/2014	
5916029	05/15/2014	Lack of knowledge of how it all works
5916229	05/15/2014	
5945265	05/15/2014	
5972882	05/16/2014	This answer does not apply to me but I could see problems arising where someone is in the process of writing a book and therefore wants to limit access in some way until published
5975098	05/16/2014	
5975549	05/16/2014	No
5976200	05/16/2014	Stipulations of publishers re online publication
6013294	05/16/2014	habit!, but I prefer to publish properly
6026879	05/17/2014	
6066803	05/19/2014	No, only that the projects I am usually working on have specific outputs that have so far not included making research available online before publication (although I have freely shared data with colleagues that needed it). This is, however, soon to change with the current project I am working on, where a digital output is to the forefront.
6072332	05/19/2014	No. Unfortunately I just haven't had much opportunity to publish as of yet!
6077520	05/20/2014	Copyright restrictions. Trying to ensure that other people working on the project don't get annoyed with me for releasing the information. All the delicate negotiations that go on in relation to permissions.
6077963	05/20/2014	My Masters thesis is technically the property of my university. It is availabe in their repository. Otherwise, I'm pretty new at my job but I believe that anything I produce will be freely available online and in hard copy.
6086259	05/20/2014	Your questions assume that publishing something-without bandying it all about beforehand-is a means of restricting access whereas I see publication as a means of creating access so I can't say I feel properly represented by the available answers above. Anyway, I would always ask the few folk likely to be interested to review a draft beforehand.
6101310	05/21/2014	
6102136	05/21/2014	Client confidentiality
6103755	05/21/2014	Laziness! Uncertainty about copyright for articles in journals / books
6155561	05/26/2014	
6164582	05/27/2014	If being published in a book or journal, the publisher does not want the paper made freely available until a reasonable time has passed
6204316	05/29/2014	As an independent researcher, access to online publications/outlets to publish research.
6277005	06/04/2014	Copyright is the major issue here with regard to previously published work
6277014	06/04/2014	No
6277313	06/04/2014	
6302122	06/05/2014	