Ahead of the curve: adventures in e-publishing in *Internet Archaeology*

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Abstract – The e-journal *Internet Archaeology* was first published in 1996. At the time it was the first fully online peer-reviewed e-journal, in any discipline. Now, 18 years later, it is in its 38th issue and is still publishing rich interactive content, including monograph length hypertext articles, online databases and Geographic Information System (GIS) interfaces, virtual reality models, and multimedia sound and movie files. All content is archived by the UK's Archaeology Data Service (ADS), and the journal has won several awards for its creative exemplars of linked e-publications and archives. When Internet Archaeology was established, the Internet itself was still in its infancy. The journal has had a transformative effect on scholarly communication in archaeology, and a significant impact on the humanities more broadly. This paper reviews the challenges faced in developing a fully online journal and the particular difficulties in establishing a sound publishing business model, setting them in the wider context of developments in electronic publication, Open Access and Open Data.

Key words – Electronic publishing, Open Access, Open Data

Zusammenfassung – Die Online-Zeitschrift 'Internet Archaeology' wurde 1996 erstmals veröffentlicht. Seinerzeit war sie die erste vollständig online erscheinende und peer-reviewte Zeitschrift, auch jenseits der Archäologie. Heute, 18 Jahre später, erscheint im 38. Jahrgang weiterhin ein reicher und interaktiver Inhalt, darunter Hypertext-Beiträge in Monografienlänge, Datenbanken im Onlinezugriff, Schnittstellen zu Geographischen Informationssystemen, Modelle in Virtueller Realität, sowie Audio- und Videostreams. Der gesamte Inhalt wird im britischen Archaeology Data Service (ADS) archiviert. Die Zeitschrift hat verschiedene Auszeichnungen gewonnen als kreatives Beispiel einer vernetzten e-Publikation und eines Archivs. Als 'Internet Archaeology' gegründet wurde, war das Internet selbst noch in seiner Anfangsphase. Die Zeitschrift hat einen Transformationseffekt auf die wissenschaftliche Kommunikation in der Archäologie ausgeübt, und darüber hinaus einen deutlichen Einfluss auf die Geisteswissenschaften allgemein. Der vorliegende Aufsatz präsentiert einen Überblick über die Herausforderungen bei der Entwicklung einer Online-Zeitschrift mit besonderem Blick auf die Schwierigkeiten, dafür ein tragfähiges Geschäftsmodell zu etablieren, und stellt dies in den weiteren Kontext der Entwicklungen im elektronischen Publikationswesen, von Open Access und Open Data.

Schlüsselwörter – elektronisches Publizieren, Open Access, Open Data

Introduction

The online e-journal *Internet Archaeology* began publication in 1996. At the time it was the only fully online peer-reviewed e-journal, in any discipline. The Internet was itself in its infancy and Mosaic, the first windows-based web browser, had only been released three years earlier. Now, 18 years later, the journal is in its 38th issue and is still publishing rich interactive content, including monograph length articles which make full use of hypertext links to provide multiple pathways through the text at varying levels of detail, as well as online databases and Geographic Information System (GIS) interfaces, virtual reality models, and multimedia sound and movie files. The journal has had a transformative effect on scholarly communication in archaeology, and a significant impact on the humanities more broadly.

However, acceptance of electronic publication has been slower than many predicted and it has always felt that *Internet Archaeology* has been ahead of the curve. As early as 1978 Wilfrid Lancaster wrote: *"In my opinion, there is no real question that completely paperless systems will emerge in science and in other fields. The only real question is 'when will it happen?' We can reasonably expect, I feel, that a rather fully developed electronic information system ... will exist by the year 2000, although it could conceivably come earlier"* (LANCASTER 1978, 355).

That we have still not, 15 years later than Lancaster predicted, completed the transition to a full electronic system is down to a combination of resistance from both publishers and readers (RICHARDS 2006). Many publishers have simply sought to migrate their traditional business model to the Internet, setting up web-based services that give access to electronic versions of existing printed journals, often using the Portable Document Format (PDF) to maintain the typography and layout of the printed version (DAY 1999). For many the shift actually allowed them to decrease costs, reducing printing costs and using the Internet as a means of distribution. They found common cause with librarians who, with budgets under pressure from spiraling journal inflation, found they could cut shelving and staffing costs if they moved from a collections policy to an access policy.

This paper will describe the development of *Internet Archaeology*, and the way in which it has evolved. It reviews the challenges faced in developing a fully online journal and the particular difficulties in establishing a sound publishing business model, setting them in the wider context of developments in electronic publication, Open Access and Open Data.

Open Access publication

For the more radical proponents of electronic communication, such as Stevan Harnad, the move by traditional publishers to disseminate their journals as PDFs but to continue to charge subscriptions did not go far enough. They asked why the status quo in paper journals should simply duplicate itself in the new medium (Harnad & Hemus 1997; Harnad 2001). They saw self-publishing (sometimes called self-archiving) through the Internet as 'a means of returning the responsibility of ownership and distribution of scholarship to its creators' (Day 1999).

One of Harnad's basic assumptions was that when scholars and scientists publish in peer-reviewed journals they are not primarily interested in monetary reward – which would, in any case, be unlikely – but in having their work read, used, and referenced (Harnad & Hemus 1997). In the 'Gutenberg era', authors had to maintain what Harnad called a 'Faustian bargain' with commercial publishers, whereby they handed over their copyright in return for having their research published (Harnad & Hey 1995). Harnad argued that this made sense when publishing remained an exclusive and expensive domain, but that it had no relevance in the electronic era when scholars can publish their own papers at little or no personal cost. He argued that authors should make the texts of their papers freely available on the Internet and that readers would then access the free electronic version of a paper rather than a more expensive paper version published much later (Harnad & Hey 1995, 114-5). For Harnad, the apparatus of anonymous peer review, which many commercial publishers used to justify their editorial costs, would be replaced by open peer commentary or open peer review (Harnad 1991). One of the first exemplars of the 'subversive-proposal' in action was the 'e-print archive' for high-energy physics set up by Paul Ginsparg at the Los Alamos National Laboratory in 1991 (Ginsparg 1994). It very quickly became the primary means of scholarly communication in its subject area and has since expanded to cover the whole of physics, mathematics and computer science.

However, as institutions – often driven by the Research Excellent Framework (REF) in the UK – have sought to promote the research undertaken by their own scientists and researchers, and to increase its impact, many have developed their own institutional eprint repositories, creating a fragmented hybrid publication landscape, split between discipline-based data centres, generic institutional e-repositories, and traditional publishers. Harnad's suggestion that eprints should be made freely available prior to formal publication has evolved into what is now often referred to as 'Green' open access (OA), whereby authors publish in any journal and then self-archive their pre-publication text in their institutional repository or on some other open access website. By contrast, 'Gold' open access is provided by authors publishing in an open access journal that provides immediate OA to all of its articles on the publisher's website (Harnad 2005). In order to be free at the point of use these journals are generally funded by subventions drawn from authors, and ultimately research funding bodies, known as Author Processing Fees (or APCs). In addition, in this transitional era, there are also what are known as 'hybrid' open access journals which provide Gold OA only for those individual articles for which their authors (or their author's institution or funder) pay an OA publishing fee. The traditional journal publication model has been further disrupted by free online services such as academia.edu and researchgate.net which encourage authors to build up an online professional profile on social media by uploading pre- or post-prints of their papers (Kelly & Delasalle 2012).

In 2012 the report from the National Working Group on Expanding Access to Published Research Findings (the 'Finch Group') was published (Finch 2012). The report recognised the need for different channels to communicate research results, but recommended support for the 'gold' route, in particular. UK Research Councils have used the findings of the group to further develop their own policies and the four UK HE funding bodies have introduced a new policy for open access in relation to research assessments after the 2014 REF. The policy states that, to be eligible for submission to the post-2014 REF, authors' final peer-reviewed manuscripts must have been deposited in an institutional or subject repository on acceptance for publication (HEFCE 2014). Deposited material should be discoverable, and free to read and download, for anyone with an Internet connection. The requirement applies only to journal articles and conference proceedings with an International Standard Serial Number, however, and not to monographs.

The concept of Open Access publication has gained considerable momentum in Archaeology, but concern has also been expressed for the future of learned societies and their journals. Publication still carries a cost, even if it can continue to depend on the goodwill of editors and reviewers, or their employers, who are willing to contribute their time for free. The publication infrastructure, whether it is a traditional journal, an ejournal, or

an eprint repository, still costs money to staff and maintain. The Open Archiving movement simply transfers the cost from the publisher onto the university libraries that maintain the repositories.

Open Data

Within archaeology the debate on openness has typically focused on 'open access' publication, and have been particularly focused on its impact on the 'traditional' outputs of research and grey literature (Lake 2012). Yet, as the benefits of openness within archaeological publication have been recognised, its expansion to the structured data produced during archaeological research and fieldwork seems logical. The development of so-called 'open data' has, and will continue to have a significant impact on the development of the profession. However, what do we mean by open data? Open data can be broadly defined as, 'data that can be freely used, reused and redistributed by anyone – subject only, at most, to the requirement to attribute and share-alike' (Open Knowledge Foundation). More specifically it can be defined according to three concepts:

1. Technical openness: data should be made available in widely used, non-proprietary formats that can be used across multiple computing and software platforms.
2. Legal openness: data must be free of encumbering intellectual property restrictions.
3. Access: datasets must be made available freely and, unless there are overriding privacy or security needs, data releases need to be both comprehensive and sufficiently documented to enable reuse (Kansa 2012, 506).

For many Open Data is often equated with Linked Open Data and attempts to develop a linked data cloud of open data sets, in which key concepts are each linked to other online sources, in fulfilment of Berners Lee's original vision of a semantic web of machine-readable data (Binding 2010; Wright 2011; Isaksen 2011; Tudhope, Binding et al. 2011; Tudhope, May et al. 2011). However, this paper is concerned with open data more broadly. In fact the concept of open access to scientific data is not a new one, and long pre-dates the Internet. Indeed, it was first institutionally established in preparation for the International Geophysical Year of 1957-8. The International Council of Scientific Unions established several World Data Centres to minimize the risk of data loss and to maximize data accessibility, further recommending in 1955 that data be made available in machine-readable form. The drive to open access to research data is often justified in terms of public interest (Wessels et al 2014). In 2004, the OECD (Organisation for Economic Co-operation and Development) Science Ministers ruled that all publicly funded archive data should be made publicly available.

The European Commission (2012) has outlined a 'digital agenda for Europe' which seeks to promote open data for publicly-funded research.

Beyond the academic sector, however, many archaeological and heritage data sets are held and maintained by cultural heritage organisations, such as regional and national heritage bodies. Although yet to be full embraced by the heritage sector, in many European countries the INSPIRE directive for geospatial data (http://inspire-geoportal.ec.europa.eu/) has had more impact on the open data discussion within state-run cultural heritage organisations than the EC digital agenda for Europe.

The UK Government has advocated 'a culture of openness' which contends that 'access to data is fundamental if researchers are to reproduce and thereby verify results that are reported in the literature' (House of Commons Science and Technology Committee 2011). Endorsing the findings of the Finch report (2012), the UK Government has promoted greater accessibility for research data and grey literature through subject and institutional repositories (House of Commons, Department for Business Innovation and Skills 2012, 4). The Government's Open Data White Paper: 'sets out clearly how the UK will continue to unlock and seize the benefits of data sharing' by enhancing access to data and safeguarding it from potential misuse (Cabinet Office 2012). In the light of these developments research councils, funding agencies and higher education institutions have outlined commitments to open data (Research Councils UK 2013). The implications of these statements are currently being worked out through the policies and procedures of individual councils, with the Engineering and Physical Sciences Research Council (EPSRC) taking one of the strongest positions to date, namely that research organisations are expected to publish online appropriately structured metadata describing the research data they hold, normally within 12 months of the data being generated, and for the data themselves to be made available without restriction for a minimum of 10 years. Although no additional funding has been made available to support data archives or institutional repositories, research organisations in receipt of EPSRC funding

are expected to have a roadmap in place by May 2012 for compliance with the EPSRC policy framework on research data by May 2015.

The Arts and Humanities Research Council (AHRC) – the funding body which funds most university-based archaeological research in the UK – has adopted a similar, but slightly more conservative position. Under AHRC rules publications 'should be made available as rapidly and effectively as possible via deposit in an appropriate repository at or around the time of publication', and 'Electronic resources must remain accessible for a minimum of three years after the end of the award'. For archaeological research the AHRC specifies that the ADS must be consulted within three months of the start of the proposed research and data must be offered for deposit within three months of project completion (AHRC 2014).

English Heritage, the lead state agency for heritage protection in England has adopted a robust position to make sure that the digital outputs from the work it funds are adequately archived. Under their funding guidance: 'It is a contractual requirement for projects funded through the National Heritage Protection Programme that digital archives be deposited with the Archaeology Data Service (ADS) or similar digital archiving organisations acceptable to English Heritage' and furthermore that: 'All projects creating primary digital data must archive that data' (ENGLISH HERITAGE 2014).

The international Open Data Movement has recently received two further boosts. On 13 June 2013 the European Parliament ratified new rules on Open Data, and specifically included cultural heritage data held by public archives museums and galleries. Less than a week later, on 18 June 2013, the Open Data Charter was unveiled at the G8 Summit at Loch Erne, in Northern Ireland. It recognises 'a new era in which people can use open data to generate insights, ideas, and services to create a better world for all' (CABINET OFFICE 2013). The G8 Charter establishes 5 principles: (1) that data should be open by default; (2) that steps should be taken to increase the quality, quantity and reuse of data that is released; (3) that it should be usable by all; (4) that releasing data should improve governance; and (5) that releasing data should increase innovation.

Within archaeology we have long recognised the benefits and potential impact that the sharing and reuse of data can bring. Yet, as Kansa observes: "*these barriers show growing cracks as current norms of closed access and data withholding research in archaeology become increasingly untenable and new modes of understanding and communicating the past take root*" (KANSA 2012, 499).

Nonetheless, the benefits of increased accessibility, and the messages of open access and open data, are especially poignant for archaeology, given the primary and unrepeatable status of most data sets. Indeed, within "*a discipline that relies upon destructive research methods, lack of information sharing not only inhibits scholarship, but also represents a tragic loss of irreplaceable cultural and historical knowledge. The discipline urgently requires a more professional approach if researchers are to make credible and replicable knowledge claims and act as better stewards of cultural heritage*" (KANSA & WHITCHER 2013, 88).

As a profession archaeologists have sometimes been reluctant to share their primary research data with others. For some this is attributed to the technical barriers associated with providing access to data (CONDRON ET AL. 1999; KANSA & WHITCHER 2013) or more practical restrictions on the dissemination of data imposed by publishers or data providers. Yet by far the greatest hurdle to overcome is conceptual; while Pratt has observed that 'archaeologists are eager to find ways to publish these data sets' (2013, 101), some remain unconvinced about the benefits that open data promotes. Others may be reluctant to expose perceived deficiencies in primary data recording to the critical scrutiny of their peers, or may believe that there is a risk that their data will be published by others before they have the opportunity to do it themselves. An awareness of the academic, symbolic and economic 'capital' of archaeological data streams has hindered the sharing of data (Porter 2013); whilst potential misuse and misappropriation of data have always been concerns. For Kansa "the discipline should not continue to tolerate the personal, self-aggrandizing appropriation of cultural heritage that comes with data hoarding", indeed data withholding "represents a clear threat to preserving the archaeological record" (2012, 507).

Such cultural reluctance is not new to archaeology; these issues have not precluded the sharing of data in the past, but have simply constrained the scale of dissemination. Within the current climate with disparate groups and communities conducting related research; where the scale of research and the data produced has increased exponentially, such an approach is unsustainable. Open data offers researchers a mechanism to improve disciplinary interaction and, as a consequence, enhance research. Increased accessibility has the potential to allow others to test the validity of our interpretations; allowing them to examine and re-analyse the original data. As Lake contends, these 'approaches to knowledge have the potential to bolster scientific rigour by increasing transparency' (2012, 473). At the same time this transparency

can serve to illustrate the professionalism of data creators by highlighting good research practice (Kansa 2012).

While increased accessibility and reuse has done much to raise awareness of the intrinsic value of research data, official recognition of its importance has served to encourage data creators to share these outcomes. The UK Government, for example, has stated that: *"The work of researchers who expend time and effort adding value to their data, to make it usable by others, should be acknowledged as a valuable part of their role. Research funders and publishers should explore how researchers could be encouraged to add this value"* (UK Government 2011).

A more open archaeology and the dissemination of increasing quantities of data necessitates the development of new techniques and tools to deal with the proper referencing and citation of digital resources; indeed without this there is a very real possibility of becoming 'lost in information' (Huggett 2012). At the same time a common concern amongst data creators is the lack of accreditation for data. Both concerns could be addressed through improved citation. Traditionally digital resources have utilised the URL to reference digital resources, however, the durability of this method of citation has begun to be questioned (Jeffrey 2012). A number of schemes have attempted to address this issue; one of these is the DOI system which 'allows collections of data or individual data files to be allocated a URL that will not change irrespective of changes to the physical location of the files in question' (Jeffrey 2012, 564). The 'minting' and subsequent management of DOI's is handled by a conglomerate of organisations, working as part of the International DOI Foundation, who guarantee the sustainability of the citation system (Datacite, nd). As an adopter of the DOI system the ADS creates persistent identifiers that consistently and accurately reference digital objects and collections. This serves to address one the principal concerns of the PUNS report (Jones et al 2001) by formalising associations between digital resources and printed outputs. An important outcome of the DOI system is that it also allows citations to be tracked, meaning that data creators, users and repositories can track the use and impact of specific data sets (Hole 2012).

Despite this change in mind-set the data outputs of archaeological research can still be treated with some diffidence; an incongruent outcome of less significance than the final interpretation or synthesis. Costa et al (2013) propose that in order to overcome this perception archaeological data needs to treated as 'a more relevant part of the archaeological publication, research, management, curation and policy process, and not merely an afterthought' (Costa et al. 2013; Atici et al. 2012; Pratt 2013). The solution advocated by many is treat the dissemination of data as a form of publication; one which should employ established practice found within text-based publishing, included citation and editorial control (Kansa et al. 2010; Kansa & Whitcher 2011). This it is believed will instil a sense of familiarity to process of disseminating and citing digital resources. This movement towards, what is termed 'data sharing as publication', is intended make the dissemination of data 'a more regular and integral part of professional practice' (Atici et al. 2012, 161).

Internet Archaeology – adventures in E-publishing

Internet Archaeology (intarch.ac.uk) was established in 1995 with initial funding until 1998 (later extended until 2001) from the Joint Information Systems Committee (JISC) eLib (electronic libraries) programme (Rusbridge 2001). Its first paper – a searchable visual catalogue of Roman amphorae in Britain by Paul Tyers, was published in September 1996, just 3 years after the release of, the first windows-based web browser (Tyers 1996). *Internet Archaeology* was the first refereed online e-journal in Archaeology and has been very successful in gaining international recognition as a high-quality academic journal. It is still unique in Archaeology in that it is a multi-media journal available exclusively on the Web; it has no print equivalent. It includes elements that would be impossible in a paper publication, such as searchable database and map interfaces which can be used for online analysis; full-colour, interactive multimedia; video footage; virtual reality models and access to related digital archive material. The idea from the outset was that the articles would enable readers to drill down into the data, to test interpretations and to put forward rival hypotheses (Heyworth et al. 1996).

The proposal to develop the journal was put forward by a consortium which comprised the Council for British Archaeology, the British Academy, and the University of York. The founding editor was Alan Vince, who worked part-time on the journal until 1999, supported by Judith Winters, who then took over as Editor. The running of the journal is overseen by two co-directors, Julian Richards and Mike Heyworth, representing the host institution (University of York) and the publisher (the Council for British Archaeology) respectively. The project also had an Advisory

Committee, which has subsequently evolved into an Editorial Advisory Board.

Rusbridge himself, the programme leader for JISC, saw it as one of the great success stories of the Electronic Libraries programme: "*More successes? From the Electronic Journals area, a journal which aimed from the start to get value from the technology rather than just using it to carry images of printed pages – this was* Internet Archaeology"(Rusbridge 2001).

Reviewing Issue one, Costis Dallas (1997) described it as: "an intriguing glimpse of the potential of electronic media for scholarly publication". The New Scientist noted that "for anyone studying or working (or wishing to publish) in the subject, this is an important online resource". Writing in the Times Higher Educational Supplement in November 2000, Professor Steve Mithen described *Internet Archaeology* as 'a flagship e-journal ... providing a fine balance between the more creative use of new technologies and traditional publishing formats. The editors of *Internet Archaeology* are making an invaluable contribution to the discipline, one that goes far beyond the provision of their journal alone.'

To a large extent 'publication of data' has always been part of the *Internet Archaeology* publication model. From the outset the journal has endeavoured to promote links between the traditional outputs of research and supporting datasets. The award-winning Linking Electronic Archives and Publications (LEAP) project set out explicitly to provide a series of exemplars of linked publications in *Internet Archaeology* with archives held by the ADS, including the projects of Merv, Silchester, Troodos, and Whittlewood (Richards, Charno & Winters 2011). Of course this relationship is not exclusive and *Internet Archaeology* has also published articles linked to data sets held in other data archives, including tDAR in the United States (Holmberg 2010).

In 2013 *Internet Archaeology* introduced another publication model to encourage researchers to provide access to their data sets: the data paper. The concept of the data paper was developed in the physical sciences, and has been extended to Archaeology via the new Journal of Open Archaeological Data, established at University College London under the auspices of Ubiquity Press (JOAD nd). A data paper is generally a short paper which simply describes and summarises a research data set, and which outlines how it might be re-used. It is generally a condition of publication that the dataset must have been deposited in an archive and have been allocated a Digital Object Identifier. Thus, for example, a paper by Bevan and Conolly on the Antikythera survey pro-

ject (2012) references a dataset held by the ADS (2014). *Internet Archaeology* has developed the concept of the data paper further, adding a published review of the dataset, by a named external reviewer (e.g. Williams et al. 2014). In conjunction with the ADS, *Internet Archaeology* has also introduced an annual digital data re-use award, to encourage archaeologists to undertake their research in the digital archive, rather than expensively destroying more primary data in the field or laboratory (ADS 2014).

When *Internet Archaeology* was founded, the Open Access movement was in its infancy but from the outset it was what would now be regarded as an Open Access journal, supported by grant funding from the JISC. Registration was required, but no charge was made for access. By July 1997, over 3400 readers had already registered to use the journal, and this was growing at the rate of 270-470 a month (Heyworth et al. 1997, 1041). At that stage 39 % of the readership came from the UK, 37 % from North America, just under 15 % from the rest of Europe, and about 7 % from the rest of the world. By the time the journal ceased requiring readers to register the number of registered readers had grown to over 25,000 (Richards 2006, 218).

With the ending of eLib funding in July 2001, *Internet Archaeology* was encouraged to adopt what was then the standard journal business model, based upon subscription payments. Although the preference of the Editor and Co-directors would have been to remain free at the point of use, the journal was costly to produce, and demanded the work of a full-time editor and part-time copy-editor to prepare articles for online publication. The view of JISC at that time was that the success of a traditional subscription model would demonstrate the viability of ejournals more widely. *Internet Archaeology* therefore sought to establish itself as a sustainable electronic journal, with a business plan based upon several income streams, comprising publication subventions, advertising (or 'sponsorship') and journal subscriptions, including pay-per-article and pay-per-volume options. By 2006 it had an established subscription base of over 40 UK universities, and an equivalent and growing number of overseas subscriptions, but was still struggling to break even.

By this stage the academic publishing climate was also beginning to change, and JISC was supporting site licences to make e-content freely available to Higher and Further Education (HE/FE) Institutions, including universities and Further Education colleges. In 2006 we agreed with JISC Collections that we would put forward a

three-year plan, renewable for a further three years to continue the transition to Open Access, dependent upon performance over the first period. This comprised immediate purchase of the journal backfile for 1996-2006, making ten years of rich multimedia scholarly content immediately available to the entire UK Higher and Further Education (HE/FE) domains, followed by the introduction of Open Access to issues 22-25, published from 2007-08. The agreement involved a declining subsidy whilst the journal generated a growing proportion of its revenue from publication subventions from research councils, commercial developers, and state funding archaeological agencies. The aim was to allow free access to the growing number of universities which teach Archaeology, but also to encourage use in the FE sector, as well as extending usage of the journal to a much wider range of disciplines (History, History of Art, Creative and Performing Arts, Geography, Biological and Earth Sciences) and making it freely available for its technological and methodological interest to those in Information Science and Librarianship disciplines.

The new model also suited public sponsors of archaeological research, such as English Heritage and Historic Scotland, which had traditionally subsidised the publication of the research results, and the journal negotiated subvention deals to publish the results of some key excavations conducted within the UK over the last ten years. Similarly, in the academic sector, AHRC were promoting electronic dissemination, and the journal was successful in winning one of the AHRC ICT strategy grants, for the LEAP project (see above).

From 2007 *Internet Archaeology* was enabled by JISC to become an Open Access journal for UK HE/FE, although it continued to charge a subscription to overseas institutions and individuals and organisations not based within UK HE/FE. By 2008, 89 institutions had signed up to the JISC licence, a 300 % increase on the 29 UK HE/FE subscribing institutions in 2006. From 2010 we began to publish specific articles for which global Open Access was provided via APCs. The proportion of this content has gradually increased and in 2014 the tipping point was reached. In October 2014 *Internet Archaeology* announced that it was to become a full Gold open access journal. The hybrid phase was concluded and subscriptions will no longer be charged for access to any past and future content. Several things have spurred this decision. Over the last 4 years, the journal has made active efforts in this direction, by switching to a default CC-BY license, by opening up back issues with an annual rolling wall, and by adjusting subscription charges accordingly. During this time, there has also been a marked increase in quality, funded submissions, including several themed issues. By the start of 2014, over 50 % of articles published in the journal were open access, so it was becoming difficult to justify charging for a declining proportion of the journal's content. Other hybrid journals will face a similar dilemma, as the proportion of OA content increases. For commercial publishers this will be particularly challenging as in Archaeology many may have set the level of their APCs as a 'loss leader', at what they think the market will bear, rather than what they would need to recoup to cover all their publication costs, should all their content be OA.

In conclusion, *Internet Archaeology* has always tried to be more than 'just a journal'. It explores the possibilities of the web and has delved into many different publication formats. It has often felt as if we have been 'before our time', and that our publication model would not survive in the harsh publication climate. Nonetheless, being a small operation has meant we could be responsive to changes in the wider scholarly landscape, and has been able to adapt to fast changing times. It will be interesting to see what the next 15 years brings.

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